Leading the Way

Implementing Practical Solutions to the Climate Change Challenge

November 2008

November 7, 2008

We, the members of the 2008 Washington Climate Action Team, convened at the direction of the Governor and the Legislature of the State of Washington by the Departments of Ecology and of Community, Trade and Economic Development, are pleased to present our final report and recommendations, *Leading the Way: Implementing Practical Solutions to the Climate Change Challenge*.

Over the past seven months we have come together to develop these "most promising" strategies and opportunities to help meet the targets established for Washington in ESSHB 2815. These innovative policies and strategic investments build upon the recommendations contained in our 2007 interim report, *Leading the Way on Climate Change: The Challenge of Our Time*, and represent actions that will enable Washington to reduce greenhouse gas emissions, create business opportunities and jobs, and make the transformational shifts necessary to strengthen our economy and secure our future.

Our membership, and that of the Implementation Working Groups whose contributions were invaluable to the success of this effort, represents a broad range of diverse Washington organizations and interests with extensive knowledge and expertise. We contributed to this effort under the common understanding that responsible climate stewardship for present and future generations depends on bold and thoughtful action, both in the immediate future and over the long term, to significantly reduce greenhouse gas emissions. We envision a future and lay out a practical path in which we build and renovate our buildings so they require less energy; we move citizens and goods more efficiently with less pollution; we target investments to create transportation choices and sustainable communities; we produce and use energy more efficiently and with less carbon; we recycle more and waste less; we protect and restore our natural ecological systems, including working farms and forests to be healthier and store carbon more effectively; and our governmental, business, labor, environmental and other interests work together to support entrepreneurial creativity and economic opportunities for all. These recommendations move Washington forcefully and thoughtfully towards this future.

We appreciate the privilege we have been given to serve on the Climate Action Team. We appreciate the contribution in charting this path forward made by the many members of the Implementation Working Groups and state agency staff. We support advancing the recommendations presented here for further consideration, and as individuals and as a team, we will continue to participate constructively in their further refinement and implementation. We strongly urge the Governor and the Legislature to continue to provide leadership and real action in 2009 and beyond to reduce GHG emissions, expand the Green Economy, create green jobs, and reduce reliance upon imported fuels, informed and guided in part by our vision and recommendations. We urge the citizens of Washington to continue contributing towards climate solutions in their everyday choices, and to help realize this hopeful and necessary vision for our collective future.

Sincerely,
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* An addendum letter located in Appendix 7 provides clarification and expansion of PACCAR's position.

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Introduction

As it always has, and yet like never before, our future quality of life depends on the choices we make today. Deliberate, thoughtful and bold action is needed now, and for years to come, to reduce the impacts and costs of climate change while at the same time building a healthier and more prosperous economy. The current global economic situation—and its root causes—reinforce the need for leadership to transform our economy, expand our choices, and protect our environment. Through innovative policies and strategic investments like those recommended here, Washington can continue to meet the challenge of climate change by reducing greenhouse gas (GHG) emissions, creating business opportunities and jobs, and reducing dependence on imported fuels.

This report contains "most promising" strategies and opportunities to reduce GHG emissions affirmed in 2008 by Washington's Climate Action Team (CAT) for consideration by the Governor and the Legislature. Led by its Co-Chairs,[1] the CAT focused its efforts in four areas through Implementation Work Groups (IWGs) — the built environment, transportation, reducing the waste stream, and the role of the State Environmental Policy Act (SEPA) in climate change. The recommended actions build a future in which citizens and goods move more efficiently with less pollution; infrastructure investments and good planning create transportation choices and sustainable communities; buildings are constructed and operated with less energy; energy is produced and used more efficiently and with less carbon; solid waste is reduced and more materials are recycled; natural ecological systems are healthier and store carbon more effectively; the impacts of development on the environment are analyzed to maximize the effectiveness of mitigating climate change and avoid needless litigation; and government, business, labor, and environmental advocates work together to support entrepreneurial creativity and economic opportunities for all.

The 2007 CAT: Articulating the "Comprehensive Climate Approach"

These final recommendations build off the CAT's 2007 interim report, *Leading the Way: A Comprehensive Approach to Reducing Greenhouse Gases in Washington State*.[2] The Washington Departments of Ecology (Ecology) and Community, Trade and Economic Development (CTED) formed the CAT in 2007 to advise the Directors of Ecology and CTED on the full range of policies and strategies that should be considered in order to achieve the goals specified in Executive Order 07-02 by Washington Governor Christine Gregoire in February 2007.[3] The Executive Order established goals for reducing GHG emissions to 1990 levels by 2020 and 50 percent below 1990 levels by 2050; increasing Green Economy jobs to 25,000; and reducing expenditures on fuel imported into the State by 20 percent by 2020.

The CAT, a broad-based group of Washington business, academic, tribal, state and local government, labor, religious, and environmental leaders, worked throughout 2007 to develop a comprehensive set of state-level policy recommendations to meet these goals. The CAT created the "Comprehensive Climate Approach," defining

[1] Juli Wilkerson, Director of Community, Trade and Economic Development, and Jay Manning, Director of the Department of Ecology

[2] www.ecy.wa.gov/climatechange/CATdocs/020708_InterimCATreport_final.pdf

[3] www.governor.wa.gov/execorders/eo_07-02.pdf

12 targeted areas and 45 sets of mitigation strategies encompassing a significant range of policies and programs that Washington could undertake to reduce GHG emissions efficiently and effectively. This Comprehensive Climate Approach, if implemented in a timely manner along with actions already taken by the state, would set Washington upon a path to achieve its goals by 2020, and on a path of declining GHG emissions over the long-term. (Refer to the 2007 interim CAT report for additional information about the CAT, including greater detail behind the CAT's complete suite of recommendations and its "Comprehensive Climate Approach.")

The 2008 CAT: "Most Promising" Climate Strategies and Opportunities to Reduce GHGs

In 2008, the Legislature called for Washington to continue playing a leadership role in addressing climate change. ESSHB 2815, *An Act related to creating a framework to reduce GHG emissions in Washington State*,[4] directed the CAT to continue its work and recommend "most promising actions to reduce emissions of greenhouse gases or otherwise respond to climate change."[5] ESSHB 2815 codified the GHG reduction goals of Executive Order 07-02, and also added a fourth requirement to help achieve the GHG reduction targets: decrease the annual per capita vehicle miles travelled (VMT) 18 percent by 2020, 30 percent by 2035, and 50 percent by 2050.

The 2008 recommendations build off the base of recent actions already taken by state government. These recent actions are expected to make significant contributions toward achieving GHG emission reductions. Key among these actions are the vehicle tailpipe emissions standards enacted by the Legislature in 2005; Initiative 937, which targets conservation and use of clean and renewable energy; several legislative and executive initiatives to promote biofuel production and use; green building and fleet efficiency standards for state buildings; building code enhancements; improved energy efficiency standards for appliances; and renewable energy and energy efficiency requirements established by the federal Energy Independence Act.

The 2008 CAT consisted of those 2007 members interested in continuing to serve on the CAT, and additional members who were identified by Ecology and CTED to meet membership requirements specified in the Executive Order and legislation. Members were appointed to provide specific expertise, and/or to otherwise round out and deepen the membership of the 2008 CAT. The Department of Natural Resources (DNR) continued on the CAT, and the Department of Transportation (WSDOT) and the Department of Agriculture (WSDA) joined the CAT partnership by becoming CAT members, convening workgroups, and dedicating staff and resources to this effort.

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[4] http://apps.leg.wa.gov/documents/billdocs/2007-08/Pdf/Bills/House%20Passed%20Legislature/2815-S2.PL.pdf

[5] The term "most promising" was used by the 2007 CAT to describe a range of potential options to reduce GHG emissions that the CAT identified for further consideration. The Legislature then instructed the CAT to continue its work and to recommend "most promising" strategies. The CAT chose to focus its efforts on the four areas described here. The continued use of "most promising" is not meant to imply that these recommendations were compared to all possible options. Rather, the CAT believes that these are some of the most promising, given that the CAT did not evaluate all potential options against common criteria, and other options that the CAT did not consider may very well be worthy of significant consideration for implementation as well.

Transformational Change is Needed

The CAT has looked for opportunities to encourage the types of systemic transformations needed to develop communities and a Green Economy that are far less carbon-dependent. Many of these recommendations can be sequenced to ensure successful implementation in both the short and long-term. For example, optimizing the solid waste collection system in order to address the "other 50 percent" of the waste stream not currently recycled can accomplish both short-term GHG emission reduction benefits and establish commitments to the longer-term structural shifts necessary to achieve Washington's long-range goals.

Washington must continue its practical focus on doing what is possible now, while changing what is possible to do in the future. For example, Washington can "do what is possible now" in the built environment by revising the existing Washington State Energy Code to achieve greater reductions in energy use through the application of existing remodeling, retrofit and equipment replacement practices; and "change what is possible to do" by establishing a long-term strategy for code revisions that will achieve carbon-neutral buildings by 2030. This approach provides for near-term, achievable advances in energy use, and longer-term technical standards that anticipate and will stimulate development of building requirements and power systems to ensure that future buildings are essentially carbon-emission free.

To accomplish this transformation across all sectors of our society, we must all see ourselves as part of the solution. To effectively address the challenge of climate change requires a true partnership at all levels of government and all sectors of society. Several of these recommendations highlight actions that the Executive Branch and Legislature can take. Coordinated efforts between local, regional, and state government, leadership and partnership with business and non-governmental organizations, and the creativity and contribution of every citizen in Washington will also be required to address these problems effectively. Actions we take to address climate change need to be consistent with and complementary of other policy objectives. Climate change activities should recognize and be designed to reinforce the priorities of local governments to pursue local economic activity, expand transportation choices, and revitalize city centers. Climate policies must also ensure that Washington businesses and our economy thrive. Finally, actions should also drive the behavioral changes that will shift production and consumption patterns towards lifestyles and development that are sustainable into the future.

The CAT has identified a number of tactical approaches that can be used to implement these transformational actions:

- **Leverage existing systems and processes wherever possible to advance climate solutions rather than create new programs or procedures.** Many of the existing ways of "doing business" can be improved to produce significant GHG emissions reductions.
- **Ensure that policy interventions and decision-making are made at the point where they are most efficient and cost-effective.** Strategic action to address climate change should be taken where it can most efficiently and cost-effectively shape governmental, business and consumer choice.
- **Design and structure programs so that direct users and beneficiaries pay for their choices and receive the benefits.** Many of the recommendations are also designed so that the direct users and

beneficiaries pay for their choices; this serves to reduce the net social costs of these strategies while ensuring that any benefits also go to those who pay for the initial investment and/or choice.

- **Reprioritize and develop resources to adequately fund climate solutions.** Accepting the urgency to tackle climate change requires reprioritizing budgets, encouraging investments, developing innovative new finance mechanisms,[6] public/private partnerships, and/or appropriating the funding necessary to stimulate both government and business to respond meaningfully and successfully. Adequate financial resources are necessary to enable local and tribal governments to fulfill the responsibilities associated with these recommendations, since many of these actions require local implementation or site-specific attention to be successful. The state must also be allocated sufficient resources to remain a leader regionally and nationally, and to fulfill its responsibility in implementing these emission reduction strategies.[7]

Furthering the Green Economy Is Critical to Reducing Greenhouse Gases

Significant action to address the current and future impacts of climate change must continue to be an important priority for Washington. The CAT's vision is to continue to move Washington boldly and thoughtfully towards a low-carbon future, emphasizing the economic opportunities that doing so holds for Washington. Implementing these recommendations will develop new industries, transform and improve the competitiveness of existing industries, and enhance job opportunities throughout Washington. This report has been completed as Washington begins to experience the effects of a national and global economic crisis. These economic challenges are the toughest Washington has faced in recent memory, and undoubtedly Washington's leaders and citizens will focus on the immediate need to address our current economic situation. The temptation to delay action on climate change in light of these other challenges is understandable—but in fact, the opportunities associated with responding to climate change remain bright and, if pursued diligently, can create jobs that are vital to both economic recovery and future vitality. Importantly, addressing many of these recommendations will require upfront investments by government and businesses that, even if they result in positive financial returns and GHG emission reductions, may be challenging to obtain in the current financial environment. In challenging economic times, careful selection of priorities and consideration of implementing mechanisms, and sequencing the implementation of these recommendations will allow us to continue to make needed progress toward the targets.

These recommendations build upon the strategic, competitive advantage of Washington by supporting our forests and farmlands, protecting and restoring our natural environment that attracts and retains our citizenry, utilizing our high-tech information industry, and promoting our international trade leadership. They reinforce our tradition of progressive land use and energy efficiency policies. These are precisely the activities we should be pursuing to strengthen our economy. By investing in infrastructure, Washington businesses, higher education, and workforce

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[6] For more information on some of the financing mechanism being considered in Washington, see the Green Economy Strategic Framework in the State's ESSHB 2815 report.

[7] This reaffirms the 2007 CAT "Headline" #12: "Allocate sufficient State resources to maintain Washington's leadership role regionally and nationally and to fulfill its responsibilities for structuring and guiding implementation of emission reduction strategies."

training, Washington can develop the physical and human infrastructure capable of generating innovations in green technology and economic recovery. Therefore, the CAT strongly urges that the Legislature and Governor continue to move forward to address climate change.

Building Compact Communities and Providing Lower-Carbon Transportation Choices is Critical to Reducing Greenhouse Gases

These recommendations emphasize the importance of land use decisions, transportation choices, and development patterns working together to achieve the GHG emission and VMT reduction targets specified in ESSHB 2815. This imperative is apparent within and across a number of the recommended strategies, as well as from recommendations emerging through several other efforts. Land use policies that reduce GHG emissions and VMT also support key infrastructure investments and transportation improvements, which are critical to attract and retain economic development to Washington.

Broadly, these various efforts share the goal of promoting denser development in urban areas. This can be accomplished by encouraging well-planned density/infill, providing housing in close proximity to jobs and services, establishing necessary infrastructure and essential public facilities for a high quality of life, and maximizing access to affordable public transportation and other mobility options. The many benefits to be realized from compact urban development include VMT and GHG emissions reductions, reduced dependence on imported fuel, and increased carbon retention from retaining working farms and from conservation of working forestland.

Several strategies from the Transportation, Energy Efficiency and Green Buildings (EEGB) and SEPA IWGs support climate-oriented land use and development. (For details, see the specific recommendations for each area, below.) Several other recent efforts underway have also addressed key elements of the implications of land use and development patterns on climate, and have recommended measures that shape these policies and investments to advance climate-oriented goals. This includes both the Agriculture Carbon Market Workgroup and the Forest Carbon Market Workgroup chartered under the direction of ESSHB 2815 (for more information, see the state's final ESSHB 2815 report), which have developed recommendations on avoiding conversions of farm and forest land. CTED's Land Use and Climate Change Advisory Committee (LUCC), chartered under ESSB 6580,[8] is recommending a number of actions that will emphasize planning for and supporting compact urban development, multi-modal transportation and avoiding land conversion through use of tools such as Transfer Development Rights (TDRs). The work of CTED's TDR Policy Advisory Committee[9] to develop a central Puget Sound TDR program is also contributing ideas on how to accomplish this.

The objectives of these various strategies and recommendations resonate across and reinforce a number of other significant public policy initiatives in Washington, such as the Puget Sound Partnership (PSP), a community effort of citizens, governments, tribes, scientists and businesses working together to restore and protect Puget Sound. In

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[8] For more information, see the State's final report for ESSB 6580, *An Act relating to mitigation the impacts of climate change through the growth management act*. The full text of ESSB 6580 is available at http://apps.leg.wa.gov/documents/billdocs/2007-08/Pdf/Bills/Senate%20Passed%20Legislature/6580-S.PL.pdf.

[9] Under RCW 43.362.020, CTED has sponsored a process to develop a regional TDR program that comports with chapter 36.70A RCW. More information is available at http://apps.leg.wa.gov/rcw/supdefault.aspx?cite=43.362.020

working towards a clean and healthy Puget Sound ecosystem and a thriving Puget Sound economy, the Puget Sound Partnership has identified current land use patterns as a significant stressor on the Puget Sound, and the needs to build denser, livable communities; stop conversion of working forests and farms; and protect and restore natural ecological systems as critical elements for restoring Puget Sound. The PSP's land use-related recommendations that are emerging from its process are consistent with the recommendations from the CAT concerning transportation choices and the use of SEPA to promote well-planned urban development.

Many CAT members have been active participants in these other efforts, and the CAT as a whole is cognizant of their range. The CAT believes that the recommendations and decisions coming from these other efforts also represent opportunities to reduce climate impacts and reinforce many of the CAT's own recommendations in these crucial areas. The CAT recommends that the state recognize the importance of incorporating climate considerations into land use planning, development patterns, and transportation-related decisions, and believes that the state should integrate the results from these efforts into a cogent policy framework capable of promoting effective, coordinated and focused action to accomplish this critical objective.

GHG Targets Combined with Market Incentives Are Critical For the Success of the Comprehensive Climate Approach

Two objectives are key to achieving the state's goals for GHG emission reductions: 1) a binding GHG emissions limit, and 2) alignment of market incentives to support achieving that limit. The Legislature and the Governor, in passing and signing ESSHB 2815, established a firm public policy commitment to achieve significant reductions in GHG emissions. In order to meet the 2020 targets and achieve the longer-term GHG emission reduction targets, a "centerpiece" market-based policy—for example, a cap and trade system as described below—must be aligned with these limits to deliver cost-effective solutions and drive the broad structural changes needed to achieve a flourishing low-carbon economy. The sector-specific "most promising" policies recommended here can complement, but cannot supplant, this centerpiece policy; but they alone cannot (and are not intended to) achieve the longer-term goals in the absence of this market signal. Market alignment with GHG reduction targets is crucial to help guide the untold number of everyday decisions that will reduce carbon and stimulate the investments and innovations needed to transform the economy over the long term. The exact mix of policies, investments, inventions, and behavioral choices needed to achieve Washington's 2050 target is impossible to predict today. However, market mechanisms can incorporate the goal of significantly reduced GHG emissions into all of our economic decisions, and support the most efficient way of getting there.

In 2007, the CAT called for Washington to **"build market-based mechanisms to unleash investment in the creativity and innovation of Washington's economy to deliver cost-effective emission reductions"** (Headline #1). The CAT also called for the state to "continue to participate and provide leadership in the Western Climate Initiative (WCI) and emerging national efforts to develop market mechanisms". Over the course of 2008, the CAT has kept abreast on the developments of the WCI, which released its design recommendations for a regional cap and trade program in September 2008. The CAT applauds the efforts and leadership of the state in the development of the WCI design. This path-breaking achievement demonstrates the capacity of highly diverse states and provinces to work collaboratively and develop a market mechanism that enables each jurisdiction to meet its emission reduction goals, lower costs, and address its unique circumstances. Washington should continue to participate and provide leadership in WCI and other regional and national efforts to address climate change

through market mechanisms and other means. By actively participating in these broader dialogues, the state will be able to ensure that Washington's interests are recognized and more effectively influence the development of any federal climate policy.

The CAT believes that some key principles should be observed when designing a market-based approach to drive reductions of GHG emissions:

- **The approach must be effective in reducing GHG emissions at a pace and depth commensurate with achieving the state's climate goals.**
- **The reductions should be accomplished in a manner that minimizes costs as much as possible.**
- **Sufficient market oversight should be provided to prevent market manipulation.**
- **The approach should recognize Washington's competitive strengths, avoid leakage of emissions or jobs, and minimize impacts to Washington citizens, especially low-income residents.**

As the Legislature evaluates whether continued participation in the further development of WCI is in Washington's best interest, various individual members of the CAT, but not the CAT as a whole, have expressed the following considerations for potential design performance:

- Establishing an economy-wide approach to reducing GHG emissions;
- Encompass a geographic and economic market broad enough to be viable;
- Create linkages with other existing trading systems;
- Enhance the ability to influence the development of, and eventually connect with, future national or international systems;
- Utilize verified offsets and other design features to reduce the costs of compliance for emitters and for the state as a whole;
- Invest any generated revenue in efforts that reinforce GHG emission reductions without impeding the ability for entities with compliance obligations to make the investments needed to reduce their own GHG emissions;
- Ensure sufficient returns to the private sector to serve as a catalyst for investment in low carbon technologies; and
- Result in significant GHG emission reductions within the covered sectors of the economy by the year 2020.

The CAT as a whole has not developed a collective opinion on whether or not WCI as currently designed accomplishes these and other design considerations. Many key implementation decisions still lie ahead, both for the WCI as a whole and for the state on aspects for which the state has discretion. The CAT believes that other approaches, such as a tax on carbon, may also be capable of aligning the economy to stimulate meaningful GHG reductions by 2020, and the state should be open to them should it decide that continued participation in the development of WCI is not warranted. In deciding if such other mechanisms are feasible, the CAT recommends

that consideration be given to whether the approach will actually ensure meaningful GHG reductions; what other states or political jurisdictions, if any, would need to participate so as not to diminish Washington's economic competitiveness; and how such an approach would be distributed throughout Washington's economy and upon its citizens.

The CAT is concerned that if a centerpiece approach to align the market in order to drive GHG emission reductions is not soon available in Washington, then significantly more intensive regulatory policies or public subsidies will become necessary to ensure that Washington can meet its GHG emission reduction targets. The CAT believes that such an approach may be less efficient in achieving the necessary GHG emission reductions.

Local Governments Have a Critical Role in Reducing GHG Emissions and Will Need State Support

Many of the recommendations will need some form of Legislative authorization. Several of the recommended changes to state law are needed in order to enable local governments to play a vital role in implementing the recommendations, duties which many local governments are eager to perform. It is essential that the state provide sufficient technical and financial support for the cities and counties of Washington to participate successfully in implementation. Almost all of the recommendations contain a vibrant and crucial role for local government leadership and engagement. For example, expanding the municipal collection services to collect more recyclables is crucial to meeting the goal of recycling 80 percent of Washington's overall solid waste stream by 2020. Likewise, linking transportation choices, including reliable transit options, with land use planning to create compact livable communities, will be accomplished in large part by local governments. Even amending the energy code to create more energy-efficient buildings means local government building departments will need training and resources to support implementation of this new code. Opportunities to make progress in reducing GHG emissions should not be missed because of "unfunded mandates." State recognition of and support for the important front-line role local governments play in reducing GHG emissions is essential if Washington is to reach its targets in 2020 and beyond.

"Most Promising" Actions to Reduce GHGs

The recommendations contained in this report have been developed by IWGs under the direction of the CAT (see Appendix 1 for a list of IWG members). The CAT affirms them as "most promising" strategies and opportunities within specific areas to move forward for consideration by the Legislature and Governor in 2009 and beyond to help meet the targets. If enacted, these recommendations can enable significant reduction of GHG emissions and per capita VMT, result in transformational shifts and strengthen Washington's economy.

The IWGs focused on a small number of strategic opportunities within specific areas whose implementation could contribute significantly towards reducing GHG emissions. The topics and goals for the four IWGs were initially identified by the CAT Co-Chairs, based on a review of the comprehensive 2007 CAT recommendations and the direction coming from the 2008 Legislature, and considered and affirmed by the CAT as the focus of work for 2008. The basic goals of each IWG were as follows:

	Energy Efficiency and Green Buildings
	The goal of the Energy Efficiency and Green Buildings (EEGB) IWG was to achieve significant GHG emission reductions in Washington's built environment both directly through reduced use of carbon-based energy as well as indirectly by reducing the use of GHG-intensive products. This IWG also aimed to strengthen the energy efficiency and green building sectors and thus contribute directly to the Green Economy job goals articulated in Executive Order 07-02.
	Transportation
	The goal of the Transportation IWG was to make recommendations to achieve significant reductions in transportation-related GHG emissions—which account for nearly half of total emissions in Washington—and to recommend tools and best practices to achieve the VMT reduction goals enacted in ESSHB 2815.
	Beyond Waste
	The goal of the Beyond Waste IWG was to significantly expand source reduction, reuse, recycling, and composting, and to build on what is best and most successful in the current waste management system by targeting products and organic materials with the largest GHG emission reduction potential. This IWG focused on both reducing the amount of waste that Washingtonians produce and increasing the portion of recycled material that is otherwise discarded.
	State Environmental Policy Act (SEPA)
	The goal of the SEPA IWG was to ensure that consideration of climate change is included in the SEPA processes and guidance in a clear and straightforward manner that minimizes lawsuits over this issue and contributes to understanding and mitigating GHG emissions resulting from activities covered under SEPA. This IWG focused on developing recommendations that clarify how, where, and when to best address climate change in state and local governments' SEPA processes and decisions.

The range of expertise and number of interests involved in the IWGs was considerable. The members' commitment contributed to the depth and detail in the strategies that the various IWGs were able to accomplish in a very short period of time. The IWGs were comprised of individual CAT members, and other experts and interests appointed by Ecology, CTED and WSDOT as needed to perform the tasks required. Over 100 people participated in this work as members of the IWGs, and included representatives from tribal and local governments, builders and developers, faith-based organizations, environmental advocates, lawyers, haulers and recyclers, auto dealers, engineers, and transit and bicycle advocates, among others. Each IWG and their co-leads accomplished a tremendous amount of valuable work, and these recommendations are the product of IWG members' dedication and hard work.

Over the course of the IWG's deliberations, the CAT provided input, suggested needed analysis, and affirmed that the IWG's final recommendations should be considered by the Legislature and Governor. The CAT believes that these recommendations are consistent with its vision and, if properly implemented, can bring about the transformational change that will significantly reduce GHG emissions in Washington. The CAT believes these recommendations should continue to move forward, and once ready, be implemented. Some of these recommendations may be ready to be implemented by the Executive Branch now while others may need authorization and/or funding from the Legislature. Some are accompanied by draft statutory language while others are more conceptual in nature. In either case, additional effort may be necessary to fully prepare them for implementation. Some reflect how to impact specific programs right here and now while others identify broader

Recommendations

Energy Efficiency/Green Buildings

1. Establish incentive-based approaches to encourage energy efficiency.
2. Upgrade the energy efficiency and develop and implement energy benchmarking and performance disclosure in existing, new, and renovated buildings.
3. Revise the Washgington State Energy Code and establish 2030 Building Goals

Transportation

1. Expand and enhance transit, rideshare, and commuter choice.
2. Encourage compact and transit oriented development
3. Use GHG/VMT as criteria for funding and pursue new revenue sources to support transportation choices.
4. Use transportation pricing to reduce per capita VMT and GHG emissions, raise revenue, and manage the system for better efficiency and reliability.
5. Pursue additional non-VMT actions to reduce GHG emissions from the transportation sector, including rail use, diesel engine improvements, transportation systems management, plug-in hybrid and electric vehicles, and a low-carbon fuel standard.

Beyond Waste

1. Optimize the collection of recycled materials.
2. Establish a product stewardship framework.
3. Develop markets for diverted organics.
4. Evaluate and recommend environmentally responsible purchasing policies for government.
5. Collaborate with retailers to reduce consumer waste.

SEPA

1. Revise the SEPA checklist and provide clear guidance for evaluating GHG emissions.
2. Regularly update and distribute reference materials, and coordinate to achieve consistency in Statewide tools use.
3. Develop and/or identify emissions tools.
4. Allow use of qualitative analysis in some cases.
5. Develop guidance on the effectiveness of mitigation options.
6. Develop an approach to threshold determination.
7. Conduct further work and analysis on approaches for using SEPA-related incentives or disincentives to promote "climate-friendly" development.
8. Revise the SEPA checklist to incorporate analysis of future vulnerabilities.
9. Take into account lead agency resources, capacity and constraints.
10. Provide training and funding for lead agencies and applicants.
11. Establish an advisory committee to address future work.

policy changes that surely will engender further discussion and debate beyond the CAT. As any of these recommendations move toward implementation, there will inevitably and appropriately be "give and take" on the best way to accomplish the desired outcomes. Therefore, the CAT's affirmation of these recommendations should not be seen as an endorsement of whatever subsequent future implementation-related discussions occur on any particular recommendation. The CAT and its individual members look forward to this "give and take," and are willing to work on the next steps needed to implement these recommendations.

The following recommendations will contribute towards meeting Washington's GHG emission and VMT reduction targets as established in ESSHB 2815. The recommendations also further develop and reinforce most of the 12 directional recommendations from the CAT's 2007 interim report. The directional statements, called "Headlines" in the 2007 report, articulated the path which the state should take to meet its GHG emission goals. The 2008 CAT recommendations relate specifically to the ways that the 2007 CAT "Headlines" can be pursued. An introductory context for each specific area examined by the IWGs is first provided below, followed by high-level summaries of the specific recommendations from each IWG. The full details of the recommendations are contained in the IWG reports, appended to this report.

Energy Efficiency and Green Buildings: Short- and Long-Term Efficiency Improvements to the Built Environment

Given the long-lived nature of the built environment, building and community design decisions will have a profound impact on Washington's ability to meet its longer-term emission reduction targets. By 2030, new buildings constructed in the preceding two decades will account for 20 to 25 percent of the commercial building floor area and will account for more than 20 percent of the housing units. Over the same 20-year period, it is expected that most existing buildings will undergo some level of renovation, install new equipment, and will add or replace many energy-using devices. In developing policies to increase the energy efficiency of new and existing buildings, the EEGB IWG has developed a set of policies that also aims to strengthen energy efficiency and green building industries, as well as to contribute to the Green Economy job goals articulated in the Governor's Climate Change Challenge.

The EEGB IWG has developed a set of actions incorporating both near-term opportunities to increase building energy efficiency and long-term strategies to further develop Washington's ability to meet emission reduction goals. Near-term strategies include an upgrade to the building energy code to achieve a 30-percent reduction in energy use (EEGB Recommendation 3, part 1) and strengthening current high-performance public buildings legislation to extend the green building standards for the public sector (EEGB Recommendation 2A). The EEGB IWG has developed draft legislation designed to establish incentive-based approaches to motivate and accelerate the design, construction, and annual operation of buildings to levels of superior energy performance (EEGB Recommendation 1A), to encourage the incorporation of Combined Heat and Power (CHP), distributed electricity generation, and other distributed and district energy systems, including district heating and cooling (EEGB Recommendation 1B), and to develop and implement energy benchmark public disclosure requirements for private non-residential and residential buildings at time of sale or at time of lease (EEGB Recommendation 2B). Over the long-term the EEGB IWG has proposed legislative action to develop and implement a state building efficiency and carbon reduction strategy to guide the continued improvement of the energy performance of the state's building stock over the longer-term (EEGB Recommendation 3, part 2).

The recommendations developed by the EEGB IWG are consistent with and incorporate the goals of the Climate Advisory Team's 2007 Report Headline #8, ***Design, build, upgrade, and operate new and existing buildings and equipment to maximize energy efficiency***, and also, especially through the longer-term goals associated with Recommendations 2 and 3, incorporate elements of the Climate Advisory Team's Headline #9, ***Deliver energy from lower or non-carbon sources and more efficient use of fuels***.

These recommendations focus on achieving reductions in carbon emissions through increased energy efficiency of new and existing buildings in the private and public sector. Recommended standards for green buildings link to climate change actions taken in the Transportation and Beyond Waste areas, through increasing transportation options to buildings, as well as directing CTED to incorporate embodied energy criteria in standards used to establish eligibility under incentive programs.

The recommended EEGB actions are summarized below. Please see the full EEGB IWG report in Appendix 3 for additional detail on these recommendations.

EEGB RECOMMENDATION 1: ENERGY EFFICIENCY INCENTIVES

This recommendation calls for legislation to establish incentive-based approaches to motivate and accelerate the design, construction, and annual operation of buildings to levels of superior energy performance (Recommendation 1A), and to encourage the incorporation of combined heat and power, distributed electricity generation, and other distributed and district energy and water systems, including district heating and cooling (Recommendation 1B). This approach would reward actual demonstrated energy performance with tax credits.

1A: ENERGY EFFICIENCY QUALITY INVESTMENT PROGRAM (EEQUIP)

Near-term high priority legislative concepts for this recommendation include:

1. Public Utility Tax (PUT) credits for non-residential buildings that meet specific levels of energy performance based on actual utility data, with 50 percent of the PUT credit supplied by the utilities serving the building.
2. A modification of statutory language related to Local Improvement Districts (LID) that adds energy efficiency as a qualifying activity.

Other most promising future legislative concepts for this recommendation include:

1. Partial sales tax refunds for new non-residential buildings that achieve energy performance standards equivalent to an ENERGY STAR Target Finder rating of 90.
2. Partial sales tax refunds for new and existing residential buildings that meet a level of energy performance equivalent to an ENERGY STAR Northwest-rated home.

The concepts incorporated into this recommendation are designed to work with familiar and accessible programs of merit (e.g., LEED, ENERGY STAR, Built Green, or other verifiable third-party or independent certifications) that have gained widespread acceptance. In addition, standards to qualify for incentives become increasingly stringent over time, so as to drive the market in Washington toward progressively more energy-efficiency building design, construction, and operation.

1B: EXPANDED IMPLEMENTATION OF DISTRIBUTED ENERGY AND WATER, COMBINED HEAT AND POWER (CHP) AND RENEWABLE ENERGY

Complementary to Recommendation 1A, this recommendation offers tax incentives to encourage the development and use of CHP and other distributed energy systems potentially including B&O (business and operations) Tax credits, Public Utility Tax credits for buildings and industries that use CHP/distributed energy systems, sales tax exemptions on machinery and equipment used in CHP/distributed energy systems, and property tax exemptions for distributed energy and water systems. In the short- term, sales tax exemptions on purchases of equipment used in distributed energy and water systems—consistent with the existing manufacturing and retail sales tax and use exemptions (which include exemptions for CHP systems used in manufacturing)—will be the most straightforward to implement. This recommendation also includes:

- Efficiency requirements for CHP systems.

- Similar eligibility criteria for incentives for other distributed energy systems based upon the effectiveness of the system and incentive models established for CHP.
- For district water projects, baseline fractional water demand reduction to receive incentives, with a tiered approach so that progressively higher percentage reductions qualify for higher incentives.
- Addressing barriers to implementation of distributed energy systems, including barriers to interconnection with the electricity grid, issues associated with dispatching of generation resources, split incentives between project owners and tenants, and issues associated with compliance with local and state regulations.

Impacts on Goals

These legislative concepts are designed to use incentive-based approaches to motivate and accelerate the design, construction, and annual operation of buildings to levels of superior energy performance. The reward through tax credits for actual demonstrated energy performance is innovative and critically important to achieving the Washington's overall GHG reduction and quality job creation goals, outlined in Executive Order 07-02. Overall this recommendation (components 1A and 1B together), implemented at the levels of revenue impacts shown below, is estimated to provide a net reduction in GHG emissions of 1.1 million metric tons of carbon dioxide equivalents ($MMTCO_2e$) annually by 2020.

Additional Benefits

In addition to reductions in GHG emissions, building energy efficiency improvements and the implementation of CHP and distributed/district energy systems also reduce (in most cases) the emissions of non-GHG air pollutants; can result in reduced water use; and can increase the use of in-state renewable fuels while reducing the consumption of imported fossil fuels. District energy systems can also play a role in promoting compact development to reduce transportation requirements.

Costs

Preliminary estimates of revenue impacts include:

- Priority proposal: $750,000 for PUT refund with participation of 28 million sq. ft. of commercial property.
- Future legislative proposals: $1.9 million for sales tax refunds for non-residential new construction (by 2012), between $5-10 million per year for sales tax refund for existing and new residential buildings, and $1-1.5 million per year for sales tax refunds for distributed energy systems.

Overall, this recommendation implemented at the levels of revenue impacts shown here, is estimated to provide a cumulative net savings to the people of Washington of $184 million dollars (2006 dollars) between 2009 and 2020, on a net present value basis.

Other Impacts

Utility cost sharing of the PUT credit element of this recommendation provides opportunities for utilities to meet I-937 targets, while reducing the burden of this action on state revenues.

Relationship to Other Efforts

Renewable generation included in this recommendation may count toward the renewable electricity mandates of I-937. Similarly, energy efficiency gains through this action will serve to reduce the absolute amount of additional renewable energy-based electricity generation required under the renewable electricity mandates of I-937.

EEGB RECOMMENDATION 2: ENERGY EFFICIENCY, ENERGY BENCHMARKING, AND ENERGY PERFORMANCE DISCLOSURE IN EXISTING, NEW, AND RENOVATED BUILDINGS

2A: ENERGY EFFICIENCY IN EXISTING, NEW, AND RENOVATED PUBLIC BUILDINGS

Legislative action is recommended to substantially upgrade the energy efficiency and sustainability of publicly-constructed and operated buildings, including both new and existing buildings. Key elements of the proposed legislation, which has different provisions for state agencies, colleges, universities, and school districts and for cities, counties, and other taxing authorities, would include the following.

1. Require a process of benchmarking, auditing, and implementation of energy-efficiency measures in existing publicly-constructed and operated buildings, with energy-efficiency requirements becoming more stringent over time in a tiered/phased approach.[10]
2. Require that new and substantially renovated publicly-constructed and operated buildings meet strict energy performance standards; again with energy-efficiency requirements becoming more stringent over time in a tiered/phased approach.
3. Emphasize education and promotion as critical components to the success of the program.
4. Implementation will leverage the use of existing programs and funding in state and local governments.
5. Partnering with US EPA's ENERGY STAR program is a critical element and has been initiated.

2B: ENERGY BENCHMARKING AND ENERGY PERFORMANCE DISCLOSURE IN PRIVATE BUILDINGS

Develop and implement energy benchmark (e.g., energy use/square foot) public disclosure requirements for private non-residential and residential buildings at time of sale or, in some circumstances, at time of lease. To inform potential building buyers and users, a system of Energy Performance Certificates (EPCs) should be developed and implemented in Washington.

Impacts on Goals

Recommendation 2A is estimated to provide a net reduction in GHG emissions of 1.2 $MMTCO_2e$ annually by the year 2020,[11] and will contribute substantially to growth in green jobs in Washington. Recommendation 2B is

[10] Many of the tiering and phasing approaches in this and other recommendations include applying requirements to larger buildings first, including smaller buildings over time, and gradually increasing the stringency of the design and performance criteria. This allows the public sector to gain implementation experience, take advantage of future technology improvements, and have a clear planning schedule.

expected to contribute to energy savings and emission reductions through better-informed building management; however no direct emission reductions are attributed or quantified for this action. Both recommendations will contribute substantially to growth in green jobs in Washington.

Additional Benefits

With the 2005 passage of Chapter 39.35D RCW High-performance public buildings, Washington stepped forward as a national leader in public sector green building projects. As the mandate has seen implementation, areas that can increase the energy-conserving attributes of these buildings have become known. This proposal aims at increasing the strength of the legislation as it currently exists, ensuring that green public buildings are operated and maintained in such as way as to meet the energy goals of the projects, and setting the stage to address issues related to embodied energy as focus shifts to building products.

Because this proposal builds on existing legislation that has seen success, it is primarily a revision to a statute with agency and public momentum. This proposal will ensure that public buildings (new and renovated) prioritize energy efficiency credits offered in green building standards and will help to build the market for regionally produced green building materials, as well as green building services.

In Recommendation 2A, expenditures by state and local governments are expected to be more than made up for through savings in energy costs by government entities, thus reducing the overall costs of government for years to come, and setting a positive example for the private sector. In addition, this action will result in better built and operated government buildings that require less maintenance over time. Through its impacts on energy use, this action will reduce emissions of local and regional environmental pollutants, reduce water use, and promote the use of in-state sources of renewable energy.

Recommendation 2B will provide several benefits, including allowing measurement of the carbon impact of new and existing housing stock, providing a valuable guide to consumers, linking public-purpose incentives to higher performing EPC scores, stimulating technology investment in smart technologies and materials that improve EPC scores, promoting green collar job development in the building trades, and enabling prospective rental tenants to know ahead of time the likely size of their utility bills based on the availability of the EPC,

Costs

Existing programs will be utilized as much as possible—to implement Recommendation 2A, however, it is recommended that a professional-level staff member be provided to each of the following agencies: Ecology (for local governments), Department of General Administration (for state agencies, colleges and universities), and Office of the Superintendent of Pubic Instruction (for K-12 Schools). This is needed to implement these efforts across all public sector entities. Overall, this recommendation is estimated to provide a net savings to the people of Washington of $222 million dollars (2006 dollars) between 2009 and 2020, on a cumulative net present value basis.

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[11] Note that achieving this level of savings will require that a substantial percentage of existing public buildings in Washington receive significant efficiency upgrades each year and that each new building covered by this action be built to very high standards of energy efficiency. Doing so will require a comprehensive and sustained effort on the part of public entities in Washington, as well as the building industry, to provide the human capacity to carry out these improvements, and, though efficient buildings will ultimately result in significant cost savings, to provide initial financing that is sufficient to ensure that improvements can be undertaken.

For Recommendation 2B, no substantial state revenue effects are anticipated for EPCs for private non-residential and large multi-family residential buildings or for single-family and small multi-family residential buildings. However, some fiscal impacts to the state would occur in three areas for single-family and small multi-family residential buildings: covering the EPC audit cost, administrative costs of archiving EPC data in a registry, and providing training to boost the EPC delivery infrastructure.

Other Impacts

Resources available at the state level to support local and regional government efforts in improving building energy efficiency will need to be expanded in order to meet the demands of programs implemented under this recommendation. Considerations related to how requirements for private building point-of-sale or point-of-lease EPC requirements are structured, including (but not limited to) how energy efficiency performance of a building (and thus qualification for EPC) may be affected by tenant behavior, suggest that Recommendation 2B will need to be carefully designed and implemented with input from appropriate stakeholders.

Relationship to Other Efforts

Renewable generation included in this recommendation may count toward the renewable electricity mandates of I-937. Similarly, energy efficiency gains through this action will serve to reduce the absolute amount of additional renewable energy-based electricity generation required under the renewable electricity mandates of I-937.

EEGB RECOMMENDATION 3: STATE ENERGY CODE IMPROVEMENTS AND ESTABLISHMENT OF 2030 BUILDING GOALS

This recommendation includes two major elements: a revision to the Washington State Energy Code (WSEC) to achieve a 30 percent reduction in new building energy use relative to the 2007 edition of the WSEC and a long-term state building efficiency and carbon reduction strategy.

1. In the 2009 Washington State Building Code adoption cycle, revise the Washington State Energy Code (WSEC) to achieve a 30 percent reduction in new building energy use compared to the 2007 edition of the WSEC. In addition: provide substantial efficiency advances in the code as it applies to remodeling, retrofit and equipment replacement; specify a process of periodic review and improvement of building energy codes; consider the impacts of codes on the availability of incentives through utility demand-side management programs; and provide education and technical assistance in the implementation of updated codes.

2. Legislative action is recommended to provide policy direction in the development and implementation of a long-term state building efficiency and carbon reduction strategy. Legislation would direct CTED to develop a state strategy for building energy efficiency and carbon reduction in 2010, which would include establishing specific targets for building energy use intensity and targets for new buildings similar to the Architecture 2030 Challenge schedule. This strategy would examine several implementation methods, including state codes and appliance standards, emerging technologies, user incentives, education and technical assistance, and measurement. It is recommended that the strategy be updated every three years prior to the routine state building code review development and adoption process.

Impacts on Goals

This recommendation is estimated to provide a net reduction in GHG emissions of 6.4 $MMTCO_2e$ annually by 2020. By setting out a long-term strategy to produce buildings that are highly energy-efficient and to use renewable resources to meet their energy needs, this recommendation will contribute substantially to growth in green jobs in Washington. Note, however, that the targets of this recommendation, both in terms of the fraction of buildings included and the energy savings targets per building unit are, as in Recommendation 2, achievable but quite aggressive. Meeting these targets will require commitments and sustained, well-coordinated efforts on many fronts from both government and the private sector.

Additional Benefits

Through this action, expenditures by building owners and developers are expected to be more than made up for by savings in energy costs to building owners and tenants, thus reducing the overall costs of building operations for years to come. This will increase the value of the new and existing buildings covered by this recommendation. In addition, implementing this strategy will result in better built and operated buildings that require less maintenance over time. Through its impacts on energy use, this action will reduce emissions of local and regional environmental air pollutants (in addition to GHG emissions), reduce water use, and promote the use of in-state sources of renewable energy.

Costs

Some additional costs will be required at the local government levels for compliance and enforcement of new building codes, and at the state level for support of local jurisdictions in enforcing codes and in preparation of the state building efficiency and carbon reduction strategy. Additional outlays will be required to develop and provide education/training programs needed to support code officials, architects/engineers, builders, and others in compliance with revised building energy codes. Overall, this recommendation is estimated to provide a net savings to the people of Washington of $841 million dollars (2006 dollars) between 2009 and 2020, on a net present value basis.

Relationship to Other Efforts

Renewable generation included in this recommendation may count toward the renewable electricity mandates of I-937. Similarly, energy efficiency gains through this action will serve to reduce the absolute amount of additional renewable energy-based electricity generation required under the renewable electricity mandates of I-937, and efficiency measures implemented in existing buildings as a result of this recommendation will likely overlap with efficiency measures implemented under I-937 to some degree.

Transportation: Reducing GHG Emissions and Increasing Transportation Choices for the Future

Emissions from transportation-related activities account for nearly half of the total GHG emissions in Washington. Achieving significant reductions in transportation-related GHG emissions is critical for Washington and it will require meeting its short and long-term vehicle miles traveled (VMT)[12] benchmarks.

At the same time, there is a transportation funding crisis in Washington that requires urgent action. The challenge facing the state is implementing appropriate strategies to reach Washington's GHG emission reductions and VMT reduction benchmarks while addressing the impacts of the current revenue shortage on state and local transportation infrastructure and operating expenses and on the ability of transit agencies to provide appropriate levels of service. This challenge is compounded by the paradox that transportation funding is dependent on the gas tax; as the state achieves progress in reducing the amount of miles traveled, the funding available to provide appropriate levels and quality of transportation service will further diminish.

In light of this challenge, the Transportation IWG recognized an opportunity to reconceptualize transportation in Washington. The IWG was formed under the CAT to address the ESSHB 2815 requirements regarding "most promising" GHG reduction strategies and VMT reduction strategies for transportation. To work towards collaborative solutions, the Washington State Department of Transportation (WSDOT) combined its responsibilities in Section 8 of ESSHB 2815 with the CAT effort, expanding the charge to the Transportation IWG to include recommended tools and best practices to achieve the VMT-reduction benchmarks.

The recommendations of the Transportation IWG were developed using a consensus process, and are intended to meet WSDOT's requirement to report back to the Legislature based on the direction of ESSHB 2815. Through these recommendations, the Transportation IWG seeks to move Washington towards a future travel environment where citizens can choose public transportation,[13] walking, bicycling, or ridesharing for their daily activities; a future transportation system that supports transportation choices that are environmentally-friendly, easier to use, more reliable, safer, and less expensive for the user than the current system; and future funding decisions that support and encourage reductions in GHG and VMT further Washington's economic competitiveness and minimize expenditures on imported fuels. The ultimate goal is to build, operate and maintain a transportation infrastructure that is efficient and effective at moving people and goods. To achieve this vision, Washington must reexamine how investments in transportation infrastructure and services are made at all levels of government. Washington State should make funding decisions and pursue revenue-generating strategies that stimulate behaviors that support climate change solutions and that discourage behaviors that contribute to the problem.

The Transportation IWG is proposing short- and long-term VMT and GHG reduction strategies that must be implemented immediately and coordinated to account for long-term changes in behavior. A portfolio of strategies

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[12] As referred to in ESSHB 2815, vehicle miles traveled (VMT) is the number of miles that vehicles less than 10,000lbs are driven. VMT is a surrogate for GHG emissions from the transportation sector. Reducing VMT per person reduces emissions and improves the overall efficiency of the transportation system.

[13] The term "public transportation" in this document refers to all non-single occupancy vehicle transportation options. "Transit" refers specifically to motor bus services, unless otherwise indicated. "Ridesharing" refers to carpool and vanpool services.

is needed that evolves over time as the transportation infrastructure becomes available and as demand shifts, with strategies tailored to meet different types of users. Recognizing different user types (e.g., residents of large urban, small urban, and rural areas) in the design and timing of strategies is an important component of maximizing their effectiveness. Several of the strategies to reduce VMT are designed for implementation where the VMT reduction potential is greatest, such as those parts of Washington that are more densely populated (e.g., the Puget Sound region).

To reduce VMT, with the ultimate goal of reducing GHG emissions, the Transportation IWG is recommending a package of strategies that fall into three broad categories of VMT reduction activities, but which are synergistically more beneficial when integrated and implemented in conjunction with each other:

- **Transit, Ridesharing, and Commuter Choice Programs**, including recommendations to expand and enhance current programs to increase viable transportation options available to Washington residents to conduct the activities, trips, and travel needed and desired for daily life.
- **Compact and Transit Oriented Development (CTOD) and Bicycle and Pedestrian Accessibility** that supports the development of compact walking, bicycling, and public transportation-friendly communities and to increase the travel choices available.
- **Transportation Funding and Pricing Strategies** that identify and create potential pricing mechanisms to support and incentivize GHG and VMT reductions, and stress key considerations for revenue use to support transportation infrastructure maintenance and operations.

Given the need for a scalable multi-pronged approach to address the climate impacts of the transportation sector, the Transportation IWG has also defined and advanced specific non-VMT transportation policy proposals, including recommendations related to freight railroads; diesel engine emission reductions and fuel efficiency; vehicle electrification; and a low carbon fuel standard.

The recommendations from the Transportation IWG further advance several of the strategies recommended by the CAT in 2007 and build upon steps already taken by WSDOT and regional and local planning organizations. These recommendations are consistent with the 2007 CAT headlines for VMT reductions (Headline 5: ***Build and continue to redesign communities that offer real and reliable alternatives to single occupancy vehicles***), cleaner vehicles and fuels (Headline 6: ***Ensure Washington has vehicles that are as efficient as possible and use non-carbon or lower carbon intensity fuels developed sustainably from regional resources***) and investing differently in transportation infrastructure in order to move people and goods, and not just cars, as efficiently and effectively as possible (Headline 7: ***Focus investments in Washington's transportation infrastructure to prioritize moving people and goods cleanly and efficiently***).

The recommendations from the Transportation IWG, and specific proposed actions, are summarized below. For additional detail on these recommendations and other ideas, as well as the background materials developed by the Transportation IWG, see the full report in Appendix 4.

TRANSPORTATION RECOMMENDATION 1: EXPANDING AND ENHANCING TRANSIT, RIDESHARE, AND COMMUTER CHOICE

This recommendation consists of three programs to expand and enhance transit, rideshare, and commuter choice: implementation of a Washington State Transportation Access Network; enhancements to urban Commute Trip Reduction (CTR) and rideshare programs; and implementation of a Statewide Residential Trip Reduction[14] program. To maximize their effectiveness, the design and timing of these three programs must be tailored to meet the demands of three different types of users: Large Urban, Small Urban, and Rural. Reducing per capita VMT will be most achievable in denser areas of the state that have land use and development patterns which support bicycling, walking and public transportation use, and also have a higher proportion of statewide per capita VMT. Successful implementation of these strategies also requires a coordinated effort between Regional Transportation Planning Organizations, cities, counties, WSDOT, Transit Agencies, and transportation stakeholders.

1A: DEVELOP AND ENHANCE A WASHINGTON STATE TRANSPORTATION ACCESS NETWORK

A "Washington State Transportation Access Network" is a deliberate and coordinated strategy to assure that public transportation provides vital transportation connections to enable travel throughout Washington and provide affordable alternatives to a car-dependent lifestyle. The most significant component of the access network is a statewide approach to transit. However, in order to significantly reduce per capita VMT and GHG emissions in Washington, the majority of residents would need to live and work in places that both support bicycling and walking for shorter trips, and that provide reliable and convenient public transportation that meets mobility needs for longer trips. Given the diversity of land use and transportation demands in Washington, the access network will have different characteristics in the various transportation operating environments throughout Washington. By targeting public transportation improvements to the best operating environments, significant GHG emission and VMT reductions can be achieved.

Several specific actions are recommended for state and local agencies to overcome existing barriers and implement this statewide public transportation system:

Recommended actions to address operating costs:

- Explore state purchasing contracts for transit buses.
- Provide statewide guidance/assistance on types of buses to purchase with the potential to offset the current cost premium of hybrid buses.
- Identify the incremental increase in expenses during fleet replacement planning to migrate the infrastructure to cleaner-technologies, including maintenance and base capacity.
- Expand the definition of Renewable Energy Credits (under Initiative 937) to include connection to local transit systems with a focus on migration to hybrid or electrification of transit systems.
- Develop a statewide policy statement for a prioritization of uses of energy block grants for transit projects.

[14] Residential Trips are all non-commute related trips.

- Develop WSDOT policy recommendation that the Federal Transit Administration resume the bus research program.

Recommended actions to recruit and retain drivers and mechanics:

- WSDOT should serve as the lead organization and coordinate with the Employment Security Department to perform labor market research to establish a job training grant program for transit operators, mechanics, and planners and assure these professions are included in the green jobs definition.
- Establish a center of excellence at a community college for transit operators, schedulers, mechanics, and planners.
- Request that King County Metro develop a module on how to use the Job Access and Reverse Commute program to recruit and train operators and mechanics from low income communities.

Recommended actions to address the fact that transit maintenance/base facilities are at capacity and/or are outdated:

- Allow transit agencies to use design/build procedures to construct transit facilities.
- Request that WSTA explore the current status of efforts to expedite permitting process for essential public facilities.

Recommended actions to address Park and Ride lot capacity:

- Provide incentives to move vanpool and carpool users away from park and ride lots served by transit to park and pool locations.
- Develop more park and pool and lease lots.
- Develop traveler information for park and rides at state-owned facilities (i.e., roadside signs that show the number of available spaces).

Recommended actions to address congestion on the transit network (which degrades service efficiency and eliminates any travel time advantage):

- Explore bus-only lanes, queue jumping, signal prioritization, opportunities to increase HOV capacity, and direct access.
- Create a program that provides matching funding to local governments to enhance non-single-occupancy vehicle intermodal connections to improve access to the Washington State Transportation Access Network.

Recommended actions to address ineffective intermodal connections:

- Encourage WSTA to sponsor strategic planning and scenario planning sessions to propose additional investments to improve intermodal connections in support of the Washington State Transportation Access Network.

Recommended actions to address barriers that new users may experience, including bus routes and service that are confusing and/or intimidating:

- Improve marketing and outreach for first-time users through CTR and Growth and Transportation Efficiency Center (GTEC)[15] programs.
- Identify a role for Washington's software industry in providing real-time information to transit agencies (to assist in bus flow and movement) and customers (for routes, connection, availability, etc.).

1B: ENHANCE URBAN COMMUTE TRIP REDUCTION AND RIDESHARE PROGRAMS

This strategy emphasizes expanding the number of urban commute trips by vanpool, carpool and telework, and implementing compressed work week schedules statewide. Supply-side investments in vans and "park and pool" capacity, and demand-side investments in ride matching technology, outreach and incentive programs (such as CTR, GTEC, and residential-based trip reduction) would support growth in all commute options.

Some of the recommended actions for WSDOT to enhance urban CTR and rideshare programs include:

- Perform a statewide analysis of the vanpool program to identify possibilities for efficiencies and document best practices.
- Support utilization of existing "park and pool" lots with traveler information improvements and incentives
- Expand and update the RideshareOnline.com website to improve travel options and increase effectiveness.
- Launch a statewide marketing campaign to provide information, incentives and tools for commuters to choose commute options, integrating promotion of Rideshareonline.com and traveler information for park and pools.
- Provide resources and direction to gather commute and travel data, and use this information to guide partnership creation and investment decisions.
- Rapidly expand state support for telework, and support Washington State University's re-emergence as the statewide technical assistance resource for telework.

1C: CREATE A STATEWIDE RESIDENTIAL TRIP REDUCTION PROGRAM

This outreach and incentive strategy is recommended to encourage all travelers, not just commuters, to try ways other than driving alone for their trips.[16] A statewide Residential Trip Reduction program would use individualized marketing strategies to educate travelers on their options and broaden the state's trip reduction efforts beyond the commute. Over 75 percent of all trips taken are not for getting to and from the workplace. In urban areas, many trips are short (five miles or less), and over 50 percent of the shortest trips (one mile or less) are made in

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[15] A GTEC is a defined boundary of dense mixed development with major employers, small businesses and residential units, within an established urban growth area. The goal of the GTEC program is to provide greater access to employment and residential centers while decreasing the proportion of commuters driving alone on the State highway system.

[16] As the "third leg" of the recommendation to expand and enhance transit, rideshare, and commuter choice, Residential Trip Reduction is substantially supported by the Statewide public transportation system and the ridesharing investments as part of the enhancements to urban commute trip reduction and rideshare programs.

cars. Changing the way these trips are made requires reaching out to the residents of target communities and engaging them to consider how they can change any of the trips they make.

The program would be implemented on two levels. State level support would consist of a program brand, an implementation model, and tools (such as a website and calendaring system) to reduce costs for communities that partner in implementation. Focused implementation within each target community would incorporate community-based messaging and, support and outreach.

Impacts on Goals

Achieving the targets in ESSHB 2815 requires a coordinated approach to land use development patterns and public transportation options. By enhancing and expanding Transit, Rideshare and Commuter Choice in the best operating environments, in combination with land use actions (see Transportation Recommendation 2, *Encouraging Compact and Transit Oriented Development*), significant per capita VMT reductions can be achieved.

The Transit, Rideshare, and Commuter Choice recommendation is estimated to provide a net reduction in GHG emissions of 2.6 $MMTCO_2e$ annually by the year 2020, increasing to 6.1 $MMTCO_2e$ by 2035. Daily total VMT would be reduced by approximately 67 million annually by the year 2035, and daily transit person-miles would increase by 25 million by 2035.[17]

Additional Benefits

Improved public transportation and accessibility for pedestrians have significant implications for improving the health and quality of life for Washington residents.

Costs

Implementing a system of this scope and scale will be a difficult undertaking and requires coordination with local jurisdictions and among statewide agencies. Several of the recommended actions build upon and leverage current investments by the state, transit agencies, local governments, employers, and other partners in demand management strategies.

The IWG was not able to complete a full analysis of the net costs of implementing these recommendations. Greater detail on individual program costs is available in the full IWG report. Cost savings from reduced VMT come primarily from a reduction in the variable costs of owning and operating a vehicle, and from a reduction in congestion costs. Preliminary analysis indicates that a substantial net cost savings could result from successful implementation of these strategies. As these recommendations move forward, it will be important to conduct more analysis to help clarify the complete impacts of investment in public transportation.

Relationship to Other Efforts

These recommended Transit, Rideshare, and Commuter Choice programs are designed to be adopted in conjunction with the recommendations for Compact and Transit Oriented Development (see Transportation Recommendation 2, below) and Transportation Pricing (see Transportation Recommendation 4, below) in order to

[17] The Transportation IWG analyzed VMT reductions through 2035; ESSHB 2815 specifies a reduction of per capita VMT of 30 percent by 2035, which translates into daily VMT per capita of 22 miles in 2035.

move Washington toward a future travel environment that achieves a 2035 vision for Washington's transportation system that will:

- Enable users to make environmentally-friendly transportation choices that are easier to use, more reliable, safer, and less expensive than the current system;
- Make single vehicle households an attractive option; and
- Be driven by targeted investments that reduce per capita VMT by at least 30 percent[18] and lower GHG emissions at least 25 percent below 1990 levels.

TRANSPORTATION RECOMMENDATION 2: ENCOURAGING COMPACT AND TRANSIT ORIENTED DEVELOPMENT

Compact and Transit Oriented Development (CTOD) provides the necessary density, infrastructure, and amenities to encourage the use of non-single occupancy vehicle forms of transportation. Washington's Growth Management Act (GMA) already enables, but does not require, local government planning to promote urban centers or CTODs. The following recommendations focus on five specific elements of CTOD that represent the most promising opportunities to reduce per capita VMT: housing and employment density, parking incentives and management, transportation concurrency, bicycle and pedestrian accessibility, and leveraging urban brownfield development.

2A: PROMOTE AND SUPPORT HOUSING AND EMPLOYMENT DENSITY

Recommended actions include:

- Legislatively expand use of the Multi-Family Tax Exemption in HB 1910[19] to allow any city planning under GMA to leverage and maximize the use of this tool. This change would attract multi-family development and innovative types of housing strategies and other types of infill developments to existing, emerging or planned CTOD areas.
- Adjust grant criteria to support applications and expenditures in CTODs, establish new revenue sources (tax credits, loans, revolving funds) for CTOD projects, and identify new finance mechanisms that support increased density in CTODs.
- Leverage public/private partnerships and relationships
- Educate and reach out to decision makers to overcome barriers to CTOD development.
- WSDOT should work with Regional Transportation Planning Organizations and Metropolitan Planning Organizations to develop measures to reduce per capita VMT and assure public involvement in preparing and updating those measures for inclusion in the Regional Transportation Plan.

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[18] 30 percent decrease in per capita VMT is consistent with the benchmarks in WA ESSHB 2815

[19] HB 1910 – *Modifying property tax exemption provisions relating to new and rehabilitated multiple-unit dwellings in urban centers to provide affordable housing requirements.*

http://apps.leg.wa.gov/documents/billdocs/2007-08/Pdf/Bills/Session%20Law%202007/1910-S2.SL.pdf

- Several recommendations from CTED's Land Use and Climate Change (LUCC) committee also overlap and complement these Housing and Employment Density recommendations, including:
    - Coordinate to ensure consistency with regional transportation plans.
    - Encourage the use of financing tools as developer incentives.
    - Encourage the use of new funding targeted to urban centers.

2B: DEVELOP AND PROVIDE PARKING INCENTIVES AND MANAGEMENT

Recommended actions include:

- Make regional parking maximums a requirement of Regional Transportation Plans to address minimum/maximum parking thresholds at the state/regional level.
- Develop and collaborate on parking management education programs and assistance that recognizes the importance of parking management in CTODs.
- Explore revenue and funding options (e.g., parking tax for dense urban locations), with funds made available for projects and programs in the CTOD and tax credits for lower parking ratios.
- Provide regional transportation funding for transit and multimodal infrastructure facilities in return for developer(s) maximizing development density and minimizing project parking.
- Prohibit the construction of principal use long -term parking, and allow shared parking.
- Maintain state grant support for focused trip reduction programs in CTODs.
- Several other parking management strategies were identified that merit further research. The Transportation IWG recommends that WSDOT and CTED work together to research and identify the most promising of these strategies.[20]

2C: ENCOURAGE BICYCLE AND PEDESTRIAN ACCESSIBILITY

The Washington State Legislature should affirm that walking and bicycling for transportation purposes offer many benefits to individuals, their communities, and Washington, including improved health for individuals and no harmful pollution. As part of a balanced transportation system, walking and bicycling will reduce the amount of trips made by car, thereby reducing GHG emissions caused by motor vehicles.

The Washington State Legislature should adopt a policy based on the broad concepts identified by the Complete Streets national movement, while recognizing and accommodating exceptional conditions (e.g., excessive cost to include Complete Street elements). The Transportation IWG report contains details on improvements, prioritized to provide sufficient lead time for planning and budgeting in communities throughout Washington.

2D: ENCOURAGE URBAN BROWNFIELD REDEVELOPMENT

State funding and a grants component should be included to augment the state's brownfield revolving loan fund[21] to promote compact development.

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[20] Research should consider impact on businesses including tourism as well as housing projects and account for how implementation would impact the different sizes of CTOD that exist and/or planned for in the various counties throughout the State.

2E: TRANSPORTATION CONCURRENCY

Recommendations related to transportation concurrency have been developed in conjunction with CTED's LUCC committee. The specific LUCC recommendations that align with the Transportation IWG concurrency recommendations are:

- Better enable GMA Transportation Concurrency to address all modes of transportation.
- Provide technical assistance and guidance on how to incorporate multimodal improvements or strategies in their transportation concurrency regulations.
- Require local government to consider multimodal improvements or strategies in their transportation concurrency regulations.

Impacts on Goals

Total estimated GHG reductions with CTOD range from 0.4 $MMTCO_2e$ to 1.7 $MMTCO_2e$ by 2020. The upper end of the range (1.7 $MMTCO_2e$) is very close to the CTOD estimate from the 2007 CAT (1.6 $MMTCO_2e$). While the targets of this recommendation are achievable they are also ambitious; meeting them will require commitments and coordinated effort.

Additional Benefits

CTOD has significant implications for improving health and quality of life for Washington citizens.

Relationship to Other Efforts

These CTOD recommendations are designed to be adopted in conjunction with the recommendations for Transit, Rideshare, and Commuter Choice programs (see Transportation Recommendation 1, above) and Transportation Pricing (see Transportation Recommendation 4, below) in order to achieve the 2035 vision for Washington's transportation system.

These recommendations also support and affirm the land use recommendations from the SEPA IWG, the Forestry and Agriculture Carbon Market Workgroups, and CTED's LUCC and TDR policy advisory committees.

TRANSPORTATION RECOMMENDATION 3: USE GHG/VMT AS CRITERIA FOR FUNDING AND PURSUE NEW REVENUE SOURCES

There are two components of the transportation funding recommendation:

[21] EPA provides assessment grants on a nationally competitive basis, and the State's brownfields revolving loan program is $5.9 million federally funded (http://cted.wa.gov/site/790/default.aspx). Current assessment grants are too few, and loans do not work for everyone, especially municipal governments.

3A: STATE, REGIONAL, AND LOCAL TRANSPORTATION INVESTMENTS AND OPERATIONS SHOULD BE ALIGNED WITH THE ACHIEVEMENT OF THE VMT AND GHG REDUCTION PROVISIONS OF ESSHB 2815.

This will mean reexamining not just proposed new investments, but also existing investments to ensure that Washington can achieve GHG and VMT reductions through transportation policies, as well as meet traditional objectives of transportation funding.

3B: WASHINGTON STATE SHOULD PURSUE NEW REVENUE SOURCES TO SUPPORT TRANSPORTATION CHOICES, PARTICULARLY TRANSIT OPERATIONS.

In addition to making systemic improvements in the allocation of available capital to meet all the existing objectives of Washington's transportation sector, Washington needs a funding approach to transportation that generates revenue sufficient to provide those options—including support for transit—that are essential to meeting Washington's GHG emission and per capita VMT reduction benchmarks. The current local and state transportation sources are neither adequate nor stable. The gas tax cannot supply revenue to support increased local transit necessary to reduce GHG emissions and per capita VMT.[22]

Structuring additional transportation funding options around user fees other than the gas tax provides the most promising opportunity to generate future revenue for system improvement, operation, and maintenance; to also influence travel behavior through reduced demand for single occupancy vehicle capability; and to support the creation of transportation options. The 2007 CAT identified a series of revenue tools for the Legislature to consider. A specific recommendation around one (transportation pricing) is being forwarded in 2009 (see Transportation Recommendation 4, below). However, the original list remains relevant and contains revenue tools that warrant further consideration, including user fees, local option taxes, and statewide revenue sources.

Other Impacts

The demand for transit is increasing at the same time expenses are increasing for transit agencies at all levels of government in Washington. Ensuring adequate and additional transportation funding options can help provide more reliable and flexible funding for local and regional governments that currently rely primarily on local funding. Funding options can also be structured to reinforce and encourage travel behavior by the private sector and individuals that contributes to climate change solutions.

Relationship to Other Efforts

Identifying new flexible and reliable long-term funding sources, as well as making better use of existing revenue sources to fund these strategies, is critical to achieving significant reductions in transportation-related GHG emissions, and to the other recommendations for transportation included here.

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[22] Seventy-nine percent of Washington State's transportation funding is generated through Washington's 37.5 cent per gallon gas tax and the federal gas tax. The transportation sector's dependence on gas consumption for revenue creates a paradox: as citizens contribute to climate solutions by driving less and using more fuel-efficient vehicles, the revenue available for transportation projects declines, including potentially for those projects designed to reduce GHG emissions and per capita VMT. Moreover, external factors such as unstable fuel prices and improving fuel economy standards result in less fuel usage further reducing revenue.

TRANSPORTATION RECOMMENDATION 4: USE TRANSPORTATION PRICING TO MEET THE GOALS

Transportation pricing strategies are recommended to reduce per capita VMT and GHG emissions, raise needed revenue, and manage the system for better efficiency and reliability. Usage-based pricing strategies such as tolls, parking charges, and per capita VMT or gasoline taxes, are all examples of strategies that cause travelers to adjust their travel habits and reduce per capita VMT and GHG emissions accordingly. Pricing strategies can contribute to per capita VMT and GHG emission reductions when used to fund alternatives such as transit, ridesharing, bicycling, and walking, and can provide an incentive to invest in more efficient vehicles.

The following recommended actions could increase the effect of pricing to achieve the per capita VMT and GHG emission reduction goals:

- Consider per capita VMT and GHG emissions reduction as a third objective to WSDOT's existing objectives for tolling of revenue generation and efficient traffic management[23] in project design; in the development of pricing strategies and actions; and in the regulation of toll rates.
- Use toll revenues to fund more sustainable travel patterns (e.g., public transit, carpooling). The State Legislature should provide direction to include transit operations and other sustainable transportation investments, such as increased freight mobility throughout urban corridors, as part of individual tolling authorizations.[24]
- Design toll strategies to incorporate incentives to individual actions that reduce per capita VMT and GHG emissions. The Washington Transportation Commission should establish toll rate policies that encourage drivers to make fewer and shorter trips, use less polluting vehicles, and consider alternative modes other than single occupancy vehicle driving.
- Apply tolling more broadly to promote greater achievement of revenue, efficiency, and GHG emission reduction goals. Two specific recommendations include:
    - In 2009, the State Legislature should grant authority for tolling of the Cross-Lake corridor including SR 520 and I-90.
    - In 2010, the State Legislature should establish a legislative task force to review tolling authority, and explore how to move towards a system-wide application of tolling, as opposed to a project-by-project approach.
- Establish a task force on state and local transportation funding to propose tolls and other pricing mechanisms that could fund transportation and transit needs and create price incentives to reduce per capita VMT and GHG emissions, with a goal of passing expanded transportation pricing and funding legislation. The pricing mechanism should be designed to:

[23] A legislative policy framework for tolling was established by ESSHB 1773. This framework provides the Legislature with authority to impose tolls and maintains the Transportation Commission's role to set toll rates for tolled facilities. By law, Washington State's objectives for tolling include both generation of revenues for transportation, as well as a mechanism to help manage traffic volumes and congestion.

[24] Discussion point: Although most Transportation IWG members supported this recommendation, some members expressed concern about taking funding away from maintaining, repairing, and upgrading Washington's roads, highways, and bridges. Their preference is to have the Legislature identify a dedicated funding source for transit, as they also believe that transit is a very important component in helping to solve the transportation congestion problem.

- Give priority to transit and freight operations to increase the movement of people and goods.
- Be fair, consistent, and transparent so that users can see the value of the pricing mechanisms. Pricing mechanisms should provide users with reasonable alternatives (e.g., improved transit service and reliability) and specific identifiable stakeholders (e.g., freight interests) should receive direct benefits from their user fees.

Impacts on Goals

It will be difficult for Washington to meet its GHG and per capita VMT reduction objectives without usage-based transportation pricing. The Puget Sound Regional Council estimated that full system road pricing (including arterial streets) could reduce per capita VMT by approximately 10 percent by 2020, and full freeway tolling could reduce GHG emissions by 6 percent compared to a No Action option. The per capita VMT-reduction could be greater (or less) with different toll rate assumptions and with additional investments in the transportation system.

Many factors influence the contribution of pricing to per capita VMT and GHG emissions reduction, including how tolls rates are set, how revenues are spent, how extensively tolling is implemented, and the effects tolls might have on transportation performance.

Additional Benefits

Transportation pricing strategies can raise needed revenue and allow the system to be managed to achieve better efficiency and reliability.

Costs

The Transportation IWG recognizes that there are funding policy issues that need to be addressed by the Washington State Legislature, the Washington State Transportation Commission and the Washington State Department of Transportation. Funding from all sources (federal, state, regional and local levels) will be required to implement the strategies to achieve the per capita VMT and GHG emission reductions. There needs to be clarity regarding the state's role in addressing the transportation funding shortfall that is occurring at federal, state, regional and local levels, the use of tolling revenues to fund regional and local investments, and whether the state should help fund transit.

Other Impacts

Pricing mechanisms should be designed to be fair, consistent, and transparent for all users. They should also ameliorate impacts and/or provide mitigation options for economically vulnerable constituencies.

As pricing mechanisms reduce demand, the resulting improved speeds and increased throughput per lane per hour on congested roadways may incent some people to make trips they would have avoided under more congested conditions. The pricing mechanism should be designed to ensure this effect of transportation performance does not diminish the per capita VMT and GHG emission reduction benefits.

Relationship to Other Efforts

Washington began using highway pricing with the introduction of tolls on the Tacoma Narrows Bridge to finance its expansion, and has embarked on a pilot project to convert underused HOV lanes on State Route 167 into high-occupancy toll (HOT) lanes. Tolling is anticipated as part of the financing plan for the SR 520 bridge replacement, the Columbia River Bridge crossing, and the I-405 express lanes, among other potential applications.

This Transportation Pricing Recommendation is designed to be adopted in conjunction with the recommendations for Transit, Rideshare, and Commuter Choice programs (see Transportation Recommendation 1, above) and Compact and Transit Oriented Development (see Transportation Recommendation 2, above) in order to achieve the 2035 vision for Washington's transportation system.

TRANSPORTATION RECOMMENDATION 5: PURSUE NON-VMT ACTIONS TO REDUCE GHG EMISSIONS FROM THE TRANSPORTATION SECTOR

Given the need for a scalable multi-pronged approach to address the climate impacts of the transportation sector, five specific non-VMT transportation policies are recommended that build on the work of the 2007 CAT (see the full Transportation IWG report for a list of potential specific projects and actions):[25]

5A: INCREASE THE USE OF RAIL FOR BOTH THE MOVEMENT OF PASSENGERS AND FREIGHT

5B: ENCOURAGE GHG EMISSION REDUCTIONS AND FUEL EFFICIENCY IMPROVEMENTS IN DIESEL ENGINES BY IMPLEMENTING THE ORIGINAL 2007 CAT STRATEGY (T-7: DIESEL ENGINE EMISSION REDUCTIONS AND FUEL EFFICIENCY IMPROVEMENTS)

5C: IMPLEMENT A PACKAGE OF TRANSPORTATION SYSTEMS MANAGEMENT STRATEGIES

The Transportation IWG has augmented the work of the 2007 CAT, and identified the potential GHG emissions reductions from transportation system management strategies. The Transportation IWG is not making a recommendation beyond that of the 2007 CAT.

5D: ACCELERATE DEPLOYMENT AND COMMERCIALIZATION OF PLUG-IN HYBRID ELECTRIC VEHICLES AND ELECTRIC VEHICLES

5E: ECOLOGY AND OTHER AFFECTED AGENCIES SHOULD SEEK RESOURCES FROM THE 2010 LEGISLATURE TO EVALUATE AND IMPLEMENT A LOW CARBON FUEL STANDARD REQUIREMENT APPROPRIATE FOR WASHINGTON.

(Note that a 2010 request would come after the implementation of the California LCFS and allow Washington to benefit from California's experience).

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[25] In addition, the Transportation IWG discussed adoption of the Zero Emission Vehicle (ZEV) requirement that is part of California's vehicle emission standards, but was rejected by the Washington Legislature when the Legislature adopted the CAT emissions standards in ESHB 1397 (ESHB – *Changing vehicle emission standards provisions.* http://apps.leg.wa.gov/documents/billdocs/2005-06/Pdf/Bills/Session%20Law%202005/1397-S.SL.pdf). Generally speaking, the ZEV requirements mandate that a particular number of vehicles that produce no air emissions are delivered to a State. The Transportation IWG did not attempt to reach agreement on a recommendation on either adoption of the ZEV requirements or any alternatives and decided to simply forward information to the CAT. The group concluded that this issue was complex and would be resolved by the Legislature in an upcoming session. The full Transportation IWG report presents some of the arguments for and against Washington adopting the ZEV requirements.

Impacts on Goals

Details about the GHG emissions reduction impacts for each specific strategy are available in the CAT's 2007 interim report, *Leading the Way: A Comprehensive Approach to Reducing Greenhouse Gases in Washington State*.[26]

Additional Benefits

In addition to GHG reductions, these non-VMT strategies have several specific additional benefits:

- Diesel engine emission reductions may have the additional climate protection benefits from the reduction of diesel soot, or "black carbon emissions", which may have as much as 60 percent of the global warming effect of CO_2.[27]
- Displacing petroleum with electricity or lower-carbon fuels, and subsequently reducing expenditures on oil imports, supports the state's goal to reduce dependence on fuel imports.
- Air quality and public health benefits, such as decreased risks of cancer and respiratory diseases from diesel particulate matter.
- Electric vehicles can be used to back-up power for homeowners, provide reserve and load regulation services to the grid, and enhance the integration of intermittent renewable energy generation by providing system-wide storage capability.
- Support Washington companies (Boeing, Paccar, Microsoft, V2Green) that have the capability or potential to become major players in creating products or components of these recommendations.
- Leverage and support existing programs underway among local and state jurisdictions in Washington.

Costs

Details about the costs of each specific strategy are available in the CAT's 2007 interim report.

Relationship to Other Efforts

Several of these recommendations are complementary with other efforts underway:

- Under ESSHB 1303, CTED has been exploring options for vehicle electrification for Washington State.
- Initiatives to electrify transportation can be mutually reinforcing with actions taken to "green the grid." In order to maximize GHG reductions, PHEVs and EVs must be served with electricity from sources other than fossil fuels. As well, vehicles could provide energy storage and other "ancillary services" back to the grid, enabling it to accommodate more intermittent renewable energy generation.
- Several electric vehicle and diesel retrofit programs are underway that can serve as models and inform broader statewide efforts (e.g., the Chelan School District is demonstrating an OEM diesel and electric hybrid school bus).

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[26] www.ecy.wa.gov/climatechange/CATdocs/020708_InterimCATreport_final.pdf

[27] Ramanathan V. Scripps Institution of Oceanography University of California at San Diego. *Role of Black Carbon on Global and Regional Climate Change.* Testimony to the House Committee on Oversight and Government Reform. October 18, 2007.

Beyond Waste: Reducing and Recycling the Next 50%

Through the waste reduction and recycling efforts of the last 20 years, Washington now diverts about 48% of solid waste generated in the state through reuse, recycling and beneficial use applications, representing significant GHG reductions. Pursuing the strategies recommended here to reduce and recycle "the next 50%" of solid waste in Washington could result in further reductions of at least 6 $MMTCO_2e$ per year. Because materials and products that we use in Washington are produced all over the world, not all of these reductions will occur in Washington; however, the environmental impacts of our consumption are global and so are the benefits of efforts to reduce those impacts.

The charge given to the Beyond Waste IWG was to recommend ways to significantly expand source reduction, reuse, recycling, and composting, and build on what is best and most successful in the current waste management system by developing an implementation plan targeting products with the largest GHG reduction potential.

Today's solid waste management system is part of larger systems of materials use. Materials are extracted, turned into products, used and then disposed. The solid waste system of the past focused only on the last point in this stream—disposal. Recycling, which has been widely incorporated into the system in recent years, has been demonstrated to be an effective strategy to reduce the impacts of disposal. It is now also recognized as an effective tool to reduce the upstream impacts of extraction, production and use, including GHG emissions. The recommendations keep these farther reaching benefits in mind.

Materials Targeted for Recycling and Reduction with GHG Emissions Reduction Potential*

Paper	1.6 $MMTCO_2e$
Metals	0.4 $MMTCO_2e$
#1 & #2 plastics	0.1 $MMTCO_2e$
Other plastics	1.5 $MMTCO_2e$
Construction & Demolition	1.7 $MMTCO_2e$
Organics	1.5 $MMTCO_2e$

Contaminants *(GHG potential not known, however, contaminants reduce the recyclability of the targeted materials above.)*

*GHG figures shown are potentially available annual emissions savings and are based on the projected waste stream as of 2020 using today's waste generation characteristics.

The climate change action agenda demands a shift in our economy. The traditional "dig and dump" economy relies heavily on resource extraction and waste disposal. The new "sustainable" economy will rely on resource conservation and materials reutilization. A robust recycling system is key to making this new economic system work.

The Beyond Waste recommendations build on the success of the current waste management system, focusing on:

1. Optimizing the collection system for recyclable materials,
2. Creating a product stewardship program, and
3. Providing incentives for organic materials use.

Future work is also recommended that focuses on:

4. Environmentally responsible purchasing by state and local governments, and
5. Working collaboratively with the retail industry to encourage waste reduction and recycling.

The recommendations developed by the Beyond Waste IWG are consistent with and incorporate the goals of the Climate Advisory Team's 2007 Report "Headline" #11, ***Reduce waste and Washington's emissions of GHGs through improved product choices and resource stewardship***.

The recommended Beyond Waste actions are summarized below. Please see the full Beyond Waste IWG report in Appendix 5 for additional detail on these recommendations, including "in progress" draft bill language, discussion of a sustainable product design institute, and tax incentives for use of recycled materials.

BEYOND WASTE RECOMMENDATION 1: OPTIMIZE THE COLLECTION OF RECYCLABLE MATERIALS

Source separation of solid wastes by residential and commercial generators into at least three categories should be required in order to optimize the collection of recyclable materials. This could then increase the collection of recyclable materials and products, organic materials, and construction and demolition debris to meet a new recycling goal of 80% of the overall solid waste stream by 2020.

- The fundamental strategy to achieve the 80% recycling goal is to require source separation of solid wastes by residential and commercial generators into at least three categories: recyclable materials and products, organic materials, and residual solid wastes.
- Recyclable materials include at a minimum recoverable paper, container metals, container glass (with some exceptions) and plastics (numbers 1 and 2). Organics include at a minimum yard, garden, and food wastes.
- Residential generators must separate their wastes and participate in provided collection services.
- Commercial generators must separate their wastes and can select their recycling service provider.
- Local governments would be required to update their local comprehensive solid waste management plans on a phased schedule (based on population size and location or contract renewal), describing the services that will be provided. Implementation may be phased as well. Participation by small rural counties and small population areas is optional.
- As part of the local plan, affected local governments will develop reuse and recycling policies for construction and demolition wastes.
- Financial and other incentives are needed for the private sector to invest in the infrastructure needed to support this action.
- This recommendation is complementary to the organics management recommendation and the product stewardship framework recommendation.

Impacts on Goals

This recommendation could lead to approximately 5.2 $MMTCO_2e$ in additional annual emissions savings by 2020.[28]

[28] This is the equivalent of removing 790,000 cars from the road annually.

This action will contribute to green collar job creation in industries that collect, process, and use recycled materials. This will also stimulate recycling markets, the reuse industry and other sectors.

Additional Benefits

Optimizing use of collection services will result in fewer personal vehicle trips to transport recyclables or solid waste, contributing to reduction in VMT and related GHG emissions.

Costs

Recycling of "traditional" recyclables has proven to be more cost effective than disposal. Recycling costs less than disposal given that disposal fees are avoided and that marketing of recyclables generates revenue. The cost of collection remains, in either case.

Costs will be borne by users (waste generators), not government. This is a "pay as you go" proposal. Costs to state and local government for planning, monitoring, public education and enforcement must include an identified funding source.

When successful, this strategy, in combination with a number of other waste reduction and recycling strategies underway or under consideration, could result in reduced revenue collected by the Solid Waste Collection Tax, which is deposited into the Public Works Assistance Account. Further analysis is needed to assess future impacts and to develop an approach to assure revenue neutrality on this account.

Relationship to Other Efforts

This action relies on the ability of local governments and the private sector to work collaboratively to provide services to the public.

BEYOND WASTE RECOMMENDATION 2: PRODUCT STEWARDSHIP FRAMEWORK

The goal of this recommendation is to establish a legislative framework utilizing product stewardship to minimize the environmental and health impacts of products throughout all stages of their lifecycle, including GHG emission impacts. Product stewardship links product design with end-of-life impacts so that producers take those end-of-life impacts into account during the design phase, thereby reducing or eliminating collection/processing costs for their products over time.

The framework is designed to maximize producer engagement and private sector ingenuity. The policy provides a process for maximizing outreach to and input from producers of potentially covered products through an advisory committee to Ecology. This process includes reviewing recommendations on new products or product categories, and product selection and rule-making processes. If a stewardship program is justified for a specific product, producers assist in developing the rules and then they (not the government) design and manage the stewardship program. The framework establishes base criteria to be met, establishes a level playing field among competitors, and otherwise relies on private sector ingenuity and market forces. The law is not prescriptive; it allows manufacturers flexibility in designing and providing the program.

Potential initial products include carpet, mercury-containing lighting and thermostats, paint, and rechargeable batteries. A stand-alone bill for mercury-containing lighting has also been drafted to show how the product stewardship approach could be used to address a single product.

Impacts on Goals

This action would significantly reduce GHGs. There is a two-fold benefit to product stewardship. First, there is a large potential to increase the recycling and diversion of products that are currently being disposed, which would result in reduced GHG emissions. Second, there is a significant potential to reduce GHG emissions throughout the product production process and supply chain. For example, a product stewardship program for recycling carpet could reduce GHG emissions by up to 0.9 $MMTCO_2e$ in 2020 (assuming 80% recycling). Product stewardship programs also can provide a convenient system for proper handling of mercury-containing lighting (such as CFLs) and mercury-containing thermostats. Significantly, the availability of these recycling systems will enable people to responsibly switch to energy-efficient lighting and programmable thermostats. Such shifting could reduce GHG emissions by roughly 1 $MMTCO_2e$ (not directly attributable to this action).

Additional Benefits

Product stewardship also:

- Provides a recycling solution for energy efficient products that contain mercury.
- Provides incentives to design greener products.
- Complements, and may utilize, collection programs for traditional recyclables.
- Addresses the 2007 CAT's recommendations directly.
- Creates jobs.
- Responds to citizens that want stewardship programs.

Costs

Producers—not state or local governments—would set up and pay for the recycling programs.

Residents want recycling programs, especially for toxic and hard-to-handle products; however, local governments are unable to adequately finance these programs. The framework approach minimizes waste management costs to state and local government.

There will be some costs to Ecology associated with rule-making, monitoring and enforcement.

Possible Opposition

Manufacturers and industries that would be required to arrange and finance recycling programs for their products, as well as industry associations representing the general business community are leery of this program. This concern is being addressed by building relationships with industries and industry members already in a good position to implement a product stewardship system, and by listening to their concerns and input regarding program structure. Additional outreach, education, and engagement with a diversity of producers is needed and will be undertaken. Lessons are also being taken from the successes of the electronics product stewardship system in Washington and other states.

Some CAT members have stated that successful outreach to potentially affected manufacturers is essential for their tentative support of this recommendation moving forward. These CAT members stressed that product

stewardship is a laudable concept but that the preferred approach should be for producers, retailers and the state to work together to insure that a product is not deemed problematic enough to trigger the Ecology rule-making.

Relationship to Other Efforts

Products likely to be addressed under this approach contain mercury or other toxic materials, and have significant implications for human health and water quality, including Puget Sound, if not handled appropriately at end-of-life.

BEYOND WASTE RECOMMENDATION 3: MARKET DEVELOPMENT FOR DIVERTED ORGANICS

The goal is to provide end uses for organics that have been diverted from the waste stream with an emphasis on optimizing the value of and developing markets for these materials. These recommendations are meant to function as both stand alone recommendations and to be complementary to the collections and environmentally responsible purchasing recommendations.

- The fundamental strategies to achieve this goal are to encourage anaerobic digestion and land application by providing/identifying financial incentives.
- Anaerobic digestion of putrescible organics including food scraps, manures, and food processing wastes is encouraged through feed-in tariffs and wheeling provisions.
- Use of composts and other recycled organics is expanded on a municipal level by altering the existing purchasing language to permit all recycled organics regulated by Ecology to be used in municipal projects.
- Agricultural use of composts and other recycled organics suitable for land application is encouraged through subsidies to farmers to be administered by the 47 Statewide Conservation Districts.
- The state is encouraged to promote the use of existing carbon markets by municipalities and private entities as a means to partially subsidize organics diversions including food scrap composting and municipal and on farm anaerobic digestion. The Chicago Climate Exchange currently has such projects in Washington.

Impacts on Goals

Diversion of putrescible wastes has the potential to reduce GHG emissions by 2.0 $MMTCO_2e$ annually through methane avoidance while also creating jobs, benefits and credits through production of green energy and valuable soil amendments.

The cost of diversion of food scraps is comparable to the cost of landfilling—suggesting that the incremental cost per ton of CO_2 for this program is minimal.

Additional Benefits

Use of recycled organics as soil amendments increases soil carbon, improves water use efficiency, provides a substitute for synthetic fertilizers that require fossil fuels to produce, and improves soil tilth and product quality.

Anaerobic digestion and land application are complementary technologies.

These recommendations capture the value of both the carbon and the nutrients in material that has traditionally been landfilled.

Costs

Costs for anaerobic digestion are covered by sale of energy to utility companies and other revenue sources such as sale of products (nutrient recovery and peat moss substitutes) and tip fees for the feedstock material.

Changes to the purchasing rules require no additional costs; increasing use of recycled organic products on land will require a new source of revenue.

Existing or in-process protocols on functional carbon exchanges can provide an external source of revenue for these recommendations (i.e., the Chicago Climate Exchange).

Relationship to Other Efforts

These actions rely on the public and private sectors and are complementary to recommendations by the Agriculture Carbon Market Workgroup (the full recommendations from the Agriculture Carbon Market Workgroup are available in the ESSHB 2815 report).

BEYOND WASTE RECOMMENDATION 4: GOVERNMENT ENVIRONMENTALLY RESPONSIBLE PURCHASING

This recommendation calls for establishing, through a Governor's Executive Order, an intergovernmental work group to evaluate the need for and recommend revisions to state purchasing laws, regulations and practices to ensure that products and services used by state and local government have the lowest possible environmental and carbon footprint. The goal is to develop legislative recommendations for consideration in the 2010 Legislative session.

This action is about identifying barriers to environmentally responsible purchasing within current laws and regulations and creating the legislated authorizing framework within which environmentally responsible purchasing (ERP) can be achieved. While the focus of the proposal is to reduce the carbon footprint of governmental purchasing, it is anticipated that proposed legislation would require that all purchases made with state funds meet environmental performance characteristics, such as lowest possible GHG emissions and toxicity. Currently, most government purchasing is based on three criteria: 1) price, 2) availability, and 3) physical performance. This recommendation aims to add a fourth criterion, environmental performance, to the list.

Impacts on Goals

The opportunity to leverage a significant portion of the state's buying power to achieve noticeable GHG reductions by the state as a consumer, and to influence other consumers, was the rationale for selecting this action. The effect on reducing GHG emissions is unknown at this point. As a major consumer of products and fossil fuels, the potential for reductions is significant.

Costs

Actual costs of desired products and services may or may not be higher than more traditional products have been. However, when product comparisons include life cycle costs throughout the supply chain along with environmental costs, it is likely that most products meeting environmental performance standards will be price competitive.

Other Impacts

Local government will be affected by the statutory changes as well. Embedding environmentally responsible purchasing in state law will influence local governments by providing them the tools and authorities needed to integrate ERP into their own purchasing practices.

Relationship to Other Efforts

Additional actions that should be included in the Executive Order are:

- Adopt the Electronic Product Environmental Assessment Tool (EPEAT) standards for all computers purchased by government.
- Require the use of environmentally responsible office paper by all state agencies.
- Establish standards for motor vehicles used by government related to environmental performance.

BEYOND WASTE RECOMMENDATION 5: COLLABORATE WITH RETAILERS TO REDUCE CONSUMER WASTE

Establish a voluntary collaborative mechanism to set specific commitments by retailers to reduce the carbon footprint of and waste from products and packaging they sell to consumers. Two likely initial targets are packaging and food wastes.

- Waste prevention measures result in greater GHG emission reductions than recycling. The AW-3 strategy recommended by the CAT in 2007 envisioned an overall 15% waste reduction goal, in addition to increased recycling.
- At least 50% of household wastes come through retailers. Retailers would be asked to help the state meet an overall 15% reduction goal, as described in AW-3, through voluntary actions.
- Collaboration with retailers provides a unique opportunity to reach product producers and suppliers as well as consumers—because retailers have enormous influence on the products and packaging offered to consumers and have the most direct consumer contact.
- Projects often can be structured to also benefit retailers through, for example, reduced shipping costs by light-weighting packaging and reduced spoilage of food.
- A possible implementation mechanism is a memorandum of agreement with the Governor's office to set specific commitments to improve options to consumers and reduce product packaging. The two initial targets are packaging and food wastes, though many other options will be considered.

- Nearly one-third of the food that is purchased is thrown away. The "Love Food, Hate Waste" campaign, originating in the United Kingdom, engages retailers and producers in developing packaging for longer safe food storage and information about how to store food properly.
- An example of a possible packaging initiative addresses wine bottles: in the "Glassrite" bottle initiative (also originating in the UK), retailers work with wine producers to lightweight wine bottles.

Impacts on Goals

Reducing in-state food waste generation by 50 percent could reduce annual GHG emissions by 0.9 $MMTCO_2e$ by 2020.

Additional Benefits

Raising the profile of climate change with retailers—and through them, producers, suppliers, and consumers—has valuable education potential and could prompt these parties to make other more sustainable choices.

Action on this initiative has the potential to reduce costs to producers and retailers, e.g., by reducing shipping costs through more lightweight or efficient packaging.

This proposal is compatible with and complimentary to the product stewardship framework proposal (Beyond Waste Recommendation 2).

Costs

Collaborative effort, planning, technical support, outreach and education require a funding source.

Other costs and/or savings will be incurred by retailers and/or producers, and these costs or savings most likely will be passed to consumers in the purchase price of products. There are cost savings for retailers associated with many waste reduction activities, including less wasting of food.

There are cost savings for households associated with better product choice, less wasting of food and reduced waste to be disposed.

Relationship to Other Efforts

This action relies on the ability of the state to actively engage retailers in collaborative efforts that appeal to the retail sector because of cost reduction or other benefits.

State Environmental Policy Act (SEPA): Guidance for Incorporating Climate Change into Development Decision-Making

The SEPA IWG developed products and recommendations to provide guidance for local and state agencies on how to incorporate climate change considerations into SEPA analyses. The IWG's work responded to the CAT Headline 3, ***Analyze GHG emissions and mitigation options early in decision-making, planning processes, and development projects***.

In other states and on a federal level, climate change policy under SEPA-like statutes has been made on an ad hoc basis through piecemeal litigation or through piecemeal precedent set by individual environmental reviews negotiated between individual applicants and individual lead agencies. In neither case has there been consistency or predictability.

The purpose of the SEPA IWG's work was to diminish the potential for litigation (and to provide consistency and predictability) by giving state and local agencies the tools and framework they need to fully incorporate climate change considerations into their decision-making. Through its recommendations, the SEPA IWG seeks to provide assurance to government decision-makers and project proponents that proposals will be assessed under a predictable climate change framework which will help Washington meet its GHG reduction requirements. Through these recommendations, the SEPA IWG also sought to present ways in which SEPA can be leveraged to provide incentives for "climate-friendly" plans, policies, and projects.

The IWG notes three key shared principles:

- The SEPA IWG generally supports the concept of upfront non-project SEPA review of climate change planning, based upon adequate standards, to reduce GHG emissions and to eliminate duplicative project-level SEPA review. (The term "non-projects" refers to the adoption of regulations, policies, or plans.)
- The SEPA IWG does not intend for any of its recommendations or ideas to unintentionally impact existing categorical exemptions under SEPA. Any desired changes to categorical exemptions put forward by the group or any of its members will be made explicit in the text of its report. The IWG did not address categorical exemptions in depth or focus on whether they should be expanded, reduced, or remain the same.
- The SEPA IWG acknowledges that it is equally important to provide clarity and predictability for treatment of both project and non-project actions or proposals under SEPA.

The 11 SEPA recommendations are summarized below. Please see the full report in Appendix 6 for additional detail on these recommendations, as well as other ideas and resources developed by the SEPA IWG.

SEPA RECOMMENDATION 1: CLEAR GUIDANCE AND REVISED CHECKLIST

Ecology should revise the SEPA checklist and provide guidance to assist in the evaluation of GHG emissions from both project and non-project proposals. Guidance would include:

- Clear guidance on which of the 16 categories listed in Appendix D of the SEPA IWG report should be included for typical projects and non-projects. The guidance would give lead agencies the discretion to apply any combination of the 16 source categories for exceptionally complex proposed actions outside the range of "typical" SEPA actions.
- Clear guidance on how each of the 16 source categories should be handled at different stages of the SEPA process (e.g., determination of any applicable exemptions, disclosure, quantification, threshold determination, mitigation, and future monitoring/reporting) for representative types of projects and non-projects.
- Incorporation of external resources for determining which of the categories to measure and potentially mitigate for projects and non-projects (e.g., current activity in California and Massachusetts; IPCC guidance, ISO, etc.).

A draft outline of possible Ecology guidance is included in Section 8 of the SEPA IWG report.

Expected Benefits

The guidance and the revised SEPA checklist will provide clear direction to SEPA proponents about "what to measure" under SEPA, especially for typical types of projects and non-projects. At the same time, the guidance will allow flexibility to 1) accommodate differences in the relative importance of different sources of emissions sources for different types of projects and plans, and 2) accommodate "atypical" projects that require a tailored approach.

SEPA RECOMMENDATION 2: REGULARLY UPDATED MATERIALS AND COORDINATION

Ecology should regularly update and distribute the reference materials developed through the IWG related to emission sources, assessment tools, and mitigation options. This is particularly important in the case of new emerging tools, which could be useful for GHG emissions assessment under SEPA. In updating the tool's reference materials, Ecology should coordinate with other state and local lead agencies, SEPA proponents, and the public that are looking at tools for similar purposes to help achieve statewide consistency in tools used. A future task includes the review by practitioners of the tools matrix developed by the SEPA IWG.

Expected Benefits

These resources will reduce the burden on SEPA applicants and will increase the consistency of SEPA analysis of GHG emissions. Coordination with other state and local agencies will help ensure that the most up to date tools and resources are available and will increase consistency of analysis across programs. Review by practitioners will help ensure that resources are effective and non-burdensome.

SEPA RECOMMENDATION 3: EMISSIONS TOOL DEVELOPMENT

Ecology should work with other state and local lead agencies, SEPA proponents, and the public to develop and/or identify basic tools for recommended use within the SEPA process to make assessments predictable and not overly burdensome. Any tools developed should be effective, easy to use, and useful for "typical" SEPA applications. These tools should be regularly updated as the state of knowledge in the field changes. In particular, the IWG recommends that easy-to-use tools, both qualitative and quantitative, be identified and/or developed in the following areas:

- VMT forecasting and GHG tailpipe emission factors for on-road traffic for large and small projects and plans,
- Embodied emissions,
- Loss of sinks and GHG reductions through the use of sinks,
- Reduction in space heating and electricity use for residential, commercial, and industrial buildings, and
- Mitigation effectiveness.

Expected Benefits

The development of easy-to-use tools in key areas will increase the consistency and quality of analysis and reduce the burden for project applicants to conduct measurement in key areas.

SEPA RECOMMENDATION 4: USE OF QUALITATIVE ANALYSIS

The SEPA IWG recognizes that easy to use tools are not currently available for estimating future emissions from all sources, and it may be some time before adequate tools are available. The IWG also recognizes that quantitative evaluation may not be practical or warranted for some types of proposals (e.g., small, routine projects). Therefore, the IWG recommends that applicants be able to conduct a qualitative analysis of GHG emissions in cases where 1) adequate tools do not exist, 2) criteria outlined in SEPA guidance requiring a quantitative evaluation are not met, or 3) there is an established alternative to quantification (e.g., a "green list"[29] or programmatic analysis of the proposed action). Qualitative tools may include checklists, decision trees, stream-lined assessments or screening tools where assumptions and approximations dictate that the results are qualitative in nature. Ecology should provide guidance on 1) qualitative standards, 2) when qualitative analysis is acceptable and 3) what constitutes an acceptable qualitative description of emissions.

[29] A "green list" could contain types of projects that are pre-determined not to have climate change impacts and may produce net benefits to climate. For projects contained on the list, project proponents may be relieved from some or all aspects of SEPA analysis for climate change or some or all mitigation requirements.

Expected Benefits

Giving project applicants an option for qualitative analysis (along with accompanying guidance) in specified circumstances will increase the rigor and consistency of analysis in areas where quantitative tools are not available or appropriate. It may also reduce the burden of analysis for certain types of "typical" projects where the results of quantification are easily predictable and therefore not needed in every case.

SEPA RECOMMENDATION 5: GUIDANCE REGARDING MITIGATION

Ecology should develop guidance on the effectiveness of mitigation options. The guidance should also develop criteria for assessing newly identified mitigation strategies. In addition to information on the effectiveness of strategies, (i.e., how many tons are mitigated), guidance would ideally include the following information.

- Cost and cost-savings from each strategy, and
- Criteria/approach for assessing "new" strategies not already in the guidance.

This guidance should be regularly updated.

Expected Benefits

Mitigation guidance will reduce the burden on lead agencies and applicants of identifying appropriate mitigation options. It will also increase statewide consistency in the analysis of mitigation strategies' effectiveness and appropriateness for similar types of projects and non-projects. Including criteria and approaches for assessing new strategies will help keep mitigation guidance up to date with current technology and scientific understanding.

SEPA RECOMMENDATION 6: DEVELOP APPROACH TO THRESHOLD DETERMINATION

The Department of Ecology should develop an approach to threshold determination under SEPA that has the following characteristics:

- A requirement that all lead agencies establish a significance standard.
- The development of a statewide standard of significance that is available to lead agencies should they choose to use it.
- The option for lead agencies to develop their own standard, subject to "sideboards"[30] set by the state in guidance, rule, or statute.
- The development of approaches for applicants to qualitatively obtain a Determination of Non-Significance (DNS) for climate impacts (note the relationship to qualitative analysis described in Recommendation 4.

[30] The SEPA IWG struggled with the right word to describe limits or constraints placed on lead agency discretion without implying that these would be in the form of State guidance, rule, or statute. The IWG used "sideboards" as a working term for this concept. Members suggested other terms as well, including "constraints,""benchmarks," "criteria," and "parameters."

- A linkage between the significance standards and the statewide GHG reduction requirements.

The above components of an approach to SEPA threshold determination are based on a plurality or majority of votes cast by IWG members. Even though the characteristics described above were favored by a plurality or majority of members, IWG members still held a range of views on some key points that would benefit from further discussion by Ecology and its stakeholders. (For details on the range of views expressed and the outcome of votes, please see the full SEPA IWG report in Appendix 6.)

Expected Benefits

A clear and consistent approach to threshold determination is one of the most important features of making SEPA predictable for lead agencies and project proponents. The approach outlined above seeks a balance between statewide consistency and lead agency discretion while also linking SEPA to the statewide effort to achieve GHG emissions requirements. The recommendation for further discussion of some aspects of threshold determination reflects the importance that the SEPA IWG attaches to getting this aspect of SEPA right.

SEPA RECOMMENDATION 7: CONCEPTUAL IDEAS FOR LEVERAGING SEPA

The SEPA IWG recommends four conceptual ideas to the CAT as promising approaches for using SEPA-related incentives or disincentives (i.e., "leveraging SEPA") to promote "climate-friendly" development. The IWG has not fully discussed or endorsed specific approaches for implementing these ideas—this is an area for future work. Some of the ideas may require legislation, but the IWG does not specifically recommend legislation at this time. The IWG also identifies one additional idea to the CAT as an area for further analysis by Ecology and its stakeholders.

The ideas are summarized below. In-depth descriptions—along with additional comments from IWG members—are included in Appendix C of the SEPA IWG report. These ideas are put forth based on a majority vote of IWG members. The level of IWG member support for each is also summarized in Appendix C.

The IWG recommends the following four "leveraging SEPA" ideas:

- *Neighborhood, District-Level Exemptions*. SEPA would be amended to authorize jurisdictions to provide a "neighborhood, district-level exemption." This would be for municipally-designated areas within urban growth areas, where property owners agree to comply with statutorily-set minimum sustainable development standards. The standards could require compact, connected, walkable neighborhoods, with good job ratios, open space, a wide variety of uses, transit-supportive residential densities; and high performance buildings and infrastructure. Any exemption should be clearly tied to achieving total GHG and VMT reductions to document or demonstrate effectiveness and ensure credibility. Also, the exemption language will need to be carefully drafted, and would include specific statutory criteria to address the full range of environmental impacts. This exemption could be a new statutory section, or RCW 43.21C.229 could be revised to incorporate this approach. Alternatively, RCW 43.21C.240 could be utilized, with or without amendment, to accommodate this approach.
- *Upfront SEPA*. This idea would allow cities to elect to designate a subarea for more compact commercial, residential, mixed use or industrial development ("Subarea"). If the city 1) designates the Subarea, 2)

conducts a thorough SEPA review (EIS) of the Subarea (a maximum build-out analysis that identifies mitigation steps to address significant environmental impacts,(including climate change impacts), and 3) adopts as new Subarea development regulations that incorporate and require the climate change mitigation and any other mitigation identified in the Subarea SEPA review that is not already addressed in development regulations, then all subsequent development in the Subarea would be required to implement the climate change measures and would be exempt from any project-level SEPA or SEPA appeals. Ideally this approach would be an improved form of Planned Actions with an upfront funding mechanism. SEPA Planned Actions, RCW 43.21C.031, with an upfront funding mechanism, or RCW 43.21C.240 might be utilized to preclude project-level SEPA review.

- *Voluntary Mitigation List and "Green List" Projects*. This idea involves programs for GHG emission mitigation or mitigation measures which, if included in a project proposal, could provide certainty that GHG impacts are addressed, and thus fully or partially exempt the project from further GHG reduction requirements. For example, specific mitigation measure and programs could be included on a "Green List." "Green List" mitigation measures (or mitigation types) would be considered a positive contribution to the state's efforts to reduce GHG emissions, and as such would exempt projects from further mitigation measures. Additionally, aspects of projects or programs may have mitigating effects, and as such would be given a mitigation value that would reduce or eliminate the need to further address GHG emissions through mitigation.

- *Regional Planning*. This idea involves developing and adopting a regional or statewide Climate Change Plan (GHG Reduction Plan) that would identify the broad direction of the state's or region's approach to reducing emissions. As part of that Plan process, a statewide EIS on GHG emissions, impacts, and mitigation would be prepared and could then be adopted into local plan-level EISs. The statewide EIS would be prepared anticipating its use for regional and local planning SEPA analysis. The statewide/regional plan could identify regional targets and identify alternative ways that local agencies could translate the regional targets into local plan-level and project-level environmental analysis and significance thresholds.

The IWG recommends further analysis of the following "leveraging SEPA" idea:

- *Future Vulnerabilities/Adaption Measures in Environmental Impact Statements*. The IWG suggests further analysis of the idea of incorporating the following considerations into other aspects of the SEPA process. Specifically, the ideas to be analyzed are:
    - Amending the SEPA rules to require an analysis of the adverse impacts of global warming on the proposed action as part of an EIS.
    - Amending the SEPA rules to require that EISs must include and analyze an alternative that would be minimally affected by the adverse impacts of global warming.
    - Requiring reopeners or contingent mitigation for uncertain, but high cost impacts.

Expected Benefits

Well-crafted "leveraging SEPA" ideas, with appropriate standards and safeguards, can create appropriate incentives for both reducing GHG emissions and reducing the procedural burdens of SEPA for "climate-friendly" projects. This is an area where the IWG sees one of the most direct connections between SEPA and the reduction of GHG emissions.

SEPA RECOMMENDATION 8: ANALYSIS OF FUTURE VULNERABILITIES IN CHECKLIST

Ecology should revise the SEPA checklist to incorporate analysis of how predicted changes in the existing environment due to climate change, combined with proposed actions, may create additional impacts on the natural and built environment. Ecology should also provide accompanying guidance on how to conduct this analysis. The required analysis should be based on readily available tools and resources and should not require applicants to conduct new studies. As components of this recommendation:

- The state and local governments should continue to fund and synthesize research into the anticipated regional effects of climate change.
- Ecology and other agencies should provide guidance on evaluating, as part of SEPA review, how expected future changes in climate may alter the effects of proposed actions on the natural and built environment. Ecology guidance should also address how to mitigate those effects. Ecology and other agencies should clarify the responsibilities of lead agencies and applicants in this analysis.
- Ecology and other agencies should make tools and resources available to applicants to support the required analysis.
- Ecology should amend the SEPA checklist to require analysis of the vulnerability to climate changes of the proposed action, future adaptations that may be required to address those vulnerabilities, and the impacts of those adaptations. Key resources and sectors to be addressed are:[31]
    - Water availability (changes in participation patterns)
    - Water quality (particularly temperature)
    - Urban infrastructure (including potential for increased storm water runoff from increased flooding)
    - Energy supply and demand (due to decreased water supply and temperature rise)
    - Forests (health, productivity, fires, diversity)
    - Agriculture (particularly irrigated and dryland areas)
    - Air quality (increased ozone, particulates, allergens)
    - Impacts due to extreme weather events (flooding, windstorms, droughts, heat waves)
    - Coastlines (direct and indirect impacts from sea level rise)

Expected Benefits

This recommendation is a small but important step in encouraging lead agencies and project applicants to think ahead about how expected changes in Washington's climate may affect the future impacts of their projects. Through analysis and disclosure of these potential future impacts using readily available tools and resources, projects and plans can be made more resilient to expected future changes in the climate.

[31] This list is drawn from Summary of Regional Impacts of 21st Century Climate Change (from the February 2008 CAT Interim Report).

SEPA RECOMMENDATION 9: TAKING INTO ACCOUNT LEAD AGENCY RESOURCES, CAPACITY, AND CONSTRAINTS

As Ecology develops formal SEPA and climate policy, it should take into account the implementation resources, capacity, and constraints of the range of jurisdictions implementing SEPA. The IWG has identified several related items in the "Future Work" section of its report that should be further addressed by Ecology and/or stakeholders.

Expected Benefits

This recommendation acknowledges that lead agencies in the state have dramatically different levels of resources and capacity to implement SEPA and that this affects both the burden placed on some lead agencies as they implement SEPA and climate procedures and the effectiveness of the new procedures in their jurisdictions. Accommodating these differences up front in the design of SEPA and climate procedures can make SEPA more effective and less burdensome for lead agencies.

SEPA RECOMMENDATION 10: TRAINING

The state should provide training and funding for training for lead agencies and applicants implementing SEPA and climate provisions. An estimated cost for training could be based on the cost of recent statewide storm water training.

Expected Benefits

Training will help lead agencies understand and effectively implement new SEPA and climate guidance and procedures.

SEPA RECOMMENDATION 11: ADVISORY COMMITTEE

Ecology should address future work described in the recommendations above and the highest priority issues described at the end of the IWG report in the "Future Work" section with the assistance of an advisory group and invite members of the IWG to participate. This committee may have sub-committees or working groups that focus on particular sectors (e.g., transportation) or issue areas (e.g., threshold determination).

Expected Benefits

There are many important issues that the SEPA IWG did not fully address or resolve because of the constraints of time, the complexity of the issues, and the many aspects of SEPA that are affected by considerations of climate change. The IWG expects that the continued work of a stakeholder advisory committee can help develop SEPA and climate policy and provide a valuable resource to Ecology as it implements the recommendations of this group.

Estimating the Benefits and Impacts of the CAT's Recommendations

As will be described in the state's comprehensive report in response to ESSHB 2815, these recommended actions can play a key role in the state's overall plan to meet its GHG emission reduction and other related goals. Working in concert with other existing and planned state actions, the CAT's recommended actions described in this report can contribute a significant share of the reductions needed to return the state's GHG emissions to 1990 levels by 2020 and help to spur the transition to a low-carbon economy.

As shown in the table at the end of this section, GHG emission impacts were estimated for 10 of these 14 recommendations.[32] Taken together, and assuming full and timely implementation, these 10 actions could yield 11 $MMTCO_2e$ in annual emissions reductions by 2020, a reduction of approximately 10 percent below projected 2020 levels.[33] These estimates account for interactions among the various CAT recommendations, as well as interactions with some, but not all, other existing state programs and policies, such as the energy efficiency provisions of Initiative 937.[34]

Though not directly quantified, the other recommendations are likely to contribute in one way or another to declining GHG emissions as well. Many of these strategies also have significant benefit beyond emissions reductions, and contribute towards Washington's goals of creating a Green Economy, supporting Washington industry, and reducing expenditures on imported fuel. Several strategies have other air quality benefits and/or contribute to additional "quality of life" enhancements.

The analysis of GHG emission reductions was conducted in coordination with IWG co-leads and members, using consistent data sources, assumptions and clear presentation of results across the IWGs (for more details, see the quantification approach summary in Appendix 2). Quantification of emission reductions is based on goals and assumptions outlined in each recommendation. These goals are often very ambitious, require significant effort and commitment to achieve, and may prove challenging to accomplish. If, due to financial, institutional or other constraints, actual implementation strategies are unable to deliver the level of participation or technology

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[32] Due to the general nature of some recommendations or the lack of adequate quantification tools, the other four recommendations could not be analyzed at this time.

[33] To ensure consistency with recent and ongoing analysis by the State, the quantification of 2008 recommendations is largely based on the projections and assumptions from *Washington State's GHG Inventory and Reference Case Projections, 1990-2020,* the same report that serves as the basis for the CAT's 2007 interim report as well as the State's ESSHB 2008 report. Developments since the time these projections were assembled (mid-2007) may change the economic and GHG emissions outlook for the State and the specific impact of the recommended actions, particularly in the near term. Significant increases in fuel prices and the current slowdown in economic activity are likely to dampen driving behavior, business activity, personal consumption, and thus energy use and emissions. Given the rapid pace at which economic and energy price outlooks have been changing, and the limited time available for the CAT's work, the CAT has continued to use last year's projections, while at the same time recognizing the potential impact of these recent developments. In addition to lowering the rate of business-as-usual emissions growth, slower economic growth and high energy prices are likely to decrease the estimated emissions savings and increase estimated cost savings (at least in the short run) associated with many recommended programs and policies (as well as those already implemented), especially those that aim to reduce the use of fossil fuels.

[34] This report provides on a partial accounting of the emissions impact of CAT actions. For an assessment of how CAT recommendations interact with the full suite of State actions, see the ESSHB 2815 report.

penetration described, then they will also not provide the GHG reductions estimated here. Therefore, it is important to review the goals and assumptions underlying the quantification when evaluating the GHG emissions reductions a given strategy is likely to deliver.

The CAT recognizes that there are significant public and private investments needed to implement many of these recommendations, even as there is also often significant payback to society and to businesses. Some of the policies are designed to generate public revenue; many are also designed so that the direct users and beneficiaries of the strategy pay for their choices. Still others are expected to result in cost savings. Others are designed to send price signals that both encourage changes in behavior and also may raise revenue for needed investments.

The complete IWG reports discuss the cost implications of the recommendations more fully (see Appendices 2 through 5). They touch on both the overall costs to the state as a whole (consumers and businesses), as well as the implications for state budgets, in terms of both revenue and revenue requirements. With respect to the former, the total cost (or cost savings) to the state as a whole has been estimated for those recommendations most readily subject to quantification. Similarly, the IWG reports reflect on what the recommended actions could mean in terms of state budget for the upcoming 2009-2011 biennium. For each of the legislative actions with budget implications, fiscal impact reports ("fiscal notes") are currently underway in order to inform the state and the Legislature. In some cases, a greater understanding of the costs and cost savings, particularly concerning who will initially bear costs or reap savings, will help ensure successful implementation design. For others, costs are sufficiently understood for implementation efforts to commence. The CAT recognizes that for some recommendations, additional analysis regarding the distribution of costs and benefits could be useful to inform the Governor and Legislature as they consider the recommendations. At the same time, as the CAT noted in its 2007 report, in order to act as quickly as possible to the threat that global warming represents to Washington, the state should aggressively implement those strategies deemed viable now while being cognizant of the uncertainties and potentially unintended consequences that may be associated with them.

While the current economic challenges and the resulting declining public revenues may limit the public funding and private investment capital available in the near term to address the recommendations, these economic challenges underscore the importance of reevaluating existing budgets and reallocating existing resources to accomplish the work needed to move the state towards a lower carbon economy and meet Washington's targets. As well, it emphasizes the importance of incorporating meeting Washington's climate change targets as a significant, "co-equal" criterion for the expenditure of public resources.

These recommendations are designed to ease the discernable financial burden that may fall on some parts of the economy or citizenry. As state, national, and global markets evolve to address climate change, and as choices are made and investments redirected accordingly, costs and benefits will inevitably be distributed unevenly to some sectors or interests. It will be essential to ensure that Washington communities with limited financial resources are strengthened as a result of these changes. Indeed, these communities are often those most vulnerable to the impacts of climate change itself.

GHG SAVINGS AND NPV COSTS OF RECOMMENDATIONS[35]

	GHG Savings ($MMTCO_2e$ /yr)		Cumulative GHG Savings (2008-20) ($MMTCO_2e$)	GHG Accounting Location	NPV Cost 2009-2020 (Mill $)	NPV Cost-Effective-ness ($/tCO2e)
	2012	2020				
TOTALS	**1.8**	**11.2**	**61.7**	**In-State**		
	0.0	**5.6**	**33.4**	**Undetermined**		
EE/GB IWG	**0.5**	**5.5**	**25.4**	**In-State**	**-$753**	**-$30**
Energy Efficiency Quality Investment Program (EE/GB-1A)	0.1	0.8	4.8	In-State	-$179	-$38
Financial Incentives/Instruments to Encourage Efficiency (EE/GB-1B)	0.1	0.3	1.6		-$5	-$3
Energy Efficiency in Existing, New and Renovated Public Bldgs (EE/GB-2)	0.2	1.2	6.8		-$222	-$33
State Energy Code Improvements and 2030 Building Goals (EE/GB-3)	0.4	6.4	26.6		-$841	-$32
Overlap among options	*-0.3*	*-3.2*	*-14.4*		*$494*	
n/a – not applicable (since some options are analyzed for emission reductions, but not costed, sector-wide cost-effectiveness would be misleading)						
Transportation IWG	**1.1**	**4.3**	**25.0**	**In-State**		
Transit, Rideshare, and Commuter Choice (I)	0.7	2.6	15.5	In-State	Not quantified	
Compact and Transit Oriented Development (II)	0.3	1.7	9.6			
Climate Change and Transportation Funding (III)	Not Quantified					
Transportation Pricing (IV)						
Non-VMT Contributions to Reducing GHG Emissions (V) V. Non-VMT Recommendations to Contribute to Reducing GHG Emissions Non-VMT Contributions to Reducing GHG Emissions (V)						
Overlap among options						

[35] The column entitled "GHG Accounting Location" in the GHG savings table provides some clarity about whether emissions reductions are likely to occur in Washington or otherwise impact the State's official inventory, as do emissions savings, for example, that result from reducing the emissions from electricity imported from generators outside Washington. For example, transportation-related GHG emission reductions will occur largely within Washington, which "count" towards the 2020 GHG emission reductions and will help the State meet its compliance budget if the State participates in the Western Climate Initiative cap and trade program. These reductions are shown as "in-State" in the table. Reductions from some recommendations, primarily those dealing with goods that are consumed or disposed of in Washington, but produced outside Washington, lead to emission savings outside the State These reductions are shown as being of "undetermined" GHG accounting location in the table.. Because these reductions may not occur in Washington, they may not be reflected in the State's emission inventory and, while contributing towards reducing Washington's lifecycle GHG emissions "footprint," may not "count" towards the 2020 GHG emission reductions established by the Legislature in ESSHB 2815. However, such actions are a critical demonstration of Washington's leadership in addressing climate change, represent important opportunities for sizeable emission reductions, and could prove critical on the long-term path to a global low-carbon economy.

Beyond Waste IWG	**0.2**	**1.4**	**11.3**	**In-State**		
	0.0	**5.6**	**33.4**	**Undetermined**		
Optimize Collection of Recyclable Materials (BW-1)	0.00	0.0	0.0	In-State	Not quantified	
	0.0	5.2	30.9	Undetermined		
Product Stewardship Framework Legislation (BW-2)	0.5	0.9	6.3	Undetermined		
Market Development for Diverted Organics(BW-3)	0.2	1.7	9.8	In-State		
	0.0	0.3	1.9	Undetermined		
Government Environmentally Responsible Purchasing (BW-4)	Not Quantified					
Collaborate with Retailers to Reduce Consumer Waste (BW-5)	0.2	0.7	3.9	In-State		
	0.06	0.2	1.3	Undetermined		
Overlap among options	*-0.1*	*-0.9*	*-2.5*	*In-State*		
	-0.5	*-1.0*	*-7.0*	*Undetermined*		

2009 and Beyond: Fulfilling the Comprehensive Climate Approach

In 2008, the CAT has primarily focused on recommending "most promising" next steps for Washington in four specific areas, covering 23 of the strategies recommended in 2007. In and of itself, this set of recommendations is not a comprehensive package to address all aspects of reducing GHG emissions. The CAT has not addressed every recommendation from its 2007 interim report in its 2008 deliberations, nor has the CAT identified or analyzed all potential strategies in each major sector of the economy. What has been developed here are the "most promising" recommendations of the areas the CAT did analyze in 2008. The CAT wishes to note that several of the 2007 CAT "Headlines" and specific strategies identified in its interim report have moved forward in 2008 outside the CAT process.

Actions Being Pursued Outside the 2008 CAT Process That Address the CAT's 2007 Interim Recommendations

Washington has implemented significant actions to date that reduce GHG emissions and continue its leadership to meet the challenge and seize the opportunity of addressing climate change and creating economic benefits. In particular, the following "Headline" recommendations from the CAT's 2007 interim report have moved forward in other venues:

- ***Establish Emissions reporting so that progress in emission reductions can be tracked and acknowledged (Headline #2).*** This has moved forward through internal work by Ecology through its development of reporting rules. For more information, see the ESSHB 2815 report.
- ***Invest in worker training for the emerging Green Economy to ensure having a skilled workforce and to provide meaningful employment opportunities throughout the state (Headline #4).*** Many of the CAT recommendations support development of, explicitly target, and grow Green Economy jobs in Washington; CTED and other agencies have also carried work forward on Green Economy jobs in response to Legislative direction. For more information, see the ESSHB 2815 report.
- ***Restore and retain the health and vitality of Washington's farms and forest lands to increase carbon sequestration and storage in forests and forest products, reduce the releases of GHG emissions, and support the provision of biomass fuels and energy (Headline #10).*** The Legislature established two working groups through ESSHB 2815 to address these critical issues. The CAT kept abreast of the progress of these groups and coordinated and referenced their work in its recommendations as relevant and appropriate. For more information, refer to the full recommendations from the Forestry Carbon Market Workgroup and Agriculture Carbon Market Workgroup.

State agencies, the Legislature and others have already moved several of the specific 2007 CAT strategies forward:[36]

[36] Of the 45 mitigation strategies recommended by the CAT in 2007, 42 of them have been further advanced in some manner by the CAT and/or by the State outside the CAT process. The three specific options without any explicit action by the State or CAT in 2008 were ***AW-8: Support for an Integrated Regional Food System; ES-4: Technology Research and***

- ***Quantification of GHG Impacts of Transportation Plans, Programs and Projects (T-5)*** is being addressed by the Land Use Climate Change (LUCC) technical group authorized by the Legislature under Sections 2 and 3 of ESSB 6580 (*An Act Relating to mitigation the impacts of climate change through the growth management act*[37]), which will be provided in 2009.
- ***In-State Production of Biofuels and Biofuels Feedstocks (AW-2)*** is being addressed by Washington State University and CTED. CTED is requesting legislation to extend the five tax preferences enacted in 2003 to promote the production of biofuels from wood biomass feedstocks, and WSU will be submitting a final report on December 1, 2008, in response to ESSHB1303 Section 402[38] to develop market incentives for the use of in-state biofuel.
- ***Improved Forest Health (F-1)*** is being addressed by DNR under its Forest Health Program, through which DNR provides technical assistance on tree and forest health care for a variety of public and private landowners, and conducts applied research and cooperative studies with universities and government agencies.
- ***Expanded Urban and Community Forests (F-8)*** is being addressed by DNR and CTED as required under the Urban Forestry Partnership established by ESSHB 2844.[39]
- ***Grid-Based Renewable Energy Incentives and/or Barrier Removal (ES-1)*** is being addressed in part by the energy credits associated with solar, wind, combined heat and power (CHP), and microturbines extended under the federal Emergency Economic Stabilization Act of 2008,[40] which also established new Clean Renewable Energy Bonds to finance a number of facilities generating renewable energy. In addition, a number of utilities in Washington are working with the Northwest Solar Center on a Renewable Rate Recovery and Control approach to provide incentives for solar power.
- ***Carbon Capture and Sequestration or Reuse (CCSR, including pre and post-combustion) Incentives, Requirements and/or Enabling Policies plus R&D (ES-5)*** is being addressed in part by rules adopted by Ecology for geological carbon sequestration. The Federal Emergency Economic Stabilization Act of 2008 also provides $1.5 billion in tax credits for carbon capture and sequestration and recovery (CCSR) demonstration projects as well as Carbon Dioxide Capture Credits of $10-20/ton.
- ***Transmission System Capacity, Access, Efficiency and Smart Grid (ES-6)*** is being addressed in part by rules adopted by the Washington State Energy Facility Site Evaluation Council (FSEC) applicable to the construction, reconstruction, or modification of electrical transmission facilities, which are scheduled for adoption in October, 2008.

Development, Plus Technology-Focused Initiatives; and ***RCI-5: Rate Structure and Technologies to Promote Reduced GHG Emissions (including decoupling of utility sales and revenues***).

[37] *Addressing the impacts of climate change through the growth management act* (http://apps.leg.wa.gov/documents/billdocs/2007-08/Pdf/Bills/Senate%20Passed%20Legislature/6580-S.PL.pdf).

[38] *Encouraging the use of cleaner energy.* (http://apps.leg.wa.gov/documents/billdocs/2007-08/Pdf/Bills/House%20Passed%20Legislature/1303-S2.PL.pdf)

[39] *Regarding urban forestry.* (http://apps.leg.wa.gov/documents/billdocs/2007-08/Pdf/Bills/House%20Passed%20Legislature/2844-S2.PL.pdf)

[40] http://financialservices.house.gov/

- ***Targeted Financial Incentives and Instruments to Encourage Energy Efficiency Improvements (RCI-2)*** is being addressed in part by SHB 3120,[41] which was enacted by the Legislature in 2008 and directed CTED to conduct a study of sales and use tax exemptions for certified residential and commercial construction. The research conducted as part of this effort has been reviewed and, as appropriate, has been incorporated into the EEGB IWG report.

Areas of Future Work and Next Steps

Given its focused scope in 2008, the CAT did not work on the adaptation recommendations from its 2007 interim report, but does believe that adaptation to climate change is a critical component of a comprehensive response to climate change, and that the state should determine how adaptation to the inevitable impacts of climate change should proceed. The state began an initial assessment of opportunities to prepare and adapt to climate change with the Preparation and Adaptation Working Groups in 2007. The CAT recommends that the state renew its efforts on adaptation in 2009 and beyond through such a coordinated multi-agency and sector effort. Governments, businesses and citizens need information, tools and resources to react to a potentially changing climate-impacted landscape. This response is critical to make informed planning decisions, to protect and restore natural systems, and to adjust the provision of basic services as necessary due to a warming planet.

Meeting Washington's targets for 2020 and beyond remains a compelling and daunting challenge. Climate change is not a problem that lends itself to easy, simple, or singular solutions, and despite their potential, these sector-specific recommendations alone will not get us there, especially since many of these recommended actions have not yet been initiated. The recommendations point to some of the key opportunities to change direction and make the necessary strategic choices over time, but it is imperative to act now. Many of the recommendations can be implemented in a sequence that has been laid out by the CAT. Most can at least be started in 2009. The Executive Branch and the Legislature should implement those recommendations that it deems viable now while continuing to pursue opportunities in 2010 and beyond that together will result in full implementation of a Comprehensive Climate Approach, and move Washington towards a vibrant Green Economy in a thoughtful and deliberate manner.

Much more must also be done outside Washington to ensure that the GHG emission reductions needed worldwide to minimize the damaging impacts from climate change also occur. The actions recommended here are important contributions that Washington can make in reducing GHG emissions. As importantly, these actions also represent an opportunity for Washington to continue to provide leadership to the nation and the world. The response to the global climate challenge is, however, necessarily a global one. Washington must and will continue to act, and must also continue to demonstrate the leadership that will encourage others to join us. By demonstrating the political will to follow the pragmatic approach towards implementing significant changes as laid out in this report, Washington can continue to do its fair share and show the way to an effective global response to climate change.

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[41] *Providing a sales and use tax exemption for environmentally certified residential and commercial construction.* (http://apps.leg.wa.gov/documents/billdocs/2007-08/Pdf/Bills/House%20Passed%20Legislature/3120-S.PL.pdf)

Conclusion

The recommendations in this report represent the CAT's vision for moving Washington towards a low-carbon future with economic opportunities, and describe the bold and thoughtful action needed to build the foundation by which Washington can meet its 2020 GHG emission and VMT reduction requirements as established in ESSHB 2815. There continues to be an urgent need for both immediate and sustained action over time for Washington to achieve its economic and GHG emission reduction targets for 2020 and beyond.

Climate change presents Washington with both enormous threats and substantial opportunities. The recommendations contained in this report point the way towards implementing significant efforts the CAT identified in its interim report that will allow governments, businesses, and individuals in Washington to pursue opportunities, technologies, and choices that reduce carbon emissions in our economy and our daily lives. These recommendations build upon Washington's strengths, leverage going quickly with going smartly, guide Washington's continued transition to a vibrant Green Economy, and contribute significantly towards meeting Washington's GHG emission and VMT reduction goals.

In order for these recommendations to be successfully implemented, the following four commitments need to be fulfilled:

- **Decisive and thoughtful leadership at all levels of government and in the private sector to prepare Washington to participate in the Green Economy and ensure the success of Washington's response to climate change.**
- **Targeted investment in the infrastructure changes required to reduce carbon use and spur innovation throughout Washington's economy.**
- **Protection and restoration of natural systems, including working farms and forests, to ensure the function and resiliency needed to both mitigate GHG emissions and adapt to the unavoidable consequences of some inevitable amount of climate change.**
- **Education, engagement and empowerment of the public to support the above and to generate the participation necessary to address climate change at the household and local business levels.**

The CAT believes that it has accomplished its charge from the Governor and the Legislature. The members of the CAT appreciate the privilege they have been given by the Governor to be on the CAT, and remain committed as individuals to help further advance these recommendations with the same spirit of cooperation and intellectual integrity in which they were developed. The CAT strongly urges the Governor and the Legislature to continue to provide leadership and real action in 2009 and beyond to reduce GHG emissions, expand the Green Economy, and reduce reliance upon imported fuels, informed and guided in part by the CAT's vision and recommendations. Given the long range nature of this challenge, the CAT also suggests that from time to time the state re-convene a representative group of stakeholders similar to the CAT to take stock of progress to date and re-chart as necessary the path forward. The CAT's collective effort has been and can continue to be a hopeful message that, by working together, we can meet the challenge of global warming.

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MEMORANDUM

To: Technical Leads, Washington State Climate Action Team (CAT) process:

From: CAT Technical Coordination Team

Re: Common approaches for quantification of draft CAT/IWG actions

Date: August 26, 2008

1. Introduction

This memo summarizes some recommended approaches for quantifying the impacts on Washington greenhouse gas (GHG) emissions of actions being considered by the Implementation Working Groups (IWG), and the net costs of same. As we are all aware, there are many nuances and complexities to estimating and attributing impacts and costs/savings to proposed actions, and an abundance of different potential methodologies. There are also state efforts beyond the CAT process that involve analysis of GHG emissions and economic impacts of policies, measures, investments, and actions.

This memo is specifically focused on the CAT process, and its rapid timeline, with the recognition that the Department of Ecology is engaged in a broader and longer-term coordination effort, of which the CAT process is just one part.

This memo is organized as follows:

1. **Introduction**
2. **Accounting Standards**
   - 2.1 Core Principles
   - 2.2 Accounting Period
   - 2.3 Definition of the Reference Case
   - 2.4 Interaction/Aggregation of Impacts Across Options
3. **Measuring GHG Reduction Potential**
   - 3.1 Definition and Units
   - 3.2 Reference Standards
   - 3.3 Location of Emissions
   - 3.4 Life-cycle Analysis for Biofuels, Waste, and Building Materials
   - 3.5 Electricity Emissions
4. **Measuring Cost**
   - 4.1 Definition and Units
   - 4.2 Included Costs
   - 4.3 Excluded Costs
5. **Measuring External Benefits**
6. **Measuring Distribution of Impacts**
7. **Reporting and Review Process**
   - 7.1 Documenting Assumptions
   - 7.2 Formatting
   - 7.3 Protocol

2. Accounting Standards

2.1. Core Principles

- Reflect "best practice" in analysis methods, and maximize accuracy to the greatest extent possible, given data and other constraints. Rely where appropriate on reviewed sources.

- Provide transparency in methods and assumptions.
  - Clearly document your methods and assumptions.
  - Where possible use a central repository (*e.g.* Central Desktop or a Microsoft *Sharepoint* site) for technical documentation, especially calculations spreadsheets.
  - Identify, if not necessarily quantify, key uncertainties.

- Ensure consistency and/or compatibility of methods and assumptions, to the extent possible, across options and sectors.

- Document and justify proposed departures from the methods and data used in the 2007 CAT process core documents:
  - **The final report**: *Leading the Way: A Comprehensive Approach to Reducing Greenhouse Gases in Washington State, Recommendations of the Washington Climate Advisory Team*;[1]
  - **The state inventory**: *Greenhouse Gas Inventory and Reference Case Projections, 1990-2020*;[2] (hereinafter "*Inventory & Projections*") and
  - **Policy option documents for each TWG**.[3]

- Where you use approaches or assumptions not prescribed in this memo, actively seek peer review from the other technical team members. Also seek out input from other technical team members when you see the opportunity for synergy, or potential for inconsistency, with other IWG/CAT technical analyses.

2.2. Accounting Period

Projections of IWG measure impacts shall cover the period January 1, 2008 to December 31, 2020. Where possible, project impacts (whether environmental, social or economic) for each calendar year in the accounting period, but at a minimum for the years 2012 and 2020.
Note that the accounting period may be extended to 2025 or 2030, so it would be wise to do estimates out to 2030 wherever it is feasible.

2.3. Definition of the Reference Case

Since emission reduction and cost-effectiveness assessment are based on differences from a business-as-usual or as-expected baseline, the use of a consistent reference case is essential. The 2007 CAT analysis was based on set of assumptions regarding future economic and demographic growth, existing policies, and other factors that influence "business-as-usual" GHG trajectories through 2020, as detailed in *Inventory & Projections*. However, several developments in the past year have changed that outlook, most notably: a) higher energy prices and projections; b) their impact on energy use and supply, as well as on economic factors; and c) the impact of federal legislation adopted in 2007, in particular, the Energy Independence and Security Act of 2007.

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[1] Available at: http://www.ecy.wa.gov/climatechange/CATdocs/020708_InterimCATreport_final.pdf.

[2] Available at: http://www.ecy.wa.gov/climatechange/docs/WA_GHGInventoryReferenceCaseProjections_1990-2020.pdf.

[3] Available at: http://www.ecy.wa.gov/climatechange/cat_twg_overview.htm.

2.3.1. Parameters Reported in the Inventory & Projections

The following Reference Case parameters (1990-2020) are reported in *Inventory & Projections*, and shall continue to be used for calculations by the IWGs:

Key Parameter	1990-2005	2005-2020	Sources
Population	1.7%	1.5%	The State of Washington, Office of Financial Management
Employment			Washington State Employment Security Department
Goods	0.8%	1.1%	
Services	2.1%	0.9%	
Electricity Sales	-0.6%	1.3%	EIA data for 1990-2005, Projections based on information from Northwest Power and Conservation Council and Utility plans (see Appendix A)
Vehicle Miles Traveled	1.9%	2.0%	Washington State Department of Transportation

Source: *Inventory & Projections*, p. 13

If possible, growth rates for electricity sales should be applied by sector, as follows:

	Historic		Projections	
	1990-2000	2000-2005	2005-2010	2010-2020
Residential	1.4%	0.1%	0.9%	0.9%
Commercial	2.7%	0.0%	2.3%	2.3%
Industrial	-1.4%	-9.0%	0.9%	0.9%
Total	**0.6%**	**-2.9%**	**1.4%**	**1.3%**

Source: *Inventory & Projections*, p. A-9

2.3.2. Parameters Affected by Developments in 2007-2008

The following Reference Case parameters (1990-2020) are updates based on recent changes in economic outlooks, and shall replace any assumptions inferred from *Inventory & Projections*.

Fuel cost

Fuel costs shall be scaled to the values reported in the U.S. DOE's Annual Energy Outlook 2008, revised early release.[4] The relevant values are copied below for convenience; the units are 2006 dollars per million Btu, but keep in mind that in most cases the units will be unimportant as these numbers will be used by TWGs to scale changes or growth over time from a known quantity in (most likely) 2005.

[4] Available at: http://www.eia.doe.gov/oiaf/aeo/.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Residential																
Fuel Oil	16.98	17.94	19.32	21.92	17.86	17.21	16.50	15.80	15.12	14.84	14.27	13.84	13.86	14.00	14.16	14.27
Natural Gas	12.85	13.40	12.52	12.66	12.65	12.15	11.86	11.67	11.46	11.30	11.20	11.17	11.28	11.38	11.48	11.39
Commercial																
Fuel Oil	13.82	14.59	16.63	19.03	15.86	15.24	14.82	14.10	13.52	13.38	12.88	12.44	12.46	12.63	12.96	13.24
Natural Gas	11.53	11.50	10.75	11.08	11.15	10.59	10.31	10.14	9.93	9.77	9.68	9.66	9.76	9.87	9.97	9.91
Industrial																
Fuel Oil	14.50	15.33	17.18	19.96	16.30	15.72	15.70	14.92	14.44	14.40	13.95	13.53	13.56	13.75	14.22	14.62
Natural Gas	8.37	7.66	7.04	7.42	7.60	7.21	6.89	6.69	6.46	6.27	6.15	6.10	6.16	6.23	6.29	6.21
Coal	2.22	2.34	2.42	2.49	2.48	2.42	2.39	2.35	2.34	2.32	2.31	2.29	2.29	2.28	2.28	2.28
Transportation																
E85	23.89	24.81	25.49	24.88	25.16	23.58	22.11	23.21	21.21	18.96	17.61	17.64	16.55	16.72	18.54	18.15
Gasoline	19.28	21.19	22.52	24.51	22.71	21.23	20.69	20.07	19.51	19.40	18.80	18.30	18.40	18.61	19.16	19.64
Jet Fuel	13.30	14.83	15.00	15.74	16.27	15.77	15.50	14.72	14.08	13.74	13.16	12.75	12.82	12.97	13.13	13.27
Diesel Fuel	18.09	19.72	20.49	22.77	20.33	19.68	19.38	18.58	18.11	18.09	17.65	17.18	17.19	17.35	17.86	18.26

Electricity avoided cost

Electricity avoided costs shall be scaled to the values reported in the U.S. DOE's Annual Energy Outlook 2008, Supplemental Tables for Census Division 9.[5] The relevant values are copied below for convenience; the units are 2006 dollars per million Btu, but keep in mind that in most cases the units will be unimportant as these numbers will be used by TWGs to scale changes or growth over time from a known quantity in (most likely) 2005.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Residential	31.25	34.20	32.77	33.15	33.33	32.66	31.78	31.13	31.15	31.29	31.30	31.28	31.35	31.41	31.47	31.39
Commercial	31.05	33.03	30.87	31.41	31.44	30.64	29.51	28.82	28.27	27.93	27.80	27.73	27.71	27.68	27.66	27.45
Industrial	22.38	23.11	21.58	22.22	22.20	21.69	20.97	20.45	20.11	19.93	19.86	19.81	19.82	19.83	19.85	19.71
Transportation	29.13	27.63	28.01	28.84	28.80	28.08	27.12	26.45	25.96	25.68	25.59	25.54	25.53	25.52	25.52	25.34

2.3.3. Impacts of the 2007 Energy Bill

Impacts of the Energy Independence and Security Act of 2007 have been incorporated into the Annual Energy Outlook values reported above for fuel costs. [It is as yet unclear whether this is also the case for the Census Division 9 Supplemental Tables for electricity costs. Generally a review of the energy bill's impacts on WA emissions through 2020, and interaction with prior estimates for WA existing policies and CAT options, is warranted. This is a sophisticated analysis probably impossible within the time constraints of the IWG process. The sectors most deserving attention are Transportation (Jeff Ang-Olson) and Efficiency (David Von Hippel).]

2.4. Interaction/Aggregation of Impacts across Options

Options may overlap in terms of coverage, both within and across sectors. In order to avoid double counting of GHG reduction potential and costs (for example, where more than one option addresses the same emissions source), interactive effects should be estimated where possible, and emissions reduction totals will reflect these overlaps. In other words, the total emissions reductions for the state will be lower than the sum of the results for individual options.

Provide early indication of interactions that need to be quantified and planned approaches to Hedia Adelsman (ECY) and Michael Lazarus (CCS).

[5] Available at: http://www.eia.doe.gov/oiaf/aeo/supplement/index.html.

3. Measuring GHG Reduction Potential

3.1. Definition and Units

GHG reduction potentials shall be reported in million metric tons of carbon dioxide equivalent ($MMtCO_2e$) using Intergovernmental Panel on Climate Change (IPCC) 100-year global warming potentials (GWP) from the Second Assessment Report.[6] Specifically, the GHGs to be included and their GWPs are:

Gas	100-year GWP
Carbon dioxide (CO_2)	1
Methane (CH_4)[b]	21
Nitrous oxide (N_2O)	310
HFC-23	11,700
HFC-125	2,800
HFC-134a	1,300
HFC-143a	3,800
HFC-152a	140
HFC-227ea	2,900
HFC-236fa	6,300
HFC-4310mee	1,300
CF_4	6,500
C_2F_6	9,200
C_4F_{10}	7,000
C_6F_{14}	7,400
SF_6	23,900

Source: IPCC (1996)

3.2. Reference Standards

Where emission factors or calculation methodologies are not specified in this document, draw them instead from the following documents, by order of preference:

1. The Climate Registry, *General Reporting Protocol*, Version 1.1, May 2008.[7]
2. U.S. EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006*, April 2008.[8]
3. International Standards Organization, *Greenhouse gases -- Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*, ISO 14064-1:2006, March 2006.[9]
4. Intergovernmental Panel on Climate Change, *2006 IPCC Guidelines for National Greenhouse Gas Inventories*, 2006.[10]

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6 Values from the Second Assessment Report are used to be consistent with the US EPA National GHG inventory and the United Nations Framework Convention on Climate Change.

7 Available at: http://www.theclimateregistry.org/protocols.html

8 Available at: http://www.epa.gov/climatechange/emissions/usinventoryreport.html

9 Must be purchased at: http://www.iso.org/iso/iso_catalogue.htm; cost is CHF 96.00.

10 Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

3.3. Location of Emissions

GHG reductions associated with IWG actions should be estimated regardless of the physical location of the emissions reductions. For instance, a major benefit of recycling is the reduction in material extraction and processing (e.g. aluminum production). While a policy option may increase recycling in Washington State, emissions may decrease in other states or countries where materials are produced. Such policy options contribute to overall global emission reductions; at the same time, emission reductions that occur outside the state due to state actions will not show up in future state emissions reporting or inventories.

Separate reported GHG reductions into in-state, regional (e.g. Western North America or WCI), or global reductions, depending on where analysis and judgment suggests the majority of emission reductions will occur. Where regional or global are indicated, indicate the rationale. For example, many recycling emission reductions are likely to fall in the global bin, while electricity energy efficiency reductions are likely to fall in the regional bin.

3.4. Life-Cycle Analysis for Biofuels, Waste, and Building Materials

Life-cycle analysis should applied wherever emissions impacts upstream (e.g., production, extraction) or downstream (e.g. waste disposal) from a specific activity constitute a significant fraction of a policy option's emissions impacts, and where data from existing studies are sufficient to enable this estimation. For example, lifecycle analysis should be used to estimate the emissions benefits of biofuels relative to the fossil fuels they might substitute for. Similarly, actions that significantly affect the stocks or flows of building materials or harvested wood products may require the use of life-cycle methods.

If data from existing studies to support life-cycle GHG assessment are not available, but life-cycle GHG impacts are believed to be significant, they should be reported qualitatively in the External Benefits category.

Life-cycle analysis is subject to considerable uncertainty, with different studies occasionally suggesting quite different implications for actions such as paper recycling, shifting the choice of building materials, or promoting biofuels. Since such actions may stretch across working groups coordination here will be essential, ideally to establish consistent methodologies, and at a minimum to understand how different methods and assumptions affect the results. Transparent statements of all methodologies used are critical when life-cycle assessment is involved.

Because life-cycle analysis includes indirect emission, these calculations could lead to some emissions or emissions reductions being counted twice. Coordination across work groups will be needed to accurately distribute emission reductions to individual strategies. For example, reducing the energy to produce construction materials could be considered an improvement in construction or an improvement in industrial processes.

3.4.1. Biofuels

Adopt the lifecycle GHG reductions required for biofuels to count toward targets of the Energy Independence and Security Act of 2007, as follows:

Corn ethanol:	20% GHG reduction relative to gasoline
Cellulosic ethanol:	60% GHG reduction relative to gasoline
All other biofuels:	50% GHG reduction relative to gasoline or diesel (as appropriate)

3.4.2. Building Materials/Wood Products

[TBD]

3.4.3. Waste Management

Life-cycle impacts of waste management options shall be evaluated with the U.S. EPA Waste Reduction Model (WARM), version 8.

3.5. Electricity Emissions

3.5.1. Marginal Emission Rate

A wide variety of actions could impact electricity use and the emissions associated with delivering this electricity. Unlike with specific fuels, however, there is no single method to calculate an emission factor for electricity. In fact, the range of methods that may be used can lead to a wide variance in emission factors and resulting emission reduction estimates, especially in a state like Washington, with its high proportion of low-cost, low-emission hydroelectricity. An average emission rate reflecting all electricity sources currently used in WA will be quite low. However, for this analysis, we are interested in the marginal or incremental impact on electricity generation that might result from specific actions, reducing demand or providing electricity from other sources. Thus a marginal emission rate is more appropriate. Such a rate should reflect the types of electricity generation sources that are avoided as the result of the suite of actions contemplated. In a state like Washington, the marginal emission rate will be considerably higher than the average emission rate, since it is unlikely that a significantly fraction of the hydroelectricity, at least from existing facilities, will be "on the margin", as it is low-cost resource (water won't be spilled over the dam as the result of greater efficiency or renewable energy).

For analysis of IWG options, we recommend continuing to use the marginal emission rate of 0.5 $MTCO_2e$/MWh for all years, as used for the 2007 CAT process. Since this is a key and uncertain variable in estimating GHG impacts, we are reviewing recent studies, such as the June 2008 marginal emissions report from the NW Power Council, and may revisit this figure in early September.

3.5.2. Transmission & Distribution Losses

Assume transition and distribution losses consistent with those used for the *Inventory & Projections*, as follows.

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
8.9%	7.7%	7.6%	7.6%	7.5%	7.4%	7.3%	7.2%	7.2%	7.1%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%

Source: <WA common assumptions Oct 18, 2007.xls>

4. Measuring Cost

4.1. Definition and Units

Report net present value (NPV) cost (or cost savings) for the period 2008–2020 in 2006 constant dollars, using a 5% annual real discount rate.[11] Positive numbers represent options with net costs; negative numbers represent options with net cost savings. Include direct, economic costs from the perspective of the state as whole (e.g., avoided costs of electricity production and delivery rather than consumer electricity prices). Favor a bottom-up approach that is amenable to transparency and is capable of reflecting the costs (and cost savings) associated with

[11] Capital investments with lifetimes longer than 2020 should be represented in terms of levelized or amortized costs, in order to avoid "end effects." Note that the 2008-2020 period is suggested to maximize consistency with the 2007 CAT report analyses. *[Further explanation may be needed here.]*

individual policy options, in contrast to macroeconomic analysis, which aims to capture flows and interactions across all sectors of the economy.
Also report the cost per quantity of emissions reduced (or removed) in units of dollars per metric ton of carbon dioxide equivalent ($/t$CO_2$e). This figure represents the NPV cost over the entire period 2008-2020, divided by the cumulative emission reductions over the entire period 2008–2020. This practice reflects the general approach of cost-effectiveness, as widely applied to GHG mitigation policy options.[12]

4.2. Included Costs

- Capital costs levelized (amortized) where appropriate, e.g. for improved buildings, vehicles, equipment upgrades, new technologies, manure digesters and associated infrastructure, ethanol production facilities, mass transit investment and operating expenses (net of any saved infrastructure costs such as roads)
- Operation, maintenance, and other labor costs (or incremental costs relative to standard practice),
- Fuel and material costs, e.g. for natural gas, electricity, biomass resources, water, fertilizer, material use, electricity transmission and distribution
- Other direct costs administrative and other costs (where readily estimated), such as the grid integration costs for renewable energy technologies, or the costs of administering an energy efficiency project, or of implementing smart growth programs (net of saved infrastructure costs)

4.3. Excluded Costs

- External costs such as the monetized environmental or social benefits/impacts (value of damage by air pollutants on structures, crops, etc.), quality-of-life improvements, or improved road safety, or other health impacts and benefits
- Energy security benefits
- Macroeconomic impacts related to the impact of reduced or increased consumer spending, shifting of cost and benefits among actors in the economy
- Potential revenues from participation in a carbon market

5. Measuring External Benefits

Note key, external benefits, as well as risk, qualitatively or quantitatively as existing studies or other information allow. Examples of external benefits include:

- Energy security benefits;
- Collateral reductions in traditional pollutants; or
- Health impacts.

Examples of external risks (risks that cannot be represented by dollar costs per Section 0 above) include:

- Ecosystem degradation/biodiversity loss; or
- Job or corporate income losses due to shifting macroeconomic patterns.

For some actions, you may be able to provide additional analysis, such as the financing requirements, state budget impacts, or other implications. These should be reported separately so that they are not confused with the cost terms to be reported as above.

[12] See, for example, Section 2.4 of the IPCC Fourth Assessment Report, Working Group III, for more discussion of various economic analysis approaches. http://www.MDp.nl/ipcc/pages_media/AR4-chapters.html

6. Measuring Distribution of Impacts

Describe potential macroeconomic impacts, costs, or benefits that fall disproportionately on specific groups or actors. Distributional issues will usually be noted qualitatively, though quantitative estimates are encouraged if relevant existing studies or other information are available to inform estimates. Examples of distributional issues include benefits or costs that are distributed unevenly among:

- Rural vs. urban populations; or
- Poor vs. wealthy populations; or
- Native Americans vs. non-Native Americans.

7. Reporting and Review Process

7.1. Documenting Assumptions

Key data sources, methods, and assumptions should be presented in bulleted fashion, referring to the common factors noted here.

Use consistent terminology and present similar results in similar manners.

- Be careful to note that we are conducting cost-effectiveness or cost analysis, rather than cost-benefit analysis.
- Where there are other, non-quantified (or non-quantifiable) factors that may shift the results of cost-effectiveness analysis, acknowledge/identify them, and note the likely direction, if not magnitude, of their impact on the analysis.

7.2. Formatting

The results for GHG emissions and costs should be represented in table format as shown here:

IWG	Action	GHG Emission Reductions ($MMTCO_2e$)				NPV (2008-2020) ($ Million)	Cost Effectiveness ($/$tCO_2$)
		2012	2020	Cumulative (2008-2020)	Location		
	Short Description	x.x	x.x	x.x	In-state / regional / global	$xx	$xx

7.3. Protocol

Assuming that the guidelines described here, suitably revised, will work for all of the technical leads, there are three key points where IWG members will need to call on the coordination team (initially contacting Hedia Adelsman (ECY) and Michael Lazarus (CCS)):

- **Proposed changes** to *the Inventory & Projections*, or specific assumptions and methods described here. In these cases, email the coordination team with your proposed changes and we can seek input from other technical team members, discuss and revise this or other documents accordingly.
- **Additional technical issues** not identified here. Email the coordination team, and we will follow up.

- **Review of results of analysis across groups:** Ideally well in advance of wide distribution (date TBD), please email draft analyses to the technical team so that we can do a brief review and comparison across the working groups, and have a chance to iterate with you and ensure maximum consistency (or understand the reason for any inconsistencies) prior to the Sept 18-19 CAT meeting.

In addition, we would like to receive, by Sept 5, an early indication of which CAT actions are likely to be quantified, and such information is available, how the quantification will be done. A brief email from each IWG will suffice.

Energy Efficiency and Green Buildings IWG Report to the Climate Action Team

Summary of Proposed Actions

EE/GB ACTION 1: ENERGY EFFICIENCY INCENTIVES

This proposed action recommends legislation designed to use incentive-based approaches to motivate and accelerate the design, construction, and annual operation of buildings to levels of superior energy performance (Action 1A), and to encourage the incorporation of combined heat and power, distributed electricity generation, and other distributed and district energy systems, including district heating and cooling (Action 1B). Proposed legislation would reward actual demonstrated energy performance with tax credits.

EE/GB ACTION 1A: ENERGY EFFICIENCY QUALITY INVESTMENT PROGRAM (EEQUIP)

Near-term high priority legislative concepts for this action include:

1. Public Utility Tax (PUT) credits for non-residential buildings that meet specific levels of energy performance based on actual utility data, with 50 percent of the PUT credit supplied by the utilities serving the building.
2. A modification of statutory language related to Local Improvement Districts (LID) that adds energy efficiency as a qualifying activity.

Other most promising future legislative concepts for this action include:

1. Partial sales tax refunds for new non-residential buildings that achieve energy performance standards equivalent to an ENERGY STAR Target Finder rating of 90.
2. Partial sales tax refunds for new and existing residential buildings that meet a level of energy performance equivalent to an ENERGY STAR Northwest-rated home.

EE/GB ACTION 1B: EXPANDED IMPLEMENTATION OF DISTRIBUTED ENERGY AND WATER, COMBINED HEAT & POWER (CHP) AND RENEWABLE ENERGY

Distributed energy systems are highly effective tools to maximize the efficient use energy resources, capture waste energy that would otherwise not be used (thus yielding efficiencies that exceed those of larger stand-alone systems), capitalize on the synergies of multiple uses by moving energy between these uses, optimize capital resources, and minimize GHG output. They are effective GHG minimization tools at the neighborhood, campus or district level. Distributed energy systems include combined heat and power (CHP), industrial waste heat, district cooling, and renewable energy systems.

To capture the benefits of distributed energy and related systems, offer incentives to encourage the development and use of CHP and other distributed energy systems using options potentially including B&O (business and operations) Tax credits, Public Utility Tax credits for buildings and industries that use CHP/distributed energy systems, sales tax exemptions on machinery and equipment used in CHP/distributed energy systems, and/or property tax exemptions. In the short term, focus implementation on extending current sales tax exemptions for investments in manufacturing equipment to also cover CHP and distributed energy systems meeting specified performance targets.

EE/GB ACTION 2: ENERGY EFFICIENCY, ENERGY BENCHMARKING, AND ENERGY PERFORMANCE DISCLOSURE IN EXISTING, NEW AND RENOVATED BUILDINGS

EE/GB ACTION 2A: ENERGY EFFICIENCY IN EXISTING, NEW AND RENOVATED PUBLIC BUILDINGS

Legislative action is proposed to substantially upgrade the energy efficiency and sustainability of publicly-constructed and -operated buildings, including both new and existing buildings. Key elements of the proposed legislation, which has slightly different provisions for State agencies, colleges, universities and school districts and for cities, counties, and other taxing authorities, would include:

1. Require a process of benchmarking, auditing, and implementation of energy-efficiency measures in existing publicly-constructed and –operated buildings, with energy-efficiency requirements becoming more stringent over time in a tier/phased approach.
2. Require that new and substantially renovated publicly-constructed and –operated buildings meet strict energy performance standards, again with energy-efficiency requirements becoming more stringent over time in a tier/phased approach.
3. Emphasize that education and promotion are critical components to the success of the program.
4. Implementation will emphasize the use of existing programs and funding in state and local governments.
5. Partnering with US EPA's ENERGY STAR program is a critical element and has been initiated.

EE/GB ACTION 2B: ENERGY BENCHMARKING AND ENERGY PERFORMANCE DISCLOSURE IN PUBLIC AND PRIVATE BUILDINGS

Develop and implement energy benchmark (e.g. energy use/square foot) public disclosure requirement for private non-residential and residential buildings at the time of sale or, in some circumstances, at the time of lease of a building.

EE/GB ACTION 3: STATE ENERGY CODE IMPROVEMENTS AND ESTABLISHMENT OF 2030 BUILDING GOALS

This Action includes two major elements:

1. In the 2009 Washington State Building Code adoption cycle, revise the Washington State Energy Code (WSEC) to achieve a 30 percent reduction in new building energy use compared to the 2006 edition of the WSEC. Provide substantial efficiency advances in the code as it applies to remodeling, retrofit and equipment replacement. Specify a process of periodic review and improvement of building energy codes. Consider the impacts of codes on the availability of incentives through utility demand-side management programs, and provide education and technical assistance in the implementation of updated codes.
2. Legislative action is recommended to provide policy direction in the development and implementation of a long term **State Building Efficiency and Carbon Reduction Strategy**. Legislation would direct CTED to develop a 2010 State Strategy for Building Energy Efficiency and Carbon Reduction, which would include establishing specific targets for building energy use intensity and target for new buildings similar to the Architecture 2030 Challenge schedule. This strategy would examine several implementation methods including: state codes and appliance standards, emerging technologies, user incentives, education and technical assistance, and measurement. It is recommended that the strategy be updated every three years prior to the state building code development and adoption process.

Full 2009 Action Descriptions

EE/GB ACTION 1: ENERGY EFFICIENCY INCENTIVES

EE/GB ACTION 1A: ENERGY EFFICIENCY QUALITY INVESTMENT PROGRAM (EEQUIP)

2009 ACTION DESCRIPTION:

The derived public benefit from investments in superior energy efficiency in Washington is a superior quality-built environment for those using and operating buildings, as well a strategic attraction for additional investments in our economy. To this end, development assistance to provide incentives for quality improvements in building energy efficiency, by definition, must also ensure quality improvements in operations, performance, measurement, and the craftsmanship and training that go into quality buildings. In addition to alignment with the goals of Executive Order 07-02 and subsequent statutes, this rationale works to better ensure the transparency, accountability, and success of the program, from the perspective of the direct beneficiary as well as the public at-large.

This action recommends the following;
Near-term high priority legislative concepts for this action include:

1. Public Utility Tax (PUT) credits for non-residential buildings that meet specific levels of energy performance based on actual utility data, with 50 percent of the PUT credit supplied by the utilities serving the building.
2. A modification of statutory language related to Local Improvement Districts (LID) that adds energy efficiency as a qualifying activity.

Other most promising future legislative concepts for this action include:

1. Partial sales tax refunds for new non-residential buildings that achieve energy performance standards equivalent to an ENERGY STAR Target Finder rating of 90.
2. Partial sales tax refunds for new and existing residential buildings that meet a level of energy performance equivalent to an ENERGY STAR Northwest-rated home.

PUT Credit and Benchmarking Requirement for Existing Commercial and Multifamily Residential Buildings

Legislative action is recommended in 2009 to establish a tax incentive for buildings (non-residential occupancies) that meet or exceed a defined level of energy performance as determined by the ENERGY STAR Portfolio Manager program (or a comparable verified third-party or independent system of standardized accounting and benchmarking as determined by the Community, Trade, and Economic Development Department). The Department will develop a program that provides the tax credit that initially (e.g. 2009-2010 biennium) provides incentives for buildings that meet or exceed a Portfolio Manager score of 75 or demonstrate an annual improvement of energy performance of at least 15% (regardless of baseline year Portfolio Manager score). Buildings that continue to meet or exceed the Portfolio Manager threshold score may claim the tax credit annually. Buildings that meet the 15% improvement target may claim the credit only one time. Thereafter, those buildings must meet the Portfolio Manager threshold score to claim the credit in other years

There are three mechanisms for qualification for the PUT credit. All three mechanisms begin with establishing a baseline score using the previous calendar year of energy use data).

1. If the score is 90 or above and that score is maintained or improved in the subsequent calendar year, the PUT credit for year 2 (year after baseline) is available for refund. The PUT refund is available for subsequent years if the score is maintained at 90 or above.
2. For buildings whose baseline year score is between 75 and 89, those buildings must demonstrate 5 points of improvement in year 2 to qualify for a PUT tax refund for year 2 (Note any building that exceeds a score of 90 in the second year will qualify for the process described above). If the 2nd year Portfolio Manager score is maintained or improved in subsequent years, the PUT refund will continue to be available.
3. For buildings whose baseline year score is below 75, those buildings must achieve a minimum score of 75 in any subsequent year to qualify for a PUT refund. If a score of 75 or above is maintained, the PUT refund will continue to be available.

After 3 years, the baseline score in mechanism #2 moves to a range of 80 to 89. All other features remain the same for the subsequent 3 years.

After 3 years, the baseline score for mechanism #3 moves to 80.

After 6 years, the baseline score for all buildings to qualify for a PUT credit will be 90. A score of 90 or above must be maintained in subsequent years to continue to receive the PUT credit.

Verification of Portfolio Manager benchmark scores will in all cases be done through the U.S. EPA ENERGY STAR validation process. Relying on this process reduces administrative cost and burden to the state.

The tax credit described here should be applied to the Public Utility Tax (PUT). The PUT is assessed to electric and natural gas utilities and passed through to energy end use customers. Buildings that meet the level of superior energy performance as described here will receive a full credit of the PUT provided that the serving utility to that building has agreed to participate with the State in this program. Utility participation requires the electricity or natural gas utility agreement to a 50% "cost share" with the State for the value of the tax credit. Buildings that are served by electric and/or natural gas utilities that decline to participate in this agreement will not be eligible for the tax credit. Utilities that do participate in this tax credit program will be allowed to claim a reasonable amount of energy savings from the customer project and use those savings to meet the goals of the Energy Independence Act (I-937). The Department will establish a mechanism in consultation with the state's public and private utilities and in collaboration with the Department of Revenue to minimize the transactional cost of applying this credit to qualifying buildings.

Revenue effects: It is estimated that up to 28 million square feet of commercial property will qualify for a PUT refund in the second year of the 2009-2010 biennium (given the need for a baseline year, there will be no credits in 2009). The anticipated PUT refund with this level of participation is approximately $750,000.

Sales Tax Refund for Non-Residential New Construction

Legislative action is recommended when the state's revenue situation improves, to establish a sales tax incentive for buildings (non-residential occupancies) that meet or exceed a specific level of superior energy performance. The level of energy performance will be defined as equal to or better than the energy performance of buildings that achieve an ENERGY STAR Target Finder score of 90. The Department will establish through rulemaking procedures any necessary state specific adaptations to the ENERGY STAR Target Finder benchmark as well as all qualifying rating systems that offer energy performance requirements that meet or exceed this level of energy efficiency. All projects that meet this requirement will be eligible for a sales tax refund of 0.75% of the project's documented cost of construction, up to a maximum refund per square foot of floorspace in the project applying for refund. The Department will establish rules for documenting qualification for this tax credit, for the maximum refund level per unit floor area, and for verification of qualifying cost of construction. Project owners will receive the incentive in the form of a sales tax refund.

Revenue effect: In the 2009-2010 biennium, approximately $80,000,000 of construction costs are estimated to qualify for the refund, rising to nearly $250,000,000 by 2012. This would translate to a tax refund of $400,000 in

the 2009-2010 biennium. It is estimated that very few projects would be completed in 2009, so the majority of this tax refund would occur in 2010. By 2012, the estimated tax refund would be about $1.1 million annually.

Sales Tax Refund for Existing and New Residential Buildings

Legislation is recommended when the state's revenue situation improves, to establish a partial sales tax refund for qualifying costs incurred by residential property owners for energy efficient new construction remodels and/or retrofits if as a result of that work the property reaches an established threshold of superior energy performance. The threshold level of energy performance to qualify for this tax credit will be equal to or better than that of an ENERGY STAR Northwest rated home. CTED will, through a rulemaking process, establish specific levels of energy performance pursuant to this benchmark, certify any home rating system that meets or exceeds this threshold level of energy performance, as well as define qualifying expenses for energy efficiency retrofit and renovation projects. The sales tax for these projects would be paid pursuant to RCW 82.08.020.

If the project met the threshold requirement, the property owner would be eligible to claim a partial refund for sales tax paid on the project of no more than 20% of the total tax paid capped at $5,000.

Revenue effect: The revenue effect on the state is estimated to be $3.5 - $7.5 million per year.

Amendment to Local Improvement District Statute

Legislative action is recommended in 2009 to amend the statute [RCW 35.43.040] that governs the general authority of cities and towns to establish Local Improvement Districts (LID) and to levy and collect special assessments on property specially benefited by energy efficiency upgrades in existing buildings and/or qualifying district energy projects. Amendment would allow cities and towns to establish energy efficiency investment districts (EEID) that can access capital via assessment revenue bond sales to enable large energy efficiency investments in existing buildings of the development of district energy projects. Bonds will be repaid over time based on property-specific assessments that capture the special benefits of the upgrades.

This proposal would allow cities and towns to use the LID concept to access capital for city-wide energy efficiency upgrades in existing single family, multifamily and commercial buildings.

Since LIDs are widely used throughout Washington, city and town administrators are familiar with the process and equipped to manage an LID financing.

In practice, this type of financing would likely occur with one or series of LID financings managed by a City. Normally, an LID requires 60% approval of property owners in the district, but because upgrades will be done to specific properties, the approach for an EEID will use a "checkerboard" strategy. The boundaries of the EEID will encompass the entire city and there will be an initial "opt-in" period, where property owners can choose to join the district and access capital for upgrades through the program.

Once property owners have joined, the special district is defined. This special district is allowed to certify assessments to the tax assessor for inclusion on the tax rolls, such that the assessment becomes an increment on the property's tax bill. For LIDs, these incremental property tax payments are tax deductible.

In the proposed EEID, the new assessment is a monthly or annual payment that pays back, over a predetermined term, the full value of the energy remodel elements added during the upgrades, plus interest. This cost is assessed only against individual properties as they participate in the program. If the property owner sells, the buyer can choose to pay off the assessment at the time of purchase, to eliminate any outstanding liens on the property.

An important benefit of this structure is that the proposed EEID financing concept ties repayment of the investment to the property's owners and subsequent owners. This means that the beneficiaries of the investments financed by the program are paying for the benefits. (An alternative financing mechanism may involve municipal utility revenue bonds or city general obligation bonds.) While these mechanisms would access similarly-priced capital, they would also be repaid with revenue streams (rates or taxes, respectively) derived from all ratepayers or citizens in a district.

This LID concept is viewed as one of a series of innovative financing approaches that are necessary to fully realize the energy efficiency potential of existing buildings. Combining this LID approach with other capital generating mechanisms from public, private, and/or utility sources is likely needed to achieve the state's greenhouse gas reduction goals.

Participation of Low Income Property Owners: Since the financing in this program does not result in a new mortgage on the property and qualification does not depend on income, every building owner, including all low-income building owners, should be able to participate.

Recommendation: Add energy conservation/energy efficiency measures and district energy projects as qualifying local improvements in RCW 35.43.040. For example;

(19) Energy efficiency, energy conservation measures, and district energy projects. Assessments may be levied only on property that will be specially benefited by such improvements.

Revenue Effect: This concept has no revenue impact at the state level. It allows cities and towns to establish local improvement districts (LIDs) or utility local improvement districts (ULIDs) as a mechanism to help finance energy efficiency and energy conservation measures in existing buildings.

A number of other possible alternative financing mechanisms have been developed in other jurisdictions, and might be considered (and in some cases, are being considered) for application in Washington. Additional possible alternative financing mechanisms include:

- Creation of a loan program, funded by state bonds but administered on the local level, specifically tailored to finance building energy efficiency improvements. Such a program could include elements of pooled financing programs, bond insurance, state bond banks, and state loan and bond guarantees.
- Creation of an Energy Efficiency Financing Platform Program that brings together as many sources of capital as possible into a system with streamlined and centralized implementation and repayment[1]. Such as platform would bring together capital sources such as, but not limited to state bonds, local government financing sources, utility funds, pension funds, and private investment. The fund would leverage both public and private money at multiple levels. It could be a public entity, perhaps housed within CTED, or elsewhere. It could also be a brokered fund that is privately-managed with public accountability and contributions. Repayment of loans made by the fund could be structured so as to attach the loan to a property and not an individual, either by tying repayment to property taxes, or adding payment to utility bills (on-bill financing). The fund would be managed by a program that is responsible for ensuring oversight, branding, verification, and payment collection (via utilities, municipalities, etc.). The program could be a part of CTED, or exist on its own. The administration costs for the fund would be paid for out of user fees. After an initial expenditure to establish the program, in the long run, the state general fund would not be a source of funding.
- Creation of a state Air Quality Finance Authority that could, for example, offer long-rate, long-term financing to private and other purchasers of buildings and equipment that reduce greenhouse gas emissions, purchase energy-efficient equipment in bulk to achieve large-volume discounts (for resale or lease to consumers)[2],
- The use of U.S. Department of Housing and Urban Development Community Development Block Grant Program loan guarantees for improvements, particularly to low- and median-income housing, that results in greenhouse gas emissions reductions[3].

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[1] A similar initiative, the Joint Energy Financing Fund for energy efficiency, is under consideration in Oregon.
[2] United States Environmental Protection Agency Environmental Finance Advisory Board, Report on Innovative Finance Programs for Air Pollution Reduction. A version of this document dated November, 2007 is available as http://www.epa.gov/efinpage/efab/LetterSJ110107.pdf.
[3] This and other financing options are summarized in United States Environmental Protection Agency (August 2008) Guidebook of Financial Tools: Paying for Sustainable Environmental Systems, available as http://www.epa.gov/efinpage/publications/GFT2008.pdf.

- Creation of public-private partnerships with utilities and other investors to offer financing for energy efficiency improvements that are paid back through payments made on monthly utility bills.

BASIS FOR SELECTION:

These legislative concepts are designed to use an incentive-based approach to motivate and accelerate the design, construction, and annual operation of buildings to levels of superior energy performance. They are designed to work with familiar and accessible programs of merit (e.g. LEED, ENERGY STAR, Built Green or other verifiable third-party or independent certifications) that have gained acceptance by the commercial and residential buildings market. The reward through tax credits for actual demonstrated energy performance is innovative and critically important to achieving the state's overall greenhouse gas reduction and quality job creation goals, outlined in Executive Order 07-02.

IMPLEMENTATION APPROACH AND MECHANISMS:

These tax credit proposals have a revenue impact on the state's general fund. However, the ideas can be scaled to both near-term and long-term budget realities. It is recommended that the complexities of tax credit program mechanics be left to a rule making process conducted by the Department.

SUPPORTING INFORMATION:

GHG Reduction Potential

Analysis of the costs and benefits of this Action have focused on the Public Utility Tax Credit and Sales Tax Rebate elements described above. The table the follows presents the overall results of the analysis.

Summary Results of Analysis for Action EE/GB-1B

EE/GB	Action	GHG Emission Reductions ($MMTCO_2e$)				NPV (2008-2020) ($ Million)	Cost Effectiveness ($/tCO_2$)
		2012	2020	Cumulative (2008-2020)	Location		
Action 1A	Energy Efficiency Quality Investment Program (EEQUIP)	0.1	0.8	4.8	In-state / regional	-$180 million	-$38

Additional results of and inputs to this option can be found in the Annex to this document.

Key Inputs/Assumption for Analysis of Action EE/GB-1B

PUT Rebate Element

- Levelized Electricity Avoided Cost: $66/MWh
- Levelized Natural Gas Avoided Cost: $7.6/MMBtu
- Levelized Cost of Electricity Savings: $32 $/MWh
- Levelized Cost of Natural Gas Savings: $6.6 $/MMBtu
- 50% of multi-family residential units are candidates for PUT credit element of Action

- The cumulative fraction of commercial and multi-family residential square footage qualifying for PUT rebate by maintaining Energy Star score of 90 or above is 3% by 2012, and 10% by 2020, and provide new savings equal to 1% of 2005 average electricity and gas use per square foot annually.
- The cumulative fraction of commercial and multi-family residential square footage qualifying for PUT rebate by maintaining Energy Star score of 75-89 (80-89 after year 3) is 1.5% by 2012, and 3% by 2016, and provide new savings equal to 3% of 2005 average electricity and gas use per square foot annually.
- The cumulative fraction of commercial and multi-family residential square footage qualifying for PUT rebate by improving to an Energy Star score of 75 (80 after year 3) or making an improvement of 15 points is 5% by 2012, and 8% by 2016, and provide new savings equal to 5% of 2005 average electricity and gas use per square foot annually.

Sales Tax Credit Element

- The cumulative fraction of commercial and multi-family residential square footage qualifying for PUT rebate by maintaining Energy Star score of 90 or above is 3% in 2012 and 10% by 2020.
- Construction costs for non-residential and multi-family residential buildings covered under this element are assumed to average $250/square foot (this value also serves as the maximum basis for tax credits for commercial and multi-family residential buildings). Average construction costs for single-family residences were assumed to be $150 per square foot.
- Only new (not renovated) commercial and multi-family residential floorspace is covered by this element of the Action.
- Both new renovated single-family residential units are covered by this element of the Action, and renovated and new units are assumed to occur in roughly equal numbers.
- Buildings participating in this element of the Action yield average energy savings equal to 20 percent of 2005 average electricity and gas use per square foot of floorspace annually above and beyond the requirements of the more stringent building energy codes included in Action 3.
- In addition to reductions in greenhouse gas emissions, building energy efficiency improvements for which incentives are provided under this action reduce the emissions of non-GHG air pollutants, can result in reduced water use, and can increase the use of in-state renewable fuels while reducing the consumption of imported fossil fuels.

EE/GB ACTION 1B: EXPANDED IMPLEMENTATION OF DISTRIBUTED ENERGY & WATER, COMBINED HEAT & POWER (CHP) AND RENEWABLE ENERGY

2009 ACTION DESCRIPTION:

Background:

Distributed energy systems are highly effective tools to maximize the efficient use energy resources, capture waste energy that would otherwise not be used (yielding efficiencies that exceed those of larger stand-alone systems), capitalize on the synergies of multiple uses by moving energy between these uses, optimize capital resources, and minimize GHG output. They are effective GHG minimization tools at the neighborhood, campus or district level. These systems are utilized currently in Washington by public entities such as at the University of Washington and Washington State University as well as by private entities such as Seattle Steam. Distributed energy systems connect multiple heating and cooling energy users through networks of energy sources such as combined heat and power (CHP), industrial waste heat, district cooling, and renewable energy sources such as biomass, geothermal, geoexchange, and other natural sources of heating and cooling. In addition district systems may also include fuel cells, Micro combined heat and power (MicroCHP), microturbines, photovoltaic systems, concentrating solar

collectors, reciprocating engines, small wind power systems, Stirling engines and other innovative district-based clean technologies.

District energy systems produce energy, produce and pipe steam, hot water or chilled water underground through a dedicated piping network to heat or cool buildings in a given area, reducing energy costs and greenhouse gas emissions, while freeing up valuable space in individual buildings by centralizing production equipment and, through economies of scale and equipment management, optimizing the use of fuels, power and resources.

By aggregating the thermal requirements of dozens, hundreds, or even thousands of different buildings, the district energy system can employ industrial grade equipment designed to utilize multiple fuels and employ technologies that would otherwise simply not be economically or technically feasible for individual buildings, such as deep lake water cooling; direct geothermal or waste wood combustion[4].

Distributed water systems minimize pump energy and resultant GHG output through the effective utilization of limited water resources at a localized level, minimizing regional pumping issues. Approximately 8 percent of total U.S. energy demand is used to treat, pump, and heat water according to the US EPA. Distributed water systems function through the capturing rainwater, reuse of greywater, and localized treatment of blackwater (for distribution as greywater) involving multiple users at a neighborhood, campus or district level. Integrated with Low Impact Development (LID) strategies, distributed water systems can be effective tools to minimize GHG output as well as protecting Washington water systems, such as Puget Sound.

Combined heat and power systems produce both heat—in the form of hot water, steam, or heated air—and power. The heat can be used for industrial or commercial processes, or to provide water heating and/or space heating in individual buildings or throughout multi-building campuses or districts. Using technologies such as absorption chillers, the heat from CHP systems can also be used for cooling/freezing applications, including applications such as air conditioning, district cooling, and in the food processing industry. Waste heat that often goes up the smoke stack can also be used on the "back end" of industrial processes (following its use in the process) to produce power and recover the waste heat.

The sizing of CHP systems can be based on: 1) following the thermal demand for a facility; 2) following the power demand for a facility; or 3) following both thermal and power demands, when seasonal variations occur; and 4) meeting power needs demanding high reliability. Prime CHP opportunities include forest products/pulp and paper mills, food processing with year-round operations, dairies, feedlots, wastewater treatment facilities, campus settings with district heating of multiple buildings, industrial process facilities with available waste heat, natural gas compressor stations, and facilities with high power reliability, heating and hot water, and cooling requirements such as hospitals and data centers. Cogeneration is an older term for CHP. For additional information see the Northwest CHP Application Center website at http://www.chpcenternw.org/.

Combination heating and district cooling systems provide chilled water that is used for air conditioning of building space and process cooling for data centers and switchgear. In a city, there is generally a diversity of load as different types of buildings (i.e. residential, commercial, retail, convention, etc) will use energy under different operating conditions and set peak demands at different times of day. Serving this variety of loads allows the central plant to operate at optimal output over a longer time period. Additionally, many district cooling systems incorporate thermal storage systems to further expand peak capacity and increase the operational flexibility and efficiency with the ability to operate equipment at optimal output[5].

Incentives for Development of Combined Heat and Power/Distributed Energy Systems

It is proposed to offer incentives to encourage the development and use of CHP and other distributed energy and water systems, including district heating and cooling, and district grey & black water systems in the following ways:

- Offer tax incentives potentially including B&O (business and operations) Tax credits, Public Utility Tax credits for buildings and industries that use CHP/distributed energy systems district heating and cooling,

[4] Source: IDEA Report: The District Energy Industry, International District Energy Association.
[5] Source: IDEA Report: The District Energy Industry, International District Energy Association.

and district water systems, sales tax exemptions on machinery and equipment used in these systems, and/or property tax exemptions. In some cases, it may be possible to integrate these incentives with the building energy efficiency incentive programs described in Action 1A, above. Sales tax exemptions on equipment purchases and installation of CHP, district heating and cooling, district water systems will likely be easiest to implement in the short-term, based on the existing manufacturing and retail sales tax and use tax exemptions on equipment used in manufacturing (which include exemptions for CHP systems used in manufacturing).

- Adoption of output-based emissions regulations.
- Requiring CTED and the UTC to assess the regulatory barriers to CHP, district heating and cooling, district water systems, and recommend enabling changes (see "Potential Barriers to Implementation" comments, below)

Eligibility of CHP/Distributed Energy & Water Systems

Eligible CHP projects: Combined heat and power systems that meet minimum efficiency standards should be eligible. Combined heat and power systems shall be designed to have a projected overall thermal conversion efficiency (output of electricity plus usable heat divided by fuel input) of at least 70 percent to qualify for a full exemption from the sales and use tax[6].

Eligibility criteria for incentives, and tax credits or exemptions available, for other distributed energy systems such as district cooling, district steam, district hot water, district geothermal, district geoexchange, and other effective technologies will be set by CTED based upon the effectiveness of the system and incentive models established for CHP[7].

Eligible District Water projects: Projects that demonstrate a total potable water demand reduction of a minimum of 55% for the district relative to a baseline code model would be eligible, based upon a tiered approach, for incentives based on efficiency as follows:

- Projects that have a projected total overall potable water reduction between 55-59% would be eligible for 50% of the available tax credits or exemptions.
- Projects that have a projected total overall potable water reduction between 60 and 64% would be eligible for 75% of the available tax credits or exemptions.
- Projects that have a projected total overall potable water reduction above 65% would be eligible for 100% of the available tax credits or exemptions[8].

[6] A report by the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) characterizes overall system efficiency of gas turbine-based CHP systems as ranging from 65-72%. See table on page 19 of the document at http://www.eea-inc.com/dgchp_reports/TechCharNREL.pdf. The IWG did not reach full agreement on a level of efficiency to receive a tax exemption, with some members favoring a lower threshold in consideration of the substantial efficiency benefits of going from stand-alone energy systems to CHP, and other members emphasizing using incentives to drive implementation of higher-performance CHP systems. The IWG also considered different levels of efficiency that could qualify for a partial tax exemption, but have been advised that a partial exemption from sales and use taxes, at any rate, would be very difficult to administer. The 70 percent threshold shown here reflects a relatively high threshold in consideration of a goal of modest revenue impacts. That is, the 70 percent efficiency threshold takes into account that only limited incentives will likely be practical, at least in the initial years of a program. The efficiency threshold should be more fully evaluated.

[7] There is some disagreement over the definitions of alternative energy/bioenergy with respect to organic byproducts of the pulping process. This definition may affect eligibility for incentives, to the extent that eligibility as ultimately defined by CTED includes an alternative fuels criterion. IWG members have expressed differing points of view as to whether the organic byproducts of the pulping process should be defined as alternative energy/bioenergy.

[8] Please note that the application of tax credits/exemptions to water use reduction projects has not been fully considered by the IWG as a whole.

BASIS FOR SELECTION:

Greenhouse Gas Reduction Opportunity – CHP efficiencies—the rate of conversion of fuel energy to electricity plus useful heat—ranges from 60% on the low end to 85% on the high end. This is in stark contrast to standalone fossil energy power plants (fueled principally with coal and natural gas) that have efficiencies historically in the range of 30% to 36%. It is the double or triple use of the energy that gives CHP the extra efficiency boost. This makes CHP (even natural gas-based CHP) a greenhouse gas winner. See the ES-7 strategy the chart on page 47 of "Leading the Way on Climate Change: The Challenge of Our Time". ES-7 is CHP http://www.ecy.wa.gov/climatechange/interimreport.htm. In Washington State, most CHP projects are biopower/opportunity fuels-based. This further intensifies the greenhouse gas win, since the initial fuels used for CHP produce low or no GHG emissions when burned.

CHP Potential in Washington – A 2004 report done by Energy and Environmental Analysis titled Combined Heat and Power in the Pacific Northwest: Market Assessment showed the technical market potential for CHP in Washington to be 7,721 MWc. See page 52 of the study http://www.chpcenternw.org/NwChpDocs/Chp_Market-Assessment_In_PNW_EEA_08_2004.pdf. Tapping waste heat sources for power production would provide additional CHP opportunities not specified in this report. This same report also analyzed the major environmental benefits of CHP, including reduced NO_x, SO_x and CO_2 emissions (see pages 73-75).

District cooling, district steam, district hot water, district geothermal, district geoexchange, and other effective technologies for greenhouse gas emissions reduction in Washington will be evaluated by CTED.

IMPLEMENTATION APPROACH AND MECHANISMS:

Additional details on the approach for implementation of this option, and integration of incentive approaches for CHP and distributed energy and water systems with incentive approaches for building energy efficiency improvement, are under development.

Potential Barriers to Implementation, and Approaches to Address Them

No significant CHP capacity has been built in Washington during the past 15 years due to a number of important economic and policy barriers that need to be overcome:

- Ability to Dispatch Technology: control of the operation of a CHP plant by the utility that operates the grid that the plant is connected to can be a concern for the plant owner. Mutually agreeable dispatch protocols should be negotiated between the plant owner and the host utility.
- Compliance with Grid Interconnection Standards: Washington State could seek to influence and streamline grid interconnection standards and associated costs, where applicable. Standards are set be FERC and NERC rather than the State.
- High Transaction costs Associated with CHP Projects: CHP and distributed energy projects sometimes face high financing costs because of lender unfamiliarity and perceived risk,
- "Split Incentives": Split incentives between building owners and tenants, and utility-related policies like interconnection requirement, high standby rates, exit fees, etc, act as barriers to CHP/distributed energy system development.
- Lack of Financial Incentives to Pursue CHP/Distributed Energy: Consistent, long-term, clear incentives supporting CHP, waste energy recovery, and other distributed energy systems have been largely lacking to date. The proposals above help to address these needs.
- Potential Regulated Utility Barriers restricting the creation of Mico-Utilities.
- Potential localized regulatory barriers at the county or municipal level.

- Potential regulatory barriers or constraints complicating use of natural deep water cooling.
- Potential water law and health code barriers tied to neighborhood, district, and campus rainwater capture, grey water and black water systems.
- Low electricity rates compared with many other parts of the United States.

SUPPORTING INFORMATION:

Interaction of CHP/Distributed Energy Systems with Market-based Regulatory Systems for GHG Emissions

CHP has been recognized in programs such as those developed by RGGI (Regional Greenhouse Gas Initiative, a collaborative effort by 10 Northeastern and Mid-Atlantic states), and by Alberta, and is now being discussed within the WCI (Western Climate Initiative) cap-and-trade design. There are several potential approaches on CHP and similar technologies might be handled in a market-based system. One approach would be for CHP projects to be awarded allowances or auction proceeds for the projects' avoided emissions. Another option would be simply to exempt existing CHP facilities/projects from emissions limits, and to allow for new CHP facilities/projects to quality for offset credits. Whatever approach is adopted in a market-based system with respect to CHP, the approach should reward/provide incentive for CHP, and seek to avoid inadvertently penalizing CHP systems.

GHG Reduction Potential

By recovering waste heat and reusing it through combined heat and power systems (or through using waste heat directly for generation), an equivalent amount of new fossil-based energy can be displaced, resulting in a more energy efficient production of energy services and significantly less GHG production per unit of electricity generated/heat delivered. District heating and/or cooling systems offer the opportunity to provide many users from the same source of thermal energy, including in conjunction with CHP systems. District water systems offer the opportunity to reduce pumping and water treatment energy use as water use efficiency is improved and water is re-used.

To date, analysis of the costs and benefits of this Action have focused on combined heat and power systems. A summary of the results of analysis to-date, and a listing of key inputs, is provided below. The table the follows includes:

- A row listing the benefits and costs of implementing CHP systems in Washington at rates of between 2 and 3 percent annually of estimated "Economic Potential with Accelerated Case Assumptions"[9] [10]; and
- A row showing the benefits and costs of implementing combined heat and power systems that would receive exemptions from the Sales Tax/Use Tax based on the policy outlined above. Key assumptions here are that 50 percent of CHP systems developed (at a 2-3%/year rate of implementation) achieve high enough efficiencies to qualify for tax exemptions, that 100 percent of qualifying commercial CHP systems receive exemptions, and that 10 percent of qualifying industrial systems receive exemptions under this program. Note that investments in most industrial CHP systems **already** qualify for the existing "Manufacturing Machinery and Equipment Sales Tax and Use Tax Exemption", so long as most of the power produced is consumed in the manufacturing facility in which it is located. Based on these

[9] From Combined Heat and Power in the Pacific Northwest: Market Assessment: Task 1 - Final Report., Submitted to Oak Ridge National Laboratory by Energy and Environmental Analysis, Inc., and dated August, 2004. This report can be found at: http://www.chpcenternw.org/NwChpDocs/Chp_Market-Assessment_In_PNW_EEA_08_2004.pdf. "Accelerated Case" assumptions include 2020 cost and performance specifications (somewhat lower costs in 2020 than in 2004), no stand-by charges, and financial incentives equal to about 15% of capital costs.

[10] Note that this assumption is similar, but not identical to, the level of CHP system implementation that was used in evaluating the cost and savings from development of CHP systems during the Fall 2007 Climate Advisory Team process. Other assumptions used in that analysis have been updated, producing somewhat different results than were found during the earlier analysis.

participation assumptions, the total volume of tax exemptions claimed in 2012 would be just over $1.0 million.

Summary Results of Analysis for Action EE/GB-1B

EE/GB	Action	GHG Emission Reductions ($MMTCO_2e$)				NPV (2008-2020) ($ Million)	Cost Effectiveness ($/$tCO_2$)
		2012	2020	Cumulative (2008-2020)	Location		
Action 1B	Expanded Implementation of Distributed Energy & Water, Combined Heat & Power (CHP) and Renewable Energy	0.3	1.4	7.5	In-state / regional	-$72 million	-$10
	Systems Covered by Expanded Sales and Use Tax Exemption	0.1	0.3	1.6	In-state / regional	-$4.6 million	-$3

Additional results of and inputs to this option can be found in the Annex to this document.

Key Inputs/Assumption for Analysis of Action EE/GB-1B

- Levelized Electricity Avoided Cost: $66/MWh
- Levelized Natural Gas Avoided Cost (used both for gas savings and costs): $7.6/MMBtu
- State Element Sales and Use Tax (% of purchase cost): 6.50%
- 94% of the capacity of systems implemented is fueled with natural gas, with the remainder biomass-fired.
- Usable cogenerated heat is 40 percent of the total energy input to CHP systems.
- Useful heat from CHP systems displaces 90% gas heat/steam, and 10% electric heat/steam.

Costs/Cost Savings

The analysis above suggests that the people of the State of Washington will save about $72 million from 2008 through 2020, on a net present value basis, by implementing CHP systems at the levels shown.

Other Benefits

In addition to reductions in greenhouse gas emissions, combined heat and power and distributed/district energy systems for which incentives are provided under this Action reduce (in many cases) the emissions of non-GHG air pollutants, can result in reduced water use, and can increase the use of in-state renewable fuels while reducing the consumption of imported fossil fuels. District energy systems can also play a role in promoting compact development to reduce transportation requirements.

Interaction with Ongoing GHG Emissions Reduction Programs in Washington

Programs developed in compliance with I-937 get double credit for CHP projects that qualify as distributed generation of under 5 MW of capacity.

EE/GB ACTION 2: ENERGY EFFICIENCY, ENERGY BENCHMARKING AND ENERGY PERFORMANCE DISCLOSURE IN EXISTING, NEW AND RENOVATED BUILDINGS

EE/GB ACTION 2A: ENERGY EFFICIENCY IN EXISTING, NEW AND RENOVATED PUBLIC BUILDINGS

2009 ACTION DESCRIPTION:

Background

The overall effort involves all of the public sector. It includes existing buildings, major renovations and new construction. It would include state agencies, universities, colleges, school districts and local governments. Education and promotion of the program are critical components to the success of the program. Implementation will emphasize the use of existing programs and funding from federal, state and local governments.

Partnering with US EPA's ENERGY STAR program is critical and has been initiated. The ENERGY STAR program is poised to help, for the most part, at no cost. Reporting will be through ENERGY STAR and the US Green Building Council (USGBC).

Affected state agencies will report activity to OFM, but for schools, universities, colleges and local governments will report internally and publicly. Energy performance of all buildings will be posted to a highly publicized web site. It is this program transparency and activating of stakeholders and constituents with information and awareness that will becomes the "carrot and stick" the program needs for success.

The program relies upon the well-established ENERGY STAR and US Green Building Council LEED programs for some level of training, third party verification, and reporting that will be accessible to the public. Additional training will also be coordinated by GA, Dept. of Ecology, and WSU Extension – Energy Programs.

Public entities affected by this proposal are encouraged to make operational refinements to improve the ENERGY STAR score of their buildings prior to the July 2010 target date and thereafter. These operational refinements should include scheduling equipment operation to coincide with occupancy and emphasis on energy efficient occupant behavior.

It is recommended that entities affected by this proposal that manage over 1,000,000 SF of conditioned building space consider the implementation of a Resource Conservation Management (RCM) program using dedicated staff. Energy utility(s) may provide financial support and technical assistance for an RCM program. Technical assistance will also be available through the WSU Extension – Energy Programs.

PROPOSED LEGISLATION DETAIL

Section A: Definitions

Architecture 2030. A non-profit, non-partisan and independent organization, Architecture 2030 was established in response to the global-warming crisis. It refers to an energy performance standard that uses the Energy Star commercial buildings program.

Benchmark. The energy used by a building as recorded monthly for at least one year. The building energy use and the building characteristics information are required inputs for ENERGY STAR's Portfolio Manager. Buildings on a campus served by a central plant or centralized metering can develop a prorated benchmark for the buildings served by the central plant.

Conditioned and Occupied Building. A building that is occupied more than 30 hours per week, on average, and meeting the definition of a Conditioned Space in the Washington State Energy Code.

Cost-effective. Energy conservation measures means energy conservation measures that the investment grade audit concludes will generate savings sufficient to finance project loans of not

more than ten years.

Department. Refers to the Department of General Administration.

ENERGY STAR score. The score provided by the ENERGY STAR program, which indicates the energy efficiency performance of a building compared to similar buildings in the same climate zone. ENERGY STAR is a nationally recognized EPA building energy rating system that is also used by LEED – EB O&M and Architecture 2030 as the energy performance metric. Unrated building types will develop a benchmark using guidance and principles from the ENERGY STAR and LEED EB programs. The department will recommend methods to establish benchmarks for unrated buildings.

Investment grade energy audit. A detailed building audit prepared by an Energy Service Company pre-selected by the department in an open public selection process, to provide an energy savings proposal that will guarantee first cost and savings of the energy measures identified. The proposed measures must meet the customer's cost effectiveness criteria or the investment grade audit is free.

LEED – EB O&M. Refers to Leadership in Energy and Environmental Design – Existing Buildings Operations & Maintenance as developed by the United States Green Building Council.

LEED – NC Gold. Refers to Leadership in Energy and Environmental Design – New Construction. Gold is a level of performance within the LEED Green Building Rating System.

MACC. The maximum allowable construction cost.

Preliminary energy audit. A quick evaluation by an Energy Service Company or other qualified building auditor of the energy savings potential of a building. This is a free service through the department's Energy Savings Performance Contracting program.

Resource Conservation Management program. A program focused on tracking and conserving energy and water to save on expenses.

Section B: Existing Public Buildings

Part 1: State agencies, colleges, universities and school districts

1. By July 1, 2010 each state agency, college, university and school district shall create an energy benchmark for each conditioned and occupied building over 10,000 square feet using the US EPA's ENERGY STAR Portfolio Manager program.
2. This baseline information will be posted on the ENERGY STAR website or other site as determined by Dept. of Ecology and will be open to public review.
3. For each building with an ENERGY STAR score below 50, state agencies, colleges, universities and school districts shall undertake a preliminary energy audit by July 1, 2011. Department of General Administration's Energy Performance Contracting program can provide the necessary technical assistance to meet this requirement.
4. If potential cost effective energy savings are identified, an investment grade energy audit must be completed by July 1, 2012.
5. Cost-effective energy conservation measures identified in the investment grade energy audit must be implemented by July 1, 2015.
6. All buildings under this section will be required to maintain an ENERGY STAR score of greater than 75 after October 1, 2016. Quarterly inputs are required to keep the Energy Star score current.
7. The ENERGY STAR score will be posted for public review at a site determined by Dept. of

Ecology.

8. (a) By October 1, 2016 all state agency, college, university and school district owned buildings over 50,000 SF under this section will be certified to LEED – EB O&M Silver or equivalent system as determined by the department, and will be re-certified every 5 years.

   (b) All buildings over 50,000 SF covered by this section must achieve the following standards:

      i) ENERGY STAR score of 75 or better.

      ii) LEED-EB–OM: WE credit 2 Indoor Plumbing Fixture and Fitting Efficiency (or an equivalent standard as determined by the Department) – 1 point.

      iii) LEED-EB-OM: WE credit 3 Water Efficient Landscaping (or an equivalent standard as determined by the Department) – 1 point.

      iv) LEED-EB-OM: MR credit 7 Solid Waste Management: Ongoing Consumables (or an equivalent standard as determined by the Department) – 3 points

   (c) These standards will be evaluated for update by guideline by the department in consultation with a committee of affected agencies in 2016 and every 4 years following.

9. Buildings planned for demolition or major renovation by July 1, 2015 are exempt from the requirement to undertake a preliminary energy audit and subsequent energy audits and energy measure implementation.

10. New buildings will be required to comply with the Existing Public Buildings requirements 3 years after occupancy.

11. By July 1, 2011 each conditioned and occupied leased building over 20,000 square feet occupied entirely by a state agency, college, university and school district shall create an energy benchmark using the US EPA's ENERGY STAR Portfolio Manager program.

12. This benchmark information will be posted on the ENERGY STAR website or other site as determined by Dept. of Ecology and will be open to public review.

13. All conditioned and occupied leased buildings over 20,000 SF occupied entirely by a state agency, university or school district must achieve an ENERGY STAR score of 75 or better by October 1, 2016.

14. Buildings that have lease agreements that predate this statute will be exempt, however, any new lease or lease renewal must comply within 15 months of the new lease inception.

Part 2: Cities, Counties, and other Public Taxing Authorities

The provisions are the same for buildings owned and leased by cities, counties and other public taxing authorities as in Section B (Part 1), *except* the following timelines are extended:

1. By July 1, 2011 each city, county, and other public taxing authority shall create an energy benchmark for each owned conditioned and occupied building over 10,000 square feet using the US EPA's ENERGY STAR Portfolio Manager program.

2. For each publicly owned building with an ENERGY STAR score below 50, each city, county, and other public taxing authority shall undertake a preliminary energy audit by July 1, 2012. The Department of General Administration's Energy Performance Contracting program can provide the necessary technical assistance to meet this requirement.

3. If potential cost effective energy savings are identified, an investment grade energy audit must be completed by July 1, 2014.

4. Cost-effective energy conservation measures identified in the investment grade energy

audit must be implemented by July 1, 2017.

5. All buildings under this section will be required to maintain an ENERGY STAR score of greater than 75 after October 1, 2018
6. By October 1, 2018 all buildings over 50,000 SF under this section will be certified to LEED – EB O&M Silver or equivalent system as determined by the department, and will be re-certified every 5 years.
7. The initial energy benchmarking efforts will be the responsibility of the local jurisdictions. This is good building operating practices and will help the owners identify buildings with savings opportunities. It would also help to identify no cost and low cost measures. The cost of a preliminary audit and investment grade audit, if working through the Dept. of General Administration's Energy Savings Performance Contracting (ESPC) program, would be zero if no cost effective measures are identified, or would be rolled into the cost of the qualified and contracted energy conservation measures identified. Utility incentives would be utilized to reduce the first cost of measures identified. The balance of the costs for implementation of the energy measures could come from low cost State Treasurer financing. Financing would be paid back from the guaranteed savings. Using this approach requires no capital outlay. The cost of the measures is completely paid off by the savings.
8. As for the cost of the LEED – EB O&M program for buildings over 50,000 SF, these would need to come from the local jurisdictions, however, savings in energy and water, and increase productivity of the workers would provide for a quick payback on costs. An estimate of the cost for documentation and submittal fees is $10,000 to $50,000 per building. Economies will be realized with multiple buildings and through a learning curve, subsequent buildings within an organization will cost less. The cost for LEED-EB O&M re-certification is relatively low.

Section C: New Construction of Public Buildings

Part 1: State agencies, colleges, universities and school districts

1. All occupied and conditioned buildings over 10,000 SF going into design after July 1, 2011 or after building energy code updates (for example, those proposed under Action 3) are implemented, if applicable, will be required to certify to the LEED NC Gold level or equivalent as determined by the Department. This also applies to major renovation projects where the project construction budget is over 50% of the assessed value of the building. All affected buildings must achieve the following as prerequisites:

   a) Meet "Architecture 2030" goals for energy performance.

   b) LEED-NC Water Use Reduction or an equivalent standard as determined by the Department – 2 points.

   c) LEED-NC Water Efficient Landscaping or an equivalent standard as determined by the Department – 1 point.

   d) LEED-NC Construction Waste Management or an equivalent standard as determined by the Department – 2 points.

   e) A minimum of 0.5% of the MACC must be spent on renewable energy systems as defined under LEED (or under an equivalent standard as determined by the Department).

Part 2) Cities, Counties, and other Public Taxing Authorities

1. (a) By July 2011, local governments state-wide shall adopt rules that are at least compliant with this section.

   (b) All occupied and conditioned buildings over 10,000 SF going into design after July 1, 2013

will be required to certify to the LEED NC Gold level or an equivalent standard as determined by the Department.

2. The LEED NC Gold requirement also applies to major renovation projects where the project construction budget is over 50% of the assessed value of the building. All affected buildings must achieve the following as prerequisites:

   a) Meet "Architecture 2030" goals for energy performance.

   b) LEED-NC Water Use Reduction or an equivalent standard as determined by the Department – 2 points.

   c) LEED-NC Water Efficient Landscaping or an equivalent standard as determined by the Department – 1 point.

   d) LEED-NC Construction Waste Mgt or an equivalent standard as determined by the Department. – 2 points.

   e) A minimum of 0.5% of the MACC must be spent on renewable energy systems as defined under LEED (or under an equivalent standard as determined by the Department).

3. As a point of reference for considering the cost impacts of these actions, the added cost to implement LEED NC Gold (or equivalent standards) for jurisdictions that have no such requirements is estimated to be about 2.7% of construction costs[11]. For jurisdictions that already require LEED NC Silver or an equivalent standard, the costs should be 0% to 1% of construction costs[12].

PROCEDURAL AND ADMINISTRATIVE PROVISIONS AND REQUIREMENTS

It is recommended that this proposal be implemented through legislative action. As currently proposed, it is consistent with the Governor's new Executive Order on Sustainability (expected to be released in fall 2008). An Executive Order alone could achieve a portion of the desired emission reductions; however, the extent of the impacts would be far less since the Order is only binding on the state's executive branch agencies which report to the Governor.

Many existing programs will be utilized to implement this recommendation: the department, Dept. of Ecology, ENERGY STAR, US Green Building Council's LEED program, WSU Extension-Energy Programs, NEEC (Northwest Energy Efficiency Council), and electric and gas utility conservation programs.

The Departments of General Administration (GA) and the Ecology will work closely with the Association of Washington Cities and Washington State Association of Counties to provide information and training designed to assist local jurisdictions in the implementation of this statue.

Currently the Dept. of General Administration is responsible for tracking and administration of new construction/major renovations of state and higher education LEED projects. This would remain in place. For the existing buildings, format for reporting will be established by a stake-holder group facilitated by the department (GA). Annual reporting by state agencies will be submitted to OFM. School districts and local governments will be responsible for administration of their own data through a web site identified by Dept. of Ecology.

Costs of implementation for existing buildings below 50,000 SF would be minimal. Energy savings will pay for improvements. There will be some administration related to energy data collection and interaction with the ENERGY STAR website, and if energy savings potential exists, administration of energy performance contracts with

[11] Davis Langston Adamson, Costing Green: A Comprehensive Cost Database and Budgeting Methodology, 2004.
[12] Ultimately, the net cost of meeting public building energy performance standards will also depend on the efficiency level required in building energy codes such as those proposed in Action 3.

the Department would be needed. Often this expertise exists within public organizations and can be absorbed by current staff.

Cost of implementation for existing buildings 50,000 SF and higher to achieve LEED-EB O&M Silver would range from $10,000 to $50,000 per building. Economies will be realized with multiple buildings and through a learning curve, subsequent buildings within an organization will cost less. Some costs to achieve LEED-EB O&M Silver could come from the energy performance contracting activities. Cost savings from energy, water and recycling efforts will off-set the costs to achieve LEED-EB O&M Silver over time. Support from utilities may be possible though incentives and/or a reimbursement program.

The added cost for new construction to achieve LEED Gold may only be on the order of 0% to 1% of the MACC (Maximum Allowable Construction Cost) for current projects that must currently meet the LEED Silver standard. The added construction cost to entities currently not building to LEED Silver may be 2.7% of the MACC.

BASIS FOR SELECTION:

Public Buildings Benchmarking and Efficiency Requirements

With the 2005 passage of Chapter 39.35D RCW High-performance public buildings, Washington State stepped forward as a national leader in public sector green building projects. As the mandate has seen implementation, areas that can increase the energy-conserving attributes of these buildings have become known. This proposal aims at increasing the strength of the legislation as it currently exists, ensuring that green public buildings are operated and maintained in such as way as to meet the energy goals of the projects, and set the stage to address issues related to embodied energy as focus shifts to building products.

Because this proposal builds on existing legislation that has seen success, it is primarily a revision to a statute with agency and public momentum. This proposal will ensure that public buildings (new/renovated) prioritize energy efficiency credits offered in green building standards and help to build the market for regionally produced green building materials.

PROJECTED EMISSION REDUCTIONS

Emission reductions in existing buildings when buildings reach the ENERGY STAR level of 75 will result in an average reduction in CO_2 of 20% to 25%. This would be further reduced as buildings continue to maintain an ENERGY STAR level of 75, because the overall energy use of the population of buildings included in the ENERGY STAR database will decline, thus "raising the bar" for all buildings. As older buildings are replaced with new efficient buildings, this too will raise the average energy efficiency of the building stock as a whole.

LEED Gold projects for new construction and major renovations require CO_2 reductions of 60% by 2010 when replacing an average building. The CO_2 reduction target would increase because the Optimize Energy credit within LEED would be tied to Architecture 2030 goals, which call for Net Zero carbon buildings by 2030.

As the Washington economy grows the overall number of buildings will increase and so will overall square footage of buildings. It is for this reason that the Architecture 2030 goals must be met to achieve the reductions we seek.

Summary Results of Analysis for Action EE/GB-2A

EE/GB	Action	GHG Emission Reductions ($MMTCO_2e$)				NPV (2008-2020) ($ Million)	Cost Effectiveness ($/t$CO_2$)
		2012	2020	Cumulative (2008-2020)	Location		
Action 2	Energy Efficiency in Existing, New and Renovated Public Buildings	0.2	1.2	6.8	In-state / regional	-$222 million	-$33

Key Inputs/Assumption for Analysis of Action EE/GB-2A

New and Existing Buildings

- Levelized Cost of Electricity Savings: $32/MWh
- Levelized Cost of Natural Gas Savings: $6.6/MMBtu
- Fraction of statewide commercial space owned or leased by the State, Universities, or Schools: 18%
- Fraction of existing space owned or leased by the State, Universities, or Schools in buildings of greater than 10,000 square feet: 80%
- Fraction of statewide commercial space in other public buildings: 5%
- Fraction of space in other public buildings that are greater than 10,000 square feet: 80%
- Fraction of statewide residential units publicly-owned: 5% (included in action)

Existing Buildings

- Average Electricity and Gas Savings for Buildings Participating in Program (existing commercial and residential buildings): 20% by 2012, 25% by 2020
- Average annual ongoing efficiency improvement in existing public buildings following "ramp-up": 1%/yr

New Buildings

- Fraction of new qualifying public buildings participating in program through target dates: 100%
- Fraction of new public housing units included in program: 80%
- Annual reduction in energy use relative to 2005 existing buildings (for all building types, including public housing), based on Architecture 2030 goals: 64% by 2012, 80% by 2020[13] (note that this is gross target savings, but Action 2 is applied after Action 3—building codes—so savings attributed to Action 2 are less on a net basis)
- Ratio of substantially renovated public building space (also covered under program) to new public building space: 1.00 (implies renovated space is approximately equal to new space)
- Average Fraction of Improvement in Electric Energy Intensities for Public (non-residential) Buildings from different sources are as follows:

	2012	2020/all
Energy Efficiency Improvement	90%	85%
Solar Thermal Energy (hot water/space heat/space cooling)	3%	5%
On-site Solar PV	1%	2%
On-site Biomass/Biogas/Landfill Gas Energy Use	1%	3%
Green Power Purchase (from off-site, beyond electricity supply RPS)	5%	5%

See Annex for additional details of results of and inputs to the analyses of this option.

IMPLEMENTATION APPROACH AND MECHANISMS:

Draft legislation will be prepared for the 2009 Legislative Session by **November 15, 2008**. The legislative text will be completed by a team consisting of: Rachael Jamison (Department of Ecology), Stuart Simpson (Department of General Administration), Ash Awad (McKinstry), David Van Holde (King County), Tony Usibelli (CTED), Becky Kelly (Washington Environmental Council).

[13] For quantification of emission reductions annual reduction in new buildings energy use relative to 2005 existing buildings has been based on goals outlined in EE/GB Action 2A. It is expected that annual reduction in actual implementation may be much less.

Potential Barriers:

The primary critique of the state's existing green building mandate is its lack of additional funding to ensure compliance. By revising the mandate to require a higher level of certification with currently optional credits made mandatory, agencies may have difficulty supporting the legislation due to its potential fiscal impacts and need for additional resources (education/staff/etc.). The lack of funding for energy efficiency measures can be overcome, however, by conservation requirements in the Energy Independence Act, I-937 and use of the department's Energy Performance Contracting program.

Quantification of emission reductions for this action is based on goals outlined in EE/GB Action 2A. These goals are very ambitious, will require significant effort and commitment, and may prove difficult for implementation strategies to achieve. They require that a substantial percentage of the existing public buildings in Washington receive significant efficiency upgrades in each year, and that each new building covered by this Action be built to very high standards of energy efficiency. Doing so will require a comprehensive and sustained effort on the part of public entities in Washington (as well as the building industry) to provide the human capacity to carry out these improvements, and, though efficient buildings will ultimately result in significant cost savings, to provide the initial financing to make sure that the improvements can be undertaken. If these conditions are not met the penetration rates, energy savings, and consequently, the emission reductions could fall well short of projected levels.

Program Costs:

Existing programs will be utilized as much as possible, however, it is recommended that a professional level staff person be provided to each of the following agencies: Dept. of Ecology (for local governments), Dept. of General Administration (for State agencies, colleges and universities), and Office of the Superintendent of Public Instruction (for K-12 Schools). This is needed to implement these efforts across all public sector entities.

EE/GB ACTION 2B: ENERGY BENCHMARKING AND ENERGY PERFORMANCE DISCLOSURE IN PRIVATE BUILDINGS

To inform potential building buyers and users, a system of Energy Performance Certificates (EPCs) should be developed and implemented in Washington. The EPCs would include a rating system that reflects the energy use, greenhouse gas emissions (and potentially water use) performance of a building compared against Washington State Energy Code-compliant buildings, and provide a defensible and clear measurement of the environmental footprint of new and existing buildings in the State.

EPCs disclose energy and other environmental performance information for buildings, providing consumers with a "right to know" mechanism to raise awareness of the importance of energy performance to the total cost of ownership or occupation of a building at the time of sale or lease.

PART 1: DISCLOSURE REQUIREMENT FOR ENERGY PERFORMANCE OF PRIVATE NON-RESIDENTIAL AND LARGE MULTI-FAMILY RESIDENTIAL BUILDINGS

Legislation is recommended in 2009 that requires non-residential and large multi-family residential building owners to develop an energy benchmark score using the ENERGY STAR Portfolio Manager tool or an alternative equivalent benchmark process as determined by CTED. The benchmark score will be included as part of the Energy Performance Certificate for the building. Building owners would be required to disclose this benchmark information at point of sale to prospective buyers. This benchmark score would also be disclosed to potential lessees when an entire building is being offered for lease to that prospective tenant.

To facilitate the transition to this disclosure requirement, it is further recommended that the benchmark requirement be phased in over time. Buildings 100,000 square feet or more would comply by January 2010. All buildings over 50,000 square feet would comply after January 2011. Buildings that are 20,000 square feet and

larger would comply after January 2012. Buildings under 20,000 square feet would be exempt from this requirement.

In addition, electric and natural gas utilities in the state with 100,000 customers or more would be required to provide their billing data in a form compatible with automatic download to Portfolio Manager. ENERGY STAR already offers this automatic download feature to utilities in its tool and qualifying Washington utilities would provide this feature to customers by January 2010. Specific requirements should be patterned after California's AB 1103 legislation. Additionally, data formats should also be compatible with existing benchmarking efforts by institutions and commercial businesses.

Revenue effects: No substantial state revenue effects are anticipated by this action.

PART 2: DISCLOSURE REQUIREMENT FOR ENERGY PERFORMANCE OF PRIVATE SINGLE-FAMILY AND SMALL MULTI-FAMILY RESIDENTIAL BUILDINGS

For residential buildings, a new EPC specification needs to be developed. A pilot program funded by the Energy Trust of Oregon (ETO), and supported by the Northwest Energy Efficiency Alliance and the City of Portland is currently underway to develop and test the EPC for residential dwellings in Oregon. This pilot program may serve as a model for development of a residential EPC program in Washington.

It is recommended that an entity (for example, CTED, the Department of Ecology, or another appropriate entity) be designated to develop an EPC specification for residential units (single-family residential and small multi-family buildings) by Dec 31, 2009. Specifically, the entity will:

- Review the findings of the 2008 ETO EPC pilot as part of the EPC specification development.
- Analyze the cost and implementation impacts of the 2008 ETO EPC pilot.
- Recommend a structure to support a voluntary, incentive-based program. The entity to recommend what thresholds of adoption need to be realized in the voluntary period before the initiative moves into 2011.
- Recommend public outreach and education initiatives to ensure smooth deployment of the EPC program.
- Implement a pilot program using the recommendations to refine a voluntary implementation incentive program to test the implementation of an EPC program starting Jan 1, 2010.

Provided that the performance criteria in the voluntary period have been met:

- All new dwellings will carry an EPC beginning Jan. 2011.
- All existing dwellings will carry an EPC at time of sale or lease beginning Jan 2012.
- The designated entity directed to develop minimum EPC performance levels that align with state building codes, and energy efficiency and Greenhouse Gas reduction goals, beginning Jan 2015.

Revenue effects: No substantial state revenue effects are anticipated by this action, but fiscal impacts to the state would occur in three areas: covering the EPC audit cost, administrative costs of archiving EPC data in a registry, and providing training to boost the EPC delivery infrastructure.[14]

BASIS FOR SELECTION:

Implementation of Disclosure Requirements

Introduction of the residential EPC will do the following:

[14] By way of comparison, information from the Energy Trust of Oregon EPC pilot project indicates that the cost of having an EPC audit assessment available for Oregon homes that participate will be in the range of $600 to $900 per home using current methodologies. The intent of the pilot is to explore ways to reduce time spent conducting the audit and the cost of the EPC audit. The ideal EPC audit target price is in the $150 - $225 range.

- Allow measurement of the carbon impact of new and existing housing stock.
- Provide a valuable guide to consumers, including an easy means of comparison of energy use and carbon impacts between homes under consideration for purchase or lease.
- Provide a concise performance ranking tool for a homeowner/buyer who is unfamiliar with the multitude of green building brands in the current market.
- Stimulate improvement of EPC scores for homeowners seeking higher resale values.
- Reflect the improved performance of homes receiving energy efficiency remodels.
- Stimulate mortgages; refinance packages, and homeowner insurance that are favorable to purchase of those homes with higher performing EPCs.
- Link public-purpose incentives to higher performing EPC scores.
- Allow the EPC rating to be listed on the Multiple Listing Service databases alongside a property listing.
- Allow high performance home builders to showcase their products and inventory with high scoring EPCs.
- Stimulate technology investment in smart technologies and materials that improve EPC scores.
- Promote green collar job development in the building trades.
- Enable prospective rental tenants to know ahead of time the likely size of their utility bills based on the availability of the EPC.
- Provide a tool that can guide minimum performance scores over time, in concert with Washington's climate goals (for example, those described in EE/GB Action 3) and/or the Architecture 2030 Challenge. This will effectively link new and existing housing stocks to defined carbon reduction goals.
- Addresses carbon reduction in a sector not covered by the current proposed WCI (Western Climate Initiative) Cap and Trade structure.
- Assuming that a massive infusion of funds was procured for the state (through the proceeds of a Cap and Trade allowances auction, for example, or another source) investments made in upgrading the existing housing stock (which could be up $50,000 per home) would be reflected by the issuance of EPCs.
- The universally understood 'MPG' for automobiles will be replicated for a homes' 'EPC' performance.

Many of these attributes are also shared by non-residential EPCs.

PROJECTED EMISSION REDUCTIONS:

EE/GB IWG Action 2B is not designed to specifically produce emission reductions and has therefore not been quantified. Prior experience, however, indicates that additional information for building owners and managers regarding energy usage can improve management and lead to lower energy consumption.

IMPLEMENTATION APPROACH AND MECHANISMS:

Potential Barriers:

Considerations related to how requirements for private building point-of-sale or point-of-lease EPC requirements are structured, including (but not limited to) how energy efficiency performance of a building (and thus qualification for EPC) may be affected by tenant behavior, suggest that Action 2B will need to be carefully designed and implemented with input from appropriate stakeholders. Concern has been raised that there may be opposition to establishing point of sale energy disclosure requirements. Comments received by the CAT via its public website noted opposition to point–of-sale disclosure requirements that would broaden the seller disclosure law beyond current requirements that is be based on the seller's existing knowledge.

Program Costs: No substantial state revenue effects are anticipated for EPCs for private non-residential and large multi-family residential buildings or for single-family and small multi-family residential buildings. However, some

fiscal impacts to the state would occur in three areas for single-family and small multi-family residential buildings: covering the EPC audit cost, administrative costs of archiving EPC data in a registry, and providing training to boost the EPC delivery infrastructure.

Training and Infrastructure Needs for EPC Element of Action:

Training of Home Performance with Energy Star contractors, Home Energy Rating System (HERS) raters, and other performance contractors will need to be delivered across the state. Training techniques used during the EPC pilot program in Oregon can be used as a resource in developing Washington's EPC program.

SUPPORTING INFORMATION:

Implementation Goals and Experience in Using Residential Energy Performance Certificates

According to the Pew Center's "Agenda for Climate Action," emissions can be addressed through labeling and expanded, tightened standards for products and buildings, focusing on those that would result in significant GHG reductions through reduced energy use. By requiring a minimal level of efficiency and providing consumers with information on homes that do better than the minimum, standards and labeling can overcome obstacles to building energy efficiency—insufficient and imperfect information; market distortions; and split incentives—and thus advance building efficiency.

In this regard, much work has been done in the area of bringing a labeling performance metric to the residential market in the United Kingdom. The new label released for implementation in August of 2007 is called an Energy Performance Certificate (EPC). Energy Performance Certificates, which rate the energy efficiency and carbon (CO_2) emissions impact of buildings (including residential), are part of the Home Information Packs (HIP) that the U.K. Government is promoting.

Energy Performance Certificates describe how energy-efficient a home is on a scale, and informs on the impact the home has on the environment. The most efficient homes have the lowest utility bills, and better-rated homes should have less carbon dioxide (CO_2) emission impact. The EPC is also accompanied by a list of recommended measures that will improve the EPC score, thereby saving energy and cutting carbon emissions from the home.

Relationship of Energy Performance Certificates Concept to Western Climate Initiative Mechanisms

The current design of the Western Climate Initiative, with its associated carbon emission reduction goals, frames the policy context in the following way: The WCI will address all capped sectors and drive emission targets. Since the residential housing sector accounts for 20% of GHG emissions, it is a worthy area of focus. Having a tool—the EPC—to track the baseline, the increased levels of energy performance, and carbon mitigation efforts will allow Washington to account for this uncapped sector and advance it in line with the state's target.

EE/GB ACTION 3: STATE ENERGY CODE IMPROVEMENTS AND ESTABLISHMENT OF 2030 BUILDING GOALS

2009 ACTION DESCRIPTION:

PART 1

In the 2009 Washington State Building Code adoption cycle, revise the Washington State Energy Code (WSEC) to achieve a 30 percent reduction in new building energy use compared to the 2006 edition of the WSEC.

Background:

In 2030, new buildings constructed in the preceding two decades will account for 20 to 25 percent of the commercial building floor area and will account for more than 20 percent of the housing units. Over the same 20 year period, it is expected that most existing buildings will undergo some level of renovation, install new equipment, and will add or replace many energy using devices. As a result, the effectiveness of the State Energy Code as well as federal and state equipment and appliance standards will play a large role in the future energy use intensity of all buildings. It is important to note, that it is much less expensive to implement energy efficiency in buildings during initial construction and major renovations than as stand alone measures. There will also be incentives for improvement of existing buildings as the state's large electric utilities implement conservation activities in compliance with the state Energy Independence Act.

Building codes for the State of Washington are reviewed and adopted through an administrative process conducted by the Washington State Building Code Council (SBCC). National and state-developed codes are reviewed, revised and adopted on a three-year cycle. The next review cycle begins early in 2009. Codes adopted by the council during the 2009 cycle will be implemented July 1, 2010. Under the current schedule this process will be repeated in 2012, 2015, 2018, 2021, and so on.

Specific Actions:

Code Development

Through the established administrative process, revise the Washington State Energy Code (WSEC) to achieve a 30 percent reduction in new building energy use compared to the 2006 edition of the WSEC. The administrative process will take place in 2009, with the revised code being implemented in July 2010.

The Office of the Governor is responsible for articulating the objective to SBCC, and will provide policy and administrative support consistent with obtaining the objective. Technical support shall be provided by the Department of Community, Trade, and Economic Development (CTED) Energy Policy Division.

To limit negative impacts of new building code provisions on existing structures, code development activities will make recommendations for alternative energy code provisions that may be applied to renovations and system replacement in existing buildings. Modifications to the code shall take place in the existing rulemaking process conducted by the State Building Code Council.

Code Implementation Support to Local Government

Technical support for local building departments and the building industry shall be provided. Through federal and utility grant programs, Washington State University Extension Energy Program (WSU) and the Northwest Energy Efficiency Council (NEEC) have historically provided training and technical support for the energy code. These activities provide training to local building department staff and professionals in the building industry. The IWG recognizes that training and technical support are important supporting activities for this implementation strategy. Initial training is needed for code changes and ongoing training is needed to maintain appropriate levels of compliance over the long term.

PART 2

Building Efficiency and Carbon Reduction Strategy

Legislative action is recommended to provide policy direction in the development and implementation of a long term building energy efficiency and carbon reduction strategy. This includes setting targets for building energy efficiency and carbon reduction through 2030, providing direction to CTED to develop a state strategy for building efficiency and carbon reduction, and establishing a schedule of periodic review and revisions of the state strategy for activities involved in building efficiency research, demonstration and education programs designed to support the achievement of the Targets.

Targets for Energy Efficiency and Carbon Reductions in the Building Sector:

The Washington State Building Efficiency and Carbon Reduction Strategy will include specific targets for median building energy use, by building occupancy class and climate zone. For new buildings, target development will follow a schedule similar to the schedule developed the Architecture 2030 Challenge[15], but using current code levels as the starting point. By or before 2015, the target for new buildings will be 50 percent of the energy use of base code buildings built to the 2006 Washington State Energy Code (WSEC), with an incremental improvement in new building efficiency reaching net zero by 2030. Existing buildings will be improved over time to achieve a 50 percent reduction in energy use intensity (EUI) for the sector. CTED will be charged with determining the best methodology for establishing the 2009 baseline and monitoring future improvements. Sector improvements may include energy efficiency improvements, implementing innovative sustainable design strategies, generating with on-site renewable power and/or purchasing (20% maximum) renewable energy and/or certified renewable energy credits. The table, **Target Building Sector Median Energy Use Intensity (EUI),** details the targets.

Target Building Sector Median Energy Use Intensity (EUI) Percent of Median 2009 EUI Building Occupancy Class and Climate Zone						
Target Year	2009	2010	2015	2020	2025	2030
Existing Building Sector (2009)	100%	96%	85%	74%	63%	50%
New Building Sector (2009)	100%	70%	50%	40%	20%	0%

Legislative action is recommended that directs the Washington State Building Code Council through their established public process to achieve the energy savings targets.

What is a "net zero" energy or carbon emission building?

A "net zero" energy building will produce as much energy as they use on an annual basis. This design criterion combines a high efficiency building with renewable on site generation, typically photovoltaic (PV) panels. On an annual basis the generation system produces enough energy to offset the annual building energy use. To cope with fluctuations in energy demand, zero energy buildings are typically envisioned as connected to the grid, exporting electricity to the grid when there is a surplus, and drawing electricity when not enough electricity is being produced. Under most cases, net zero energy will result in net zero carbon emissions.

It should be noted that the recommendation for the use of renewable resources to meet this target includes up to 20% off site power generation. Thermal and electric generation systems using bio-fuels in combined heat and power systems could also be used to meet net zero carbon emissions standards. Other technologies are expected to enter the marketplace.

What is the Net Zero New Building Sector?

It is recognized that given current state of the shelf technology, it will be difficult for some buildings to install the generating capacity required to power the building on an annual basis. There are also opportunities for some buildings to generate more energy than they require. For example, meeting the power needs of a one-story warehouse using rooftop PV will be easier than meeting the needs of a high rise office structure with limited roof area.[16] Providing policy direction targeting net zero energy for the new building sector allows technical development of standards that account for different building requirements and power systems, while still meeting the target for the sector as a whole.

[15] "Architecture 2030, a non-profit, non-partisan and independent organization, was established in response to the global-warming crisis by architect Edward Mazria in 2002. 2030's mission is to rapidly transform the US and global Building Sector from the major contributor of greenhouse gas emissions to a central part of the solution to the global-warming crisis". http://www.architecture2030.org/home.html

[16] B. Griffith, N. Long, P. Torcellini, and R. Judkoff, Assessment of the Technical Potential for Achieving Net Zero-Energy Buildings in the Commercial Sector, National Renewable Energy Laboratory, 2007

Develop a State Strategy for Building Efficiency and Carbon Reduction.

It is recommended that the state legislature direct CTED to develop a 2010 State Strategy for Building Energy Efficiency and Carbon Reduction. CTED will develop the strategy with input from the public. The strategy will adopt the Long Term Targets for Energy Efficiency and Carbon Reductions and develop a plan to meet the targets. The state strategy will develop recommendations for a short term and a long term action plan. This plan builds on the actions already recommended by the EE/GB workgroup.

The strategic plan will examine the implementation methods for advancing building efficiency and reducing carbon emissions. In recognition that reducing energy use in buildings will include a number of administrative and legislative actions, the strategy should include examination of the interaction between the different activities to assure that actions are complementary. The scope of the strategy shall include:

Codes and Standards: Minimum efficiency thresholds for buildings, appliances and equipment. This includes state codes and standards as well as an examination of the state role in the development and implementation of national standards.

Reach Codes and Standards: A strategy for Reach Codes and Standards shall be developed to lead the base codes and standards by one or more code adoption cycles. Early adopter programs for building efficiency are an important component of a progressive energy strategy. These include voluntary standards for building efficiency, equipment, appliances and lighting. The most prevalent example is the Energy Star program. Early adopter programs assure that voluntary programs complement progress in the base codes. It also provides the building industry a context for planning future projects.

Emerging Technologies: Research, development, demonstration and deployment to move new energy-efficient products into the buildings marketplace. It is recognized that to meet the targets specified new technology and building designs will need to be implemented. This includes both building efficiency and building integrated power systems.

User Incentives: These include tax incentives, rebates, innovative or discounted financing and non-financial support to energy consumers. This includes the role of government programs as well as utility sponsored programs.

Education and Technical Assistance: This includes school curricula, technical training, peer-to-peer exchanges for professional and trade audiences. This may also include education and information programs for energy consumers.

Measurement: This includes an examination of expanding building benchmarking actions as well as program evaluation. To the extent possible the Strategy will take advantage of program evaluation conducted by utilities.

Update the State Strategy for Building Efficiency and Carbon Reduction Every Three Years

To assure a continued commitment to the Targets for Energy Efficiency and Carbon Reductions it is recommended that the strategic planning process be repeated at a minimum every three years. It is recommended that the revised strategy precede the state building code development and adoption process that occurs every three years. On this schedule, the first updated strategy would be available prior to May, 2012.

The Update shall include review of program activities covered in the first plan, and also include evaluation of the progress toward the targets. The update shall include recommendations for revisions in each of the above program areas. Recommendation for further action required to achieve the established targets shall be included.

BASIS FOR SELECTION:

Part 1. *In the 2009 Washington State Building Code adoption cycle, revise the Washington State Energy Code (WSEC) to achieve a 30 percent reduction in new building energy use compared to the 2006 edition of the WSEC.*

There is already recognition both in the state and at the federal level that a 30 percent is the appropriate target for improvement in both the residential and commercial building sectors. This level of efficiency is achievable and is necessary to meet the carbon reduction targets established by the Climate Action Team.

A thirty percent reduction in energy use through code has been adopted by numerous organizations as an appropriate target.

- The US Department of Energy has committed to the development and adoption of national energy codes that provide a 30 percent reduction in energy use in all building sectors. This activity is being conducted in the two primary energy code adoption processes, the International Code Conference and through the American Society of Heating, Refrigerating and Air-Conditioning Engineers, standard 90.1 code development process.
- Federal Building Code: Since 2007, federal commercial building must be designed to achieve an energy consumption level that is at least 30 percent below the level achieved under 90.1-2004, if life-cycle cost-effective.
- The ASHRAE *Advanced Energy Design Guide* series for commercial buildings provides a sensible approach to easily achieve levels of energy savings without having to resort to detailed calculations or analysis. These guides were developed to provide prescriptive standards for achieving a 30% reduction in energy use compared to the current national standard.
- Energy codes in California already implement a strategy that reduces energy use in buildings by 30 percent when compared to national standards. Oregon recently passed new residential standards that provide a 15-20 percent reduction in energy consumption for homes, and will be providing new standards that achieve 25 percent reductions in commercial energy use in 2009.
- The 2005 Federal Energy Policy Act provides $2000 tax incentives for buildings that achieve a reduction in home energy use by 50 percent compared to the national standards. Washington State's largest home builder has developed and implemented designs that achieve this level of performance.

Improvements to the state energy code are being proposed as an existing administrative process. The code will be updated through the regularly scheduled process conducted by the Washington State Building Code Council. This process will occur during 2009. Implementation of the revised code will occur on July 1, 2010.

Part 2. Legislative action is recommended for the development of a State **Building Efficiency and Carbon Reduction Strategy**.

To achieve the proposed targets, it is essential to start early with substantial proposals. It is also important that the strategy be comprehensive and includes new and existing building construction, equipment, appliances as well as community heat and power systems.

In 2030, new buildings constructed in the preceding two decades will account for more than 20 percent of the commercial building floor area, and more than 20 percent to the number of housing units. Over the same 20 year period, it is expected that most buildings will undergo some level of renovation, install new equipment and will add or replace many energy using devices. The effectiveness of the State Energy Code as well as federal and state equipment and appliance standards will play a large role in the future energy use intensity of all buildings. The injection of state and utility incentives will move the existing building sector, as well as promote further innovation in new construction.

The change in the built environment occurs over time. Opportunities to capture the large efficiency improvements at a minimal cost occur only once or twice in the life of a structure. This opportunity occurs during the original design and construction of a building as well as during major renovations. Major building equipment replacements occur in a 15 to 25 year time frame. The development of community scale heat and power system occurs over long planning and implementation periods.

The implementation targets listed suggest a gradual improvement of all buildings over time. But for any specific project, it is important to achieve maximum technical potential when the prime opportunities occur.

Much of the progress in building efficiency in Washington has resulted from following a technology maturity progression that begins with research and development, moves through market entry and diffusion support efforts and culminates, where appropriate, in the adoption of common practices as minimum code requirements. Washington has been a leader in each of the elements of this progression and can take advantage of the economic development and job creation opportunity presented by additional work in these areas. Supporting university level research, participating in federal research and analysis projects, working with utilities and private sector partners within the state on market diffusion strategies and supporting effective technology transfer efforts should all be part of a comprehensive plan to continue bringing new technologies and efficiency strategies into the marketplace, into common use, and, where appropriate, into code.

PROJECTED EMISSION REDUCTIONS:

Summary Results of Analysis for Action EE/GB-3

EE/GB	Action/Element	GHG Emission Reductions ($MMTCO_2e$)				NPV (2008-2020) ($ Million)	Cost Effectiveness ($/tCO_2$)
		2012	2020	Cumulative (2008-2020)	Location		
Action 3	State Energy Code Improvements and Establishment of 2030 Building Goals (Action Total)	0.4	6.4	26.6	In-state / regional	-$841 million	-$32
	Part 1 of Action (WSEC Revision)	0.35	2.7	13.8	In-state / regional	-$487 million	-$35
	Part 2 of Action (Existing Buildings Element)	0.02	2.1	7.1	In-state / regional	-$242 million	-$34
	Part 2 of Action (New Buildings Element)	0.02	1.6	5.6	In-state / regional	-$112 million	-$20

Key Inputs/Assumption for Analysis of Action EE/GB-3

New and Existing Buildings

- Levelized cost of electricity savings: $32/MWh
- Levelized cost of natural gas and oil products savings: $6.6/MMBtu
- In both Parts 1 and 2, "substantially renovated" buildings are assumed to be equal in space/number to new buildings
- The elements of Action 3 in Part 2 exclude existing and new public-sector buildings and public housing covered in Action 2A.

<u>Existing Buildings—Part 2 "Building Efficiency and Carbon Reduction Strategy" Element</u>

- Average electricity and gas savings for buildings participating in program (existing commercial and residential buildings): 8.4% by 2012, 26.0% by 2020
- Fraction of existing (as of 2006) commercial and residential buildings participating in program through 2030: 75%
- "Ramp-up" period for existing building element begins in 2012, completed in 2017 (by which time ~4.5% of buildings participate annually)

New Buildings—Part 1 "Revised Building Energy Codes" Element

- Average electricity and gas savings for new residential and commercial buildings covered by revised codes, relative to 2006 WSEC: 30%

New Buildings—Part 2 "Building Efficiency and Carbon Reduction Strategy" Element

- Fraction of new residential and commercial buildings participating in program through target dates: 50% (after ramp-up which begins in 2012, and is completed by 2017).
- Annual reduction in energy use relative to revised energy code in Part 1 for new and renovated residential and commercial buildings: 8% in 2012, 30% in 2020
- Average fractions of improvement in electric energy intensities for residential and commercial buildings from different sources are as follows:

Average Fraction of Improvement in Electric Energy Intensities for commercial buildings from:

Energy Efficiency Improvement	90%	80%
Solar Thermal Energy (hot water/space heat/space cooling)	3%	7%
On-site Solar PV	1%	3%
On-site Biomass/Biogas/Landfill Gas Energy Use	1%	5%
Green Power Purchase (from off-site, beyond electricity supply RPS)	5%	5%

See Annex for additional details of results of and inputs to the analyses of this option.

IMPLEMENTATION APPROACH AND MECHANISMS:

In the 2009 Washington State Building Code revision cycle, revise the Washington State Energy Code (WSEC) to achieve a 30 percent reduction in new building energy use of compared to the 2006 edition of the WSEC. Provide substantial efficiency advances in the code as it applies to remodeling, retrofit and equipment replacement.

Through the 2009 administrative procedures of the Washington State Building Code Council (SBCC), develop and adopt advances to the Washington State Energy Code (WSEC) to achieve a 30 percent improvement in building efficiency compared to the 2006 WSEC. The Office of the Governor is responsible for articulating the objective to SBCC, and will provide political and administrative support consistent with obtaining the objective. Technical support for local building departments and the building industry shall be provided by CTED Energy Policy Division and the WSU Extension Energy Program.

POTENTIAL BARRIERS:

A potential barrier to implementation is the lack of knowledge at the local government building departments and in the building industry. This proposed action includes a recommendation for funding to provide training and technical support for those implementing the revised code requirements. This assistance may include training workshops, supportive materials, and direct assistance through available phone technical advice. This approach has proven successful with past energy code changes. It will also be necessary to consider the impacts of new codes on the availability of incentives through utility demand-side management programs, so as to assure that implementation of the codes do not cause unintended consequences that could reduce the level of energy efficiency improvement. The targets of this Action, both in terms of the fraction of buildings included in the Action and the energy savings targets per building unit, are, as in Action 2, achievable but quite aggressive. Meeting these targets will require commitments and significant, sustained, and well-coordinated efforts on many fronts from both government and the private sector.

SUPPORTING INFORMATION:

The following report outlines a strategy developed by the US Department of Energy for achieving Net Zero Energy Buildings in the Commercial Sector. It is important to note that not all individual buildings will meet this standard. But in the population of buildings, some will exceed net zero and offset the buildings that do not. This is in part the basis for establishing building sector median targets in the **State Building Efficiency and Carbon Reduction Strategy**.

B. Griffith, N. Long, P. Torcellini, and R. Judkoff, *Assessment of the Technical Potential for Achieving Net Zero-Energy Buildings in the Commercial Sector National Renewable Energy Laboratory*, 2007

- In this Action, expenditures by building owners and developers are expected to be more than made up for by savings in energy costs by building owners and tenants, thus reducing the overall costs of building operations for years to come, and increasing the value of the new and existing buildings covered by the Action. In addition, this Action will result in better-built and –operated buildings that require less maintenance over time. Through its impacts on energy use, the Action will reduce emissions of local and regional environmental air pollutants (in addition to greenhouse gases), reduce water use, and promote the use of in-state sources of renewable energy.

ANNEX: Additional Details of Analyses

Estimate of Mitigation Option Costs and Benefits for Washington EE/GB IWG GHG Analysis

Common Assumptions for Washington EE/GB IWG GHG Analysis

Date Last Modified: 10/2/2008 D. Von Hippel/C. Lee

Common Assumptions

Real Discount Rate	**5%**	
Levelized, Avoided Costs (2008-2020, 2006$)		
Electricity	**$ 66.13**	$/MWh
Estimate based on Energy Supply (ES) Technical Working Group (TWG) decision (at its Nov 7, 2007 meeting), as part of the 2007 WA CAT process, based on Avista avoided cost analysis as described in ES-1 option.		
Electricity - Residential	**$66**	$/MWh
Electricity - Commercial	**$66**	$/MWh
Electricity - Industrial	**$66**	$/MWh
Levelized Costs not differentiated by sector for this analysis.		
Natural Gas	**$7.6**	$/MMBtu
Levelized costs, 2008 to 2020. 2005-2007 cost from EIA data for "City Gate" prices in WA (from http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_SMT_a.htm), escalated based on AEO2008 natural gas price projections (see "Fuel prices aeo2008" worksheet in this workbook).		
Prices		
Electricity Price - Sales-Weighted, Levelized	**$59**	$/MWh
Prices are based on DOE data for prices in 2005 http://www.eia.doe.gov/cneaf/electricity/esr/esr_sum.html. Changes from 2008 to 2020 are based on the relative changes in "Region 9" prices in US DOE Annual Energy Outlook 2008. AEO 2008 projects prices to declining to below 2006 levels from 2008 onward.		
Electricity - Residential Prices (Levelized, 2008-2020)	**$67**	$/MWh
Electricity - Commercial Prices (Levelized, 2008-2020)	**$62**	$/MWh
Electricity - Industrial Prices (Levelized, 2008-2020)	**$42**	$/MWh
Natural Gas (Delivered, RCI sales-weighted average)	**$11.5**	$/MMBtu
Natural gas prices are estimated as described for electricity above.		
Natural Gas - Residential Prices (Levelized, 2008-2020)	**$13.3**	$/MMBtu
Natural Gas - Commercial Prices (Levelized, 2008-2020)	**$13.1**	$/MMBtu
Natural Gas - IndustrialPrices (Levelized, 2008-2020)	**$8.8**	$/MMBtu
Biomass - All Users	**$3.4**	$/MMBtu
	$54.5	$/dry ton
Based on mix of resources (forest biomass and mill residues) as reported in the F TWG (options F-6, and F-7)		
Coal - Industrial Users	**$2.5**	$/MMBtu
average coal heat content of 23.18 MMBTU/ton, based on USDOE/EIA data (http://www.eia.doe.gov/emeu/states/sep_use/notes/use_b.pdf). USDOE/EIA coal consumption figures for 2006 "other industrial users" are withheld for WA. A "Pacific" (West Coast) average coal price of $58.12 per ton is given for "Other Industrial Users" in http://www.eia.doe.gov/cneaf/coal/page/acr/table34.html. By contrast, the "Other Industrial Users" value for Idaho is given as $40.57 for 2006.		
Oil - Distillate/Diesel	**$15.4**	$/MMBtu
Levelized costs, 2008 to 2020. USDOE/EIA data for wholeale distillate fuel show a cost of $1.92 per gallon in 2006/07 heating season. This cost does not include fuel taxes. An appendix to the 2006 Annual Energy Outlook by USDOE/EIA (see http://www.eia.doe.gov/oiaf/aeo/pdf/appendixes.pdf) lists an energy content for distillate oil of 5.799 MMBtu/bbl, or 0.138 MMBtu/gallon. Cost computed used for 2006 price, which is escalated using the trends from AEO2008 all-user distillate oil prices for the Pacific region (see "Fuel prices AEO2008" worksheet in this workbook).		
LPG/Propane	**$13.8**	$/MMBtu
Levelized costs, 2008 to 2020. USDOE/EIA data are not available for WA. The US West Coast (PADD V) average wholesale price given by USDOE/EIA for propane is $1.22 per gallon in the 2006/07 heating season. This cost does not include fuel taxes. Prices expressed on $/MMBtu basis a conversion factor of 0.09133 MMBtu/gallon (see "Fuel Data" woksheet). Cost computed based on 2006 price, which is escalated using the trends from AEO2008 distillate oil prices for the Pacific region (see "AEO2008 Fuel Prices" worksheet in this workbook).		
Landfill Gas - All Users	**$5.0**	$/MMBtu
Placeholder Estimate		
Biogas Gas - All Users	**$5.0**	$/MMBtu
Placeholder Estimate		

Emission Rates, etc.	2010	2020	Units
Electricity T&D losses (fraction of total generation)	7.4%	7.0%	

Estimated based on US DOE Annual Energy Outlook figures for 2005 - 2025 for "total sales" and "total net energy for load" as reported in "Table 72. Electric Power Projections for EMM Region, Western Electricity Coordinating Council / Northwest Power Pool Area - 11", from http://www.eia.doe.gov/oiaf/aeo/supplement/sup_elec.xls. Could be revised to reflect WA-specific data if available.

Avoided electricity emissions rate	0.50	0.50	tCO_2/MWh

As used in Energy Supply analysis as of 9/20/07 for "small reductions" Can be considered an initial estimate.

Notes	2010	2020	Units

Multi-Gas Emission Factors

Except as noted, the following emission factors are calculated from values in the Washington Inventory and Forecast prepared for the CAT, and reflect the average emissions over 2000 to 2020 per BTU and physical amount of fuel. They include combustion CH_4 and N_20 as well as CO_2 emissions for consistency with the inventory.

	tCO_2e/billion BTU	
LPG - RCI	61.978	
Coal - RCI	93.483	
Natural Gas - RCI	52.910	
Biomass - RCI	2.500	*Rough estimate at present*
Oil - RCI	67.968	*Weighted Average over all RCI Petroleum Use, including LPG*
Oil - Residential and Commercial Only	68.741	*Weighted Average over all RC Petroleum Use, including LPG*
Landfill Gas - RCI	0.260	*Placeholder Value, from Steve Roe. Does not count benefit of capture of landfill gas.*
Biogas - RCI	5.000	*Placeholder Value--May in fact be negative*

Inflation index (to 2006$)

Calculated using http://data.bls.gov/cgi-bin/cpicalc.pl

Cost Year	Index
1997	1.26
1998	1.24
1999	1.21
2000	1.17
2001	1.14
2002	1.12
2003	1.10
2004	1.07
2005	1.03
2006	1.00
2007	0.97
2008	0.92

As of 9/08

Natural Gas Conversion	1.03	million Btu/ thousand cf
Electricity Conversion	3413	MMBTU/ GWh

Estimate of Mitigation Option Costs and Benefits for Washington EE/GB IWG GHG Analysis

GHG Emissions Totals for Washington EE/GB IWG GHG Analysis

Date Last Modified:	*10/31/2008*	*D. Von Hippel/C. Lee*

Summary Interim Results and Totals for EE/GB Mitigation Actions

	Option Name	GHG Reductions ($MMtCO_2e$) 2012	GHG Reductions ($MMtCO_2e$) 2020	Cost-Eff ($/$tCO_2e$)	NPV 2008-2020 ($million)	Cumulative Emissions Reductions (MMt CO_2e, 2008-2020)
EE/GB-1A	Energy Efficiency Quality Investment Program (EEQUIP)	0.12	0.78	-$38	-$179	4.8
EE/GB-1B	Expanded Implementation of Distributed Energy and Water, Combined Heat and Power (CHP) and Renewable Energy	0.06	0.31	-$3	-$5	1.6
EE/GB-2	Energy Efficiency in Existing, New and Renovated Public Buildings, and Energy Benchmarking and Energy Performance Disclosure in Public and Private Buildings	0.16	1.21	-$33	-$222	6.8
EE/GB-3	State Energy Code Improvements and Establishment of 2030 Building Goals	0.38	6.37	-$32	-$841	26.6
	Total Gross Savings	0.7	8.7	-$31	-$1,247	39.8

Adjustment for Estimated Overlap Between EE/GB Options and with Recent Actions						
Overlap between EE/GB Options						
EE/GB-1A, Overlap with other Actions	0.12	0.78		-$179	4.8	***See Note 1***
EE/GB-1B, Overlap with other Actions	0.00	0.02		-$4	0.1	***See Note 2***
EE/GB-2, Overlap with other EE/GB and Recent Actions	0.13	0.70		-$115	3.8	***See Note 3***
EE/GB-3, Overlap with Recent Actions	0.02	1.68		-$196	5.7	***See Note 4***
Total Estimated Overlap Among EE/GB and Recent Actions	0.27	3.17		-$494	14.4	
Total Savings Net of Overlaps	0.45	5.50	-$30	-$753	25.4	

Additional Emissions Savings from Recent Actions (not included in forecast or in policy options above)

	Option Name	GHG Reductions ($MMtCO_2e$) 2012	GHG Reductions ($MMtCO_2e$) 2020		Cumulative Emissions Reductions (MMt CO_2e, 2008-2020)	
	Existing Gas Utility DSM Spending	0.10	0.25		1.8	
	State green buildings--electricity savings	0.03	0.11		0.7	
	State green buildings--gas savings	0.03	0.09		0.6	
	Building Codes--electricity savings	0.14	0.28		2.3	
	Building Codes--gas savings	0.12	0.25		2.0	
	Appliance Efficiency Standards--electricity savings	0.41	1.13		7.9	
	Appliance Efficiency Standards--gas savings	0.07	0.14		1.1	
	I-937 Load Goals--electricity savings*	0.66	2.41		14.5	
	Total	1.57	4.66		30.91	Total Recent Action

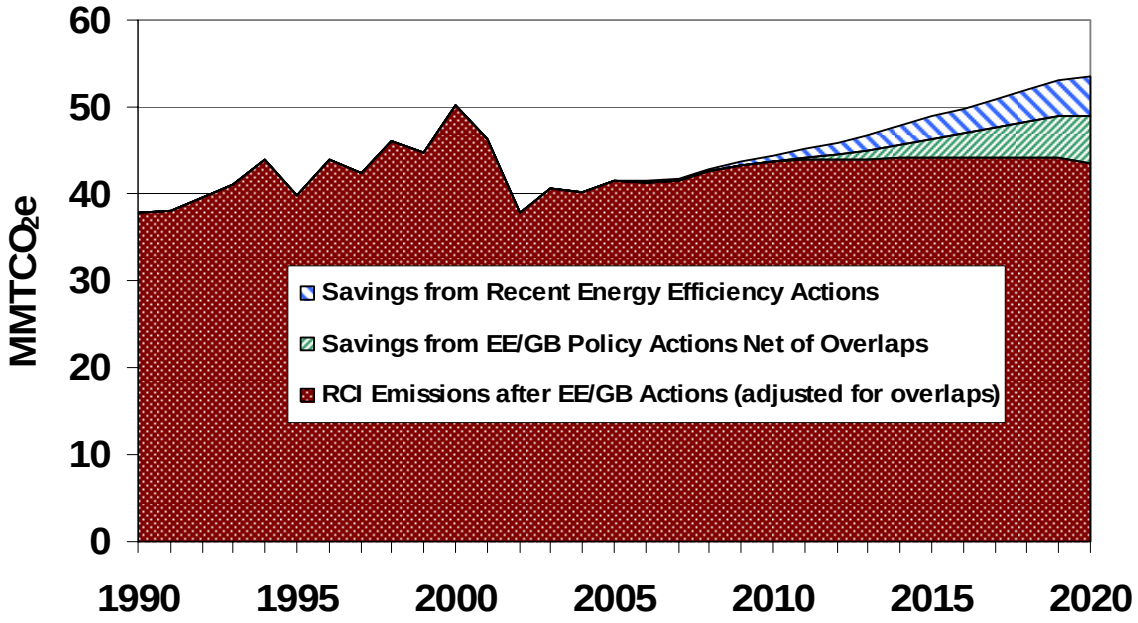
***Estimate revised as of 10/30/08**

Total Emissions Reductions Net of Overlaps (including recent actions)	2.02	10.16		56.3

TABLE BELOW SHOWS NET ADJUSTED SAVINGS BY OPTION

Summary Results and Totals for EE/GB Actions

	Option Name	GHG Reductions 2012	GHG Reductions 2020	Cost-Eff ($/$tCO_2e$)	NPV 2008-2020 ($million)	Cumulative Emissions Reductions (MMt CO_2e, 2008-2020)
EE/GB-1A	Energy Efficiency Quality Investment Program (EEQUIP)	0.00	0.00	N/A	$0	0.0
EE/GB-1B	Expanded Implementation of Distributed Energy and Water, Combined Heat and Power (CHP) and Renewable Energy	0.06	0.29	-$1	-$1	1.6
EE/GB-2	Energy Efficiency in Existing, New and Renovated Public Buildings, and Energy Benchmarking and Energy Performance Disclosure in Public and Private Buildings	0.03	0.52	-$36	-$107	3.0
EE/GB-3	State Energy Code Improvements and Establishment of 2030 Building Goals	0.36	4.69	-$31	-$645	20.8
	Total Savings	0.5	5.5	-$30	-$753	25.4



NOTES ON ESTIMATES OF OVERLAP BETWEEN POLICIES

Note 1:

EE/GB-1A provides incentives to carry out building improvements included in the goals for EE/GB Action 3 (and possibly Action 2), and thus overlaps 100% with savings from EE/GB-3 and other actions.

Note 2:

EE/GB-1B may overlap very slightly with energy efficiency and on-site energy measures carried out in EE/GB Action 3 (and possibly Action 2), and thus is assumed to overlap 5% with savings from EE/GB-3 and other actions.

Note 3:

The electricity savings from EE/GB-2 may overlap with the savings from I-937 goals, to the extent that utility programs are used to help support changes in government buildings. We assume that 25% of electricity savings from Action 2 overlap with I-937 goals. In addition, EE/GB-2 will overlap with existing programs for electricity and gas savings in state buildings. We assume that this overlap is 100% of post-2011 savings from the existing state building programs. Public buildings are also assumed to be candidates for programs mandated under I-937, and thus I-937 savings will overlap with savings in Action 2, as described in Note 4, below. The estimate of overlap in NPV cost for this action should be considered a rough approximation.

Note 4:

The electricity savings from EE/GB-3 will likely overlap significantly with the savings from I-937 goals, to the extent that utility programs support energy efficiency measures in homes and businesses, and, conversely, the building energy codes aspects of Action 3 will reduce the pool of cost-effective electricity efficiency measures available for utilities to tap under I-937. Based on analysis done by the Northwest Power Planning Council for its 5th Plan, about 10% of overall conservation potential comes from measures applicable to the the non-direct-service-industry sector (see http://www.nwcouncil.org/energy/powerplan/5/(03)%20Conservation%20Resources.pdf, figure 3-2). We thus assume that I-937 overlaps only with EE/GB results for existing buildings, with 90% of estimated I-937 savings overlapping with the existing-building portions of EE/GB Actions 2A and 3. This overlap is apportioned to EE/GB Actions 2 and 3 in proportion to the fraction of total electricity use (as of 2006) by the existing residential and commercial buildings covered by the two Actions, which is estimated as 12% for Action 2 and 78% for Action 3. The estimate of overlap in NPV cost for this action should be considered a rough approximation.

Estimate of Mitigation Option Costs and Benefits for Washington EE/GB IWG GHG Analysis

EE/GB-1A **Action 1A: Energy Efficiency Quality Investment Program (EEQUIP)**

Date Last Modified: 10/30/2008 D. Von Hippel

Key Data and Assumptions	2012	2020/all	Units
First Year Results Accrue		2010	
Placeholder assumption pending TWG input			
Electricity	2012	2020/all	Units
Levelized Cost of Electricity Savings		$32	$/MWh
Preliminary estimate based on 7-year payback as estimated in WGA CDEAC EE Report. See Note 1.			
Levelized Cost of Natural Gas Savings		$6.6	$/MMBtu
Preliminary estimate based on 7-year payback as estimated in WGA CDEAC EE Report. See Note 1.			
Avoided Electricity Cost		$66	$/MWh
See "Common Factors" worksheet in this workbook.			
Avoided Natural Gas Cost		$7.6	$/MMBtu
See "NG prices aeo2006" and "Common Factors" worksheets in this workbook.			

Other Data, Assumptions, Calculations	2012	2020/all	Units
Inputs to/Intermediate Results of Calculation of Electricity and Gas Savings			
Total Commercial Floorspace in Washington (million square feet)	1,817	2,072	
Draft estimates from Northwest Power Planning Council for "6th Power Plan" (see "WA_Activities_Est" worksheet in this workbook). An estimate in the same worksheet, based on USDOE EIA CBECS (commercial survey) data for the Pacific region, extrapolated using projected Washington population as a driver, yields quite similar results.			
Est. area of new commercial space per year in WA (million square feet)	31.5	23.6	
Calculated based on annual floorspace estimates above.			
Total Residential Housing Units in Washington	2,965,669	3,383,726	
Draft estimates from Northwest Power Planning Council for "6th Power Plan" (see "WA_Activities_Est" worksheet in this workbook). An estimate in the same worksheet, which assumes 2005 ratio of new homes to increase in population holds through 2020, based on 2005 WA housing units as provided in U.S Census Bureau annual data, http://www.census.gov/popest/housing/HU-EST2005.html, produces similar results.			
Implied persons per housing units in Washington (for reference only)	2.24	2.22	
Estimated number of new residential units per year	44,695	39,648	
Calculated based on estimates above.			
Total Multi-family Residential Housing Units in Washington	610,955	715,883	
Draft estimates from Northwest Power Planning Council for "6th Power Plan" (see "WA_Activities_Est" worksheet in this workbook).			
Estimated average floorspace per multi-family unit.	1,000	1,000	
Estimate, but consistent with data in BASELINE CHARACTERISTICS OF THE MULTI-FAMILY SECTOR: OREGON AND WASHINGTON, prepared for the Northwest Energy Efficiency Alliance by Ecotope (David Baylon, Alison Roberts, Shelly Borrell, and Michael Kennedy), October, 2001.			
Implied Floorspace in Multi-family Residential Housing Units in Washington (million square feet)	611	716	
Implied New Floorspace Annually in Multi-family Residential Housing Units in Washington (million square feet)	10.11	10.49	
Estimated fraction of multi-family floorspace in buildings qualifying for Action	50%	50%	
[Placeholder estimates for now, pending further definition of eligibility. Data on fraction of units in buildings by number of units per building may be available from Northwest Power Planning Council for 5th or 6th Power Plan materials.] 1999/2001 survey data from PSE and PacificCorp suggest that about 80 and 55 percent, respectively, of the multi-family units in their service territories were in buildings of 4 units or more (as reported in NPPC workbook "PNWResCharacteristicsData.XLS").			

Implied Average Electricity Consumption per Square Foot Commercial Space in Washington as of 2005 (see Note 2)	17.04	kWh/yr
Implied Average Natural Gas Consumption per Square Foot Commercial Space in Washington as of 2005 (see Note 2)	27.58	kBtu/yr
Implied Average Electricity Consumption per Housing Unit in Washington as of 2005 (see Note 2)	**12.08**	MWh/yr
Implied Average Natural Gas Consumption per Housing Unit in Washington as of 2005 (see Note 2)	**27.58**	MMBtu/yr
Estimated Average Electricity Consumption per Multi-Family Housing Unit in Washington as of 2005 (as assumed in Action 3 analysis)	**11.00**	MWh/yr
Estimated Average Natural Gas Consumption per Multi-Family Housing Unit in Washington as of 2005 (as assumed in Action 3 analysis)	**5.35**	MMBtu/yr

ADDITIONAL PROGRAM ASSUMPTIONS FOR EEGB-1A

PUT Credit and Benchmarking Requirement for Existing Commercial and Multifamily Residential Buildings

	2012	2020/all	Units
CUMULATIVE fraction of commercial and multi-family residential square footage qualifying for PUT rebate by maintaining Energy Star score of 90 or above.	3%	10%	
Placeholder assumption, assuming that progressively more buildings will be shifted to this category over time. Adjusted to yield total 2010 PUT credit revenue impact noted in Action Document.			
Fractional additional annual savings relative to 2005 energy use (electricity and gas) for commercial and multi-family residential buildings qualifying for PUT rebate by maintaining Energy Star score of 90 or above.	1%	1%	
Placeholder assumption--buildings already at Energy Star rating of 90 wouldn't be required to improve to meet targets (though presumably qualifying for the rebate could help to drive the market).			
Electricity and gas use relative to 2005 energy use (electricity and gas) for commercial and multi-family residential buildings qualifying for PUT rebate by maintaining Energy Star score of 90 or above.	65%	55%	
Placeholder assumption--used to estimate total electricity and gas use in the buildings for the purposes of estimating the PUT credit.			
CUMULATIVE Fraction of commercial and multi-family residential square footage qualifying for PUT rebate by maintaining Energy Star score of Energy Star score of 75 to 89 (80 to 89 after 3 years of the program) and posting an improvement in their score in the second year of at least 5 points.	1.5%	0.0%	
Placeholder assumptions. Adjusted to yield total 2010 PUT credit revenue impact noted in Action Document.			
Average annual fractional savings relative to 2005 energy use (electricity and gas) for commercial and multi-family residential buildings qualifying for PUT rebate by maintaining Energy Star score of 75 to 89 (80 to 89 after 3 years of the program) and posting an improvement in their score in the second year of at least 5 points.	3%	3%	
Placeholder assumption.			
Electricity and gas use relative to 2005 energy use (electricity and gas) for commercial and multi-family residential buildings qualifying for PUT rebate by maintaining Energy Star score of Energy Star score of 75 to 89 (80 to 89 after 3 years of the program) and posting an improvement in their score in the second year of at least 5 points.	75%	65%	
Placeholder assumption--used to estimate total electricity and gas use in the buildings for the purposes of estimating the PUT credit.			
CUMULATIVE Fraction of commercial and multi-family residential square footage starting with an Energy Star score of less than 75 but qualifying for PUT rebate by posting an improvement in their score to least 75 points (80 points after three years of the program).	5.0%	0.0%	
Placeholder assumption. Adjusted to yield total 2010 PUT credit revenue impact noted in Action Document.			
Average annual fractional savings relative to 2005 energy use (electricity and gas) for commercial and multi-family residential square footage starting with an Enegy Star score of less than 75 but qualifying for PUT rebate by posting an improvement in their score to least 75 points (80 points after three years of the program).	5%	5%	

Electricity and gas use relative to 2005 energy use (electricity and gas) for commercial and multi-family residential buildings starting with an Energy Star score of less than 75 but qualifying for PUT rebate by posting an improvement in their score to least 75 points (80 points after three years of the program).	85%	75%

Placeholder assumption--used to estimate total electricity and gas use in the buildings for the purposes of estimating the PUT credit.

Public Utility Tax (PUT) Rate: **3.873%**

As provided by Gary Grossman of the Department of Revenue.

Fraction of Public Utility Tax credit to be provided by electric and gas utilities: **50%**

As specified in Action Document.

Sales Tax Refund for Non-Residential New Construction

CUMULATIVE fraction of commercial and multi-family residential square footage qualifying for PUT rebate by maintaining Energy Star score of 90 or above.	3%	10%

Placeholder assumption, assuming that progressively more buildings meet goals over time.

Average (and maximum for rebate) cost of non-residential construction: $ 250.00 /square foot

Rough assumption, but considered a reasonable average by Implementation Working Group members in and familiar with the building industry in Washington. Value is in year 2007 dollars per square foot.

Fraction of cost of non-residential construction (up to maximum above) to be provided as a sales tax rebate: **0.75%**

As specified in Action Document.

Ratio of the area of commercial or multi-family residential floorspace substantially rennovated to that of new commercial floorspace covered by this element of Action: **0.00**

Placeholde assumption--set at zero because the Action Document makes no mention of the inclusion of rennovated space, though rennovated space might be included in the future.

Fractional annual savings relative to 2005 energy use (electricity and gas) for commercial buildings qualifying for sales tax rebate. Savings fractions shown are over and above energy efficiency improvements required by revised building codes included in Action 3.	20%	20%

Placeholder assumption.

Sales Tax Refund for Existing and New Residential Buildings

Fraction of new and rennovated residential space qualifying for Sales Tax Refund	4%	10%

Placeholder assumption, assuming that progressively more buildings meet goals over time.

Average cost of non-residential construction: $ 150.00 /square foot

Rough assumption, but considered a reasonable average by Implementation Working Group members in and familiar with the building industry in Washington. Value is in year 2007 dollars per square foot.

Ratio of number of homes substantially rennovated to new residential homes covered by this element of Action: **1.00**

Placeholder assumption--implies approximately the same number of rennovated as new homes.

Average floorspace of new residential homes and rennovated space covered by this element of Action	1,850	1,800	square feet

Placeholder assumption. Values are roughly consistent with data from Puget Sound Energy and PacificCorp (Washington customers) appliance saturation surveys in 1999 and 2001, respectively, as reported in NPPC workbook "PNWResCharacteristicsData.XLS".

Sales Tax Rate (State portion): **6.500%**

As provided by Gary Grossman of the Department of Revenue.

Fraction of applicable sales tax to be provided as a sales tax rebate: The lower of	20.00%	of tax paid or
	$5,000	per unit

As specified in Action Document.

Fractional annual savings relative to 2005 energy use (electricity and gas) for commercial buildings qualifying for sales tax rebate. Savings fractions shown are over and above energy efficiency improvements required by revised building codes included in Action 3.	20%	20%

PROGRAM PARTICIPATION AND SAVINGS CALCULATIONS FOR EEGB-1A

PUT Credit and Benchmarking Requirement for Existing Commercial and Multifamily Residential Buildings

	2012	2020/all	Units
Square feet of existing commercial buildings qualifying for PUT Tax Credit (score of 90 or greater)	56.4	207.2	million square feet
Square feet of existing commercial buildings qualifying for PUT Tax Credit (score of 75 to 89 in first three years, 80 to 89 years 4 through 6)	28.2	-	million square feet
Square feet of existing commercial buildings qualifying for PUT Tax Credit by improving to score of 75 in first three years, 80 years 4 through 6	94.1	-	million square feet
Square feet of existing multi-family residential buildings qualifying for PUT Tax Credit (score of 90 or greater)	9.5	35.8	million square feet
Square feet of existing multi-family residential buildings qualifying for PUT Tax Credit (score of 75 to 89 in first three years, 80 to 89 years 4 through 6)	4.7	-	million square feet
Square feet of existing multi-family residential buildings qualifying for PUT Tax Credit by improving to score of 75 in first three years, 80 years 4 through 6	15.8	-	million square feet
Annual (not cumulative) electricity savings in existing commercial buildings qualifying for PUT Tax Credit (score of 90 or greater)	9.6	35.3	GWh
Annual (not cumulative) gas savings in existing commercial buildings qualifying for PUT Tax Credit (score of 90 or greater)	15.6	57.1	billion Btu
Annual (not cumulative) electricity savings in existing commercial buildings qualifying for PUT Tax Credit (score of 75 to 89 in first three years, 80 to 89 years 4 through 6)	14.4	-	GWh
Annual (not cumulative) gas savings in existing commercial buildings qualifying for PUT Tax Credit (score of 75 to 89 in first three years, 80 to 89 years 4 through 6)	38.9	-	billion Btu
Annual (not cumulative) electricity savings in existing commercial buildings qualifying for PUT Tax Credit by improving to score of 75 in first three years, 80 years 4 through 6	80.1	-	GWh
Annual (not cumulative) gas savings in existing commercial buildings qualifying for PUT Tax Credit by improving to score of 75 in first three years, 80 years 4 through 6	129.7	-	billion Btu
Annual (not cumulative) electricity savings in existing multi-family residential buildings qualifying for PUT Tax Credit (score of 90 or greater)	1.0	3.9	GWh
Annual (not cumulative) gas savings in existing multi-family residential buildings qualifying for PUT Tax Credit (score of 90 or greater)	0.5	1.9	billion Btu
Annual (not cumulative) electricity savings in existing multi-family residential buildings qualifying for PUT Tax Credit (score of 75 to 89 in first three years, 80 to 89 years 4 through 6)	1.6	-	GWh
Annual (not cumulative) gas savings in existing multi-family residential buildings qualifying for PUT Tax Credit (score of 75 to 89 in first three years, 80 to 89 years 4 through 6)	0.8	-	billion Btu
Annual (not cumulative) electricity savings in existing multi-family residential buildings qualifying for PUT Tax Credit by improving to score of 75 in first three years, 80 years 4 through 6	8.7	-	GWh
Annual (not cumulative) gas savings in existing multi-family residential buildings qualifying for PUT Tax Credit by improving to score of 75 in first three years, 80 years 4 through 6	4.2	-	billion Btu

Sales Tax Refund for Non-Residential New Construction

Square feet of new and rennovated commercial space qualifying for Sales Tax Refund by achieving an Energy Star Target Finder score of 90 or more	1.0	2.4	million square feet
Annual (not cumulative) electricity savings in new and rennovated commercial buildings qualifying for Sales Tax Refund	3.4	8.0	GWh
Annual (not cumulative) natural gas savings in new and rennovated commercial buildings qualifying for Sales Tax Refund	5.5	13.0	billion Btu

Sales Tax Refund for Existing and New Residential Buildings

Number of new and rennovated homes qualifying for Sales Tax Refund	3,517	7,930	units
Annual (not cumulative) electricity savings in new and rennovated commercial buildings qualifying for Sales Tax Refund	8.5	19.2	GWh
Annual (not cumulative) natural gas savings in new and rennovated commercial buildings qualifying for Sales Tax Refund	19.4	43.7	billion Btu

TAX INCENTIVES CALCULATIONS FOR EEGB-1A

PUT Credit and Benchmarking Requirement for Existing Commercial and Multifamily Residential Buildings

	2012	2020/all	Units
Estimated electricity use in commercial buildings participating in program	2,348	1,942	GWh
Estimated natural gas use in commercial buildings participating in program	3,801	3,143	billion Btu
Estimated electricity use in multi-family buildings participating in program	255	217	GWh
Estimated natural gas use in multi-family buildings participating in program	124	105	billion Btu
Estimated electric revenues from commercial buildings participating in program	$ 136	$ 107	million
Estimated natural gas revenues from commercial buildings participating in program	$ 44	$ 36	million
Estimated electric revenues from residential buildings participating in program	$ 16	$ 14	million
Estimated natural gas revenues from residential buildings participating in program	$ 2	$ 1	million
Estimated PUT tax paid by commercial buildings participating in program	$ 7.0	$ 5.6	million
Estimated PUT tax paid by residential buildings participating in program	$ 0.7	$ 0.6	million
Total PUT Tax Credit	$ 7.7	$ 6.1	million
Total Impact of PUT Tax Credits to State Budget	$ 3.8	$ 3.1	million

Based on assumption regarding utility contribution to credit as noted above.

Sales Tax Refund for Non-Residential New Construction

Estimated value of commercial new construction and renonvations qualifying for Sales Tax Refund under program.	$ 249	$ 590	million
Estimated value of Sales Tax Refund for commercial new construction and renovations qualifying under program.	$ 1.9	$ 4.4	million

Sales Tax Refund for Existing and New Residential Buildings

Estimated value of residential new construction and renonvations qualifying for Sales Tax Refund under program.	$ 976	$ 2,141	million
Estimated value of Sales Tax Refund for residential new construction and renovations qualifying under program.	$ 3.5	$ 7.5	million

Results by Program Element	2012	2020/all	Units
PUT Credit and Benchmarking Requirement for Existing Commercial and Multifamily Residential Buildings			
Electricity			
Reduction in Electricity Sales: Residential	16	104	GWh (sales)
Reduction in Electricity Sales: Commercial	146	955	GWh (sales)
TOTAL Reduction in Electricity Sales	162	1,059	GWh (sales)
Reduction in Generation Requirements	175	1,139	GWh (generat
GHG Emission Savings	**0.09**	**0.57**	$MMtCO_2e$
Economic Analysis			
Net Present Value (2008-2020)		**-$151.6**	$million
Cumulative Emissions Reductions (2008-2020)		3.6	$MMtCO_2e$
Cost-Effectiveness		**-$41.99**	$/tCO_2e$
Natural Gas			
Reduction in Gas Use, Residential Sector	8	51	Billion BTU
Reduction in Gas Use, Commercial Sector	261	1,682	Billion BTU
TOTAL Reduction in Gas Sales	268	1,733	Billion BTU
GHG Emission Savings	**0.01**	**0.09**	$MMtCO_2e$
Economic Analysis			
Net Present Value (2008-2020)		**-$7.1**	$million
Cumulative Emissions Reductions (2008-2020)		0.59	$MMtCO_2e$
Cost-Effectiveness		**-$12.18**	$/tCO_2e$
Sales Tax Refund for Non-Residential New Construction, Existing and New Residential Buildings			
Electricity			
Reduction in Electricity Sales: Residential	17	134	GWh (sales)
Reduction in Electricity Sales: Commercial	7	51	GWh (sales)
TOTAL Reduction in Electricity Sales	24	185	GWh (sales)
Reduction in Generation Requirements	26	199	GWh (generat
GHG Emission Savings	**0.01**	**0.10**	$MMtCO_2e$
Economic Analysis			
Net Present Value (2008-2020)		**-$19.4**	$million
Cumulative Emissions Reductions (2008-2020)		0.5	$MMtCO_2e$
Cost-Effectiveness		**-$41.40**	$/tCO_2e$
Natural Gas			
Reduction in Gas Use, Residential Sector	39	305	Billion BTU
Reduction in Gas Use, Commercial Sector	11	83	Billion BTU
TOTAL Reduction in Gas Sales	50	388	Billion BTU
GHG Emission Savings	**0.00**	**0.02**	$MMtCO_2e$
Economic Analysis			
Net Present Value (2008-2020)		**-$1.2**	$million
Cumulative Emissions Reductions (2008-2020)		0.10	$MMtCO_2e$
Cost-Effectiveness		**-$12.00**	$/tCO_2e$

Summary Results	2012	2020	Units
Electricity (Conventional)			
Reduction in Electricity Sales: Residential	33	238	GWh (sales)
Reduction in Electricity Sales: Commercial	153	1,006	GWh (sales)
TOTAL Reduction in Electricity Sales	186	1,244	GWh (sales)
Reduction in Generation Requirements	200	1,338	GWh (generat
GHG Emission Savings	**0.10**	**0.67**	$MMtCO_2e$
Economic Analysis			
Net Present Value (2008-2020)		**-$171.0**	$million
Cumulative Emissions Reductions (2008-2020)		4.1	$MMtCO_2e$
Cost-Effectiveness		**-$41.92**	$/tCO_2e$
Natural Gas			
Reduction in Gas Use, Residential Sector	47	356	Billion BTU
Reduction in Gas Use, Commercial Sector	271	1,765	Billion BTU
TOTAL Reduction in Gas Sales	318	2,121	Billion BTU
GHG Emission Savings	**0.02**	**0.11**	$MMtCO_2e$
Economic Analysis			
Net Present Value (2008-2020)		**-$8.3**	$million
Cumulative Emissions Reductions (2008-2020)		0.68	$MMtCO_2e$
Cost-Effectiveness		**-$12.16**	$/tCO_2e$

Summary Results for EE/GB-1A	2012	2020	Units
Total for Option (Natural gas and Electricity)			
GHG Emission Savings	**0.12**	**0.78**	$MMtCO_2e$
Net Present Value (2008-2020)		**-$179.3**	$million
Cumulative Emissions Reductions (2008-2020)		4.8	$MMtCO_2e$
Cost-Effectiveness		**-$37.66**	$/tCO_2e$

NOTES AND DATA FROM SOURCES

Note 1:

From The Energy Efficiency Task Force Report to the Clean and Diversified Energy Advisory Committee of the Western Governors Association.
The Potential for More Efficient Electricity Use in the Western United States, January, 2006. This report is referred to here as the "WGA CDEAC EE report" and can be found at: http://www.westgov.org/wga/initiatives/cdeac/Energy%20Efficiency-full.pdf.
The CDEAC report provides a cost of saved energy (electricity) based on an average 7-year payback for code improvements (page 42). This is likely to be a lower bound for the cost of green building practices that yield a 50 percent improvement over existing buildings, but is used as a starting point for this analysis.

For Washington, the equivalent cost is estimated as follows for electricity and natural gas

payback	7	years, from CDEAC report
lifespan	25	years, conservative assumption
elec price	**$65**	$/MWh (weighted average levelized cost of residential and commercial electricity prices in WA--See Common Factors worksheet).
NG price	**$13.25**	$/MMBtu (weighted average levelized cost of residential and commercial natural gas prices in WA--See Common Factors worksheet).

Electricity levelized cost	$32.176	$/MWh
Natural Gas levelized cost	$6.583	$/MMBTU

Note 2:

Based on results from Table B.5 of the 2003 Commercial Buildings Energy Consumption Survey, Detailed Tables dated October 2006 and published by the US Department of Energy's Energy Information Administration, and available as http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/pdf2003/alltables.pdf, as described in "WA_Activities_Est" worksheet in this workbook.

Following data on electricity sales in Washington as of 2005 as described in "Utility_Sales" worksheet in this workbook. Downloaded from http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html (file sales_revenue.xls)

	MWh	Fraction of Total
Residential	33,212,197	40%
Commercial	28,099,583	34%
Industrial	22,111,773	27%
Total	83,423,553	100%

For natural gas use in Washington, consumption data are from the USDOE EIA downloaded from http://www.eia.doe.gov/oil_gas/natural_gas/applications/eia176query.html are are follows:
(See "EIA_NG_Data" worksheet in this workbook for raw EIA data)

	Sales (Million Cubic Feet of Natural Gas)			
	Residential	Commercial	Industrial	Total
2005	73,626	44,155	10,565	128,347
Fraction of 2005 Total	57%	34%	8%	100%

Estimate of Mitigation Option Costs and Benefits for Washington EE/GB IWG GHG Analysis

EE/GB-1B **ACTION 1B: Expanded Implementation of Distributed Energy and Water, Combined Heat and Power (CHP) and Renewable Energy**

Date Last Modified: *10/13/2008* *D. Von Hippel*

Key Data and Assumptions	2012	2020/all	Units
Total Remaining Estimated CHP Potential in WA as of 2004			
2,847 MW (See ***Note 1***)			
From the Combined Heat and Power in the Pacific Northwest: Market Assessment, dated August 2004, to the Oak Ridge National Laboratory (http://www.chpcenternw.org/NwChpDocs/Chp_Market-Assessment_In_PNW_EEA_08_2004.pdf). From "Economic Potential, Accelerated Case" results.			
First Year Results Accrue		2010	
Fuel Costs	2012	2020/all	Units
Natural Gas Avoided Cost		$7.6	$/MMBtu
Based on projections of "city gate" gas price.			
Biomass		$3.4	$/MMBtu
Estimate based on national study of state-by-state biomass resource resource assessments (Biomass Feedstock Availability in the United States: 1999 State Level Analysis, M Walsh et al 1999, with 2000update). Price equivalent of $51/dry ton at 16 MMBtu/dry			
Oil		$9.5	$/MMBtu
From Seattle Steam comments during Fall 2007 CAT process.			
Coal		$2.5	$/MMBtu
Average coal heat content of 26.75 MMBTU/ton, based on 2001 USDOE/EIA data. USDOE/EIA figures for 2005 "other industrial users" are withheld for WA. www.eia.doe.gov/cneaf/coal/page/acr/table34.html. See "Common Factors" worksheet in this workbook.			
Avoided Electricity Cost		$66	$/MWh
Estimate derved from NWPCC data from RTF analysis, same source as marginal CO2 emission rate for electricity reductions, this is the simple average (not levelized value) of the marginal dispatch costs for 2010, 2015, and 2020			
Avoided electricity emissions rate	0.50	0.50	tCO_2/MWh
As used in CAT Fall 2007 analyses			
State Element Sales and Use Tax (% of purchase cost)		6.50%	
Used to reflect implied revenue impacts/incentive value of Sales Tax and Use Tax exemption on commercial CHP systems (industrial CHP systems are already expected to be largely covered by the existing "Manufacturing Machinery" exemption.			
Fraction of CHP systems implemented meeting qualifying efficiency level		50%	
Assumption			
Fraction of commercial CHP systems implemented (with qualifying efficiency) receiving exemption		100%	
Assumption			
Fraction of industrial CHP systems implemented (with qualifying efficiency) receiving exemption		10%	
Assumption. This value is set low because most industrial CHP systems meeting efficiency criterion already qualify for existing Manufacturing Machinery and Equipment Sales/Use Tax Exemption. This fraction would, for example, include industrial CHP plants that produce substantially more power than can be used on-site.			

Summary Results	2012	2020	Units
Total for Policy (All Fuels, All Systems)			
Total Net GHG Emission Savings	0.28	1.4	$MMtCO_2e$
Net Present Value (2008-2020)		-$71.7	$million
Cumulative Emissions Reductions (2008-2020)		7.5	$MMtCO_2e$
Cost-Effectiveness		-$9.6	$/tCO_2e$
Total net in-state expenditures	-$2.2	-$29.3	$million
Total for Policy (All Fuels, Systems Receiving Tax Exermptions)			
Total Net GHG Emission Savings	0.06	0.3	$MMtCO_2e$
Net Present Value (2008-2020)		-$4.6	$million
Cumulative Emissions Reductions (2008-2020)		1.6	$MMtCO_2e$
Cost-Effectiveness		-$2.8	$/tCO_2e$
Total net in-state expenditures	$0.3	-$3.6	$million
Total Tax Exemption	$1.04	$1.50	$million

Note that cost results for systems receiving tax exemptions should be considered approximzate at this time, as they do not fully reflect the added capital and O&M cost sof the small fraction of systems that are assumed to be fueled with biomass.

Other Data, Assumptions, Calculations	2012	2020/all	Units
Fraction of Washington's Remaining Existing CHP Potential Tapped per Year	2.0%	3.0%	
Rough estimate to be refined in consultation with TWG. Fractions of remaining potential tapped in each year are assumed to be beyond "baseline plus existing policies" levels, and thus due to CAT policies.			
Annual Growth in CHP Potential	1.6%	1.6%	
Rough estimate based on consideration of growth in electricity use in the commercial and industrial sectors.			
Estimated CHP Potential by Year (MW)	3,182	3,612	*MW*
Potential shown above grows at the rate shown above.			
Estimated CHP Installed Under Policy by Year (MW)	64	108	*MW*
Average full-capacity-equivalent hours of operation for New CHP units:	4,000	4,000	
assumption			
Fraction of New CHP Capacity/Energy Fueled With:			
Natural Gas	94%	94%	
Biomass	6%	6%	
Oil	0%	0%	
Coal	0%	0%	
Assumptions - see Note 3			
Implied Annual New CHP Capacity by Fuel (MW)			
Natural Gas	60	102	
Biomass	4	6	
Oil	-	-	
Coal	-	-	
Implied Cumulative New CHP Capacity by Fuel (MW)			
Natural Gas	177	860	
Biomass	11	55	
Oil	-	-	
Coal	-	-	
Implied Cumulative New CHP Electricity Output by Fuel (GWh)			
Natural Gas	707	3,441	
Biomass	45	220	
Oil	-	-	
Coal	-	-	
Average Net Heat Rate by Fuel (Btu Fuel Input/kWh Electricity Output)			
Natural Gas (weighted average by system size)	9,341	8,520	
Biomass	13,000	13,000	
Oil	12,000	12,000	
Coal	12,000	12,000	
Assumptions			
Implied Fuel Input by Fuel (Billion Btu)			
Natural Gas	6,600	29,315	
Biomass	586	2,854	
Oil	-	-	
Coal	-	-	
Usable Cogenerated Heat Output as a Fraction of Fuel Energy Input			
Natural Gas	40%	40%	
Biomass	40%	40%	
Oil	40%	40%	
Coal	40%	40%	
Implied Usable Heat Output by Fuel (Billion Btu)			
Natural Gas	2,640	11,726	
Biomass	234	1,141	
Oil	-	-	
Coal	-	-	

Fraction of New CHP Capacity/Energy by Size:		
<1 MW	14%	14%
1-4.9 MW	24%	24%
5-24.9 MW	19%	19%
25-39.9 MW	13%	13%
40-259.9 MW	15%	15%
>259.9 MW	16%	16%
Implied Annual New CHP Capacity by Size (MW)		
<1 MW	9	15
1-4.9 MW	15	26
5-24.9 MW	12	21
25-39.9 MW	8	14
40-259.9 MW	10	16
>259.9 MW	10	17
Implied Cumulative New CHP Capacity by Size (MW)		
<1 MW	26	128
1-4.9 MW	45	218
5-24.9 MW	36	173
25-39.9 MW	24	115
40-259.9 MW	28	138
>259.9 MW	29	143
Implied Cumulative New CHP Electricity Output by Size (GWh)		
<1 MW	105	513
1-4.9 MW	179	872
5-24.9 MW	142	693
25-39.9 MW	95	460
40-259.9 MW	113	552
>259.9 MW	117	571
Average Net Heat Rate by Size (Btu Fuel Input/kWh Electricity Output)		
<1 MW	11,234	10,343
1-4.9 MW	9,868	8,480
5-24.9 MW	9,213	7,935
25-39.9 MW	9,945	8,865
40-259.9 MW	9,220	8,595
>259.9 MW	7,937	7,300
Implied Fuel Input by Size (Billion Btu)		
<1 MW	1,165	5,306
1-4.9 MW	1,717	7,392
5-24.9 MW	1,275	5,499
25-39.9 MW	920	4,080
40-259.9 MW	1,030	4,741
>259.9 MW	915	4,167
Usable Cogenerated Heat Output as a Fraction of Fuel Energy Input		
<1 MW	40%	40%
1-4.9 MW	40%	40%
5-24.9 MW	40%	40%
25-39.9 MW	40%	40%
40-259.9 MW	40%	40%
>259.9 MW	40%	40%
Implied Usable Heat Output by Fuel (Billion Btu)		
<1 MW	466	2,122
1-4.9 MW	687	2,957
5-24.9 MW	510	2,200
25-39.9 MW	368	1,632
40-259.9 MW	412	1,896
>259.9 MW	366	1,667

Other Data, Assumptions, Calculations	2012	2020/all	Units
Fraction of Usable Heat Output Replacing Space/Water/Process Heat Use	94%	94%	
(Assumption from Seattle Steam provided during 2007 CAT process)			
Fraction of CHP Heat Output Displacing Thermal Energy Produced Using			
Natural Gas	90%	90%	
Biomass	0%	0%	
Coal	0%	0%	
Electricity	10%	10%	
Oil	0%	0%	
Based on input from TWG			
Net Efficiency of Displaced Boiler/Heater Thermal Energy Produced Using			
Natural Gas	75%	75%	
Biomass	75%	75%	
Coal	75%	75%	
Electricity	85%	85%	
Oil	75%	75%	
Assumptions			
Net Displaced Fuel Use (Billion Btu)			
Natural Gas	**3,242**	**14,514**	
Biomass	**-**	**-**	
Coal	**-**	**-**	
Electricity	**318**	**1,423**	
Oil	**-**	**-**	
Inputs to Cost Estimates for CHP Systems			
Factors for Annualizing Capital Costs (all plant types)			
Interest Rate (real)		8%	/yr
Economic Life of System		20	years
Implied Annualization Factor		10.19%	%/yr
Estimated Average Installed Capital Costs by System Type ($2006/kW)			
Natural Gas	$ 1,005	$ 875	
Biomass	$ 1,300	$ 1,250	
Oil	$ 1,050	$ 1,000	
Coal	$ 1,200	$ 1,150	
Source: Combined Heat and Power in the Pacific Northwest: Market Assessment, based on average of range of sizes of turbine systems; Biomass system assumed $250 higher than gas turbine; Coal system assumed equal to gas turbine			
Estimated Average Non-fuel Operating and Maintenance Costs by System Type ($/MWh)			
Natural Gas	$ 8.45	$ 7.36	
Biomass	$ 12.00	$ 12.00	
Coal	$ 12.00	$ 12.00	
Source: Combined Heat and Power in the Pacific Northwest: Market Assessment. Natural gas values based on weighted average of values shown below by range of size class. Biomass and coal system values are rough assumptions at present.			
Estimated Average Installed Capital Costs by Size ($2006/kW)			
<1 MW	$ 1,456	$ 1,119	
1-4.9 MW	$ 1,090	$ 969	
5-24.9 MW	$ 1,032	$ 916	
25-39.9 MW	$ 928	$ 818	
40-259.9 MW	$ 814	$ 766	
>259.9 MW	$ 684	$ 615	
Estimated Average Non-fuel Operating and Maintenance Costs by Size ($2006/MWh)			
<1 MW	$ 17.05	$ 12.10	
1-4.9 MW	$ 9.90	$ 8.80	
5-24.9 MW	$ 8.80	$ 8.80	
25-39.9 MW	$ 5.50	$ 4.40	
40-259.9 MW	$ 4.40	$ 4.40	
>259.9 MW	$ 4.40	$ 4.40	

Intermediate Results for Cost Estimates

Total Capital Costs for New Systems by Fuel (thousand 2006 dollars)		
Natural Gas	$ 60,137	$ 89,159
Biomass	$ 4,960	$ 8,123
Oil	$ -	$ -
Coal	$ -	$ -
Annualized Capital Costs for All Systems by Fuel (thousand 2006 dollars)		
Natural Gas	$ 18,088	$ 82,671
Biomass	$ 1,492	$ 7,133
Oil	$ -	$ -
Coal	$ -	$ -
Annual Non-Fuel Operating and Maintenance Costs for All Systems (thousand 2006 dollars)		
Natural Gas	$ 5,973	$ 25,325
Biomass	$ 541	$ 2,634
Oil	$ -	$ -
Coal	$ -	$ -
Total Non-Fuel Costs for All Systems (thousand 2006 dollars)		
Natural Gas	$ 24,061	$ 107,996
Biomass	$ 2,033	$ 9,767
Oil	$ -	$ -
Coal	$ -	$ -
Total Gross Fuel Costs for All Systems (thousand 2006 dollars)		
Natural Gas	$ 50,322	$ 223,523
Biomass	$ 1,995	$ 9,717
Oil	$ -	$ -
Coal	$ -	$ -
Total Fuel Cost Savings from Displaced Heating Fuels for All Systems (thousand 2006 dollars)		
Natural Gas	$ 24,721	$ 110,671
Biomass	$ -	$ -
Coal	$ -	$ -
Electricity	$ 6,160	$ 27,578
Oil	$ -	$ -
Total Capital Costs for New Systems by Size (thousand 2006 dollars)		
<1 MW	$ 12,984	$ 17,003
1-4.9 MW	$ 16,525	$ 25,000
5-24.9 MW	$ 12,438	$ 18,803
25-39.9 MW	$ 7,426	$ 11,145
40-259.9 MW	$ 7,809	$ 12,503
>259.9 MW	$ 6,792	$ 10,392
Annualized Capital Costs for All Systems by Size (thousand 2006 dollars)		
<1 MW	$ 3,905	$ 16,931
1-4.9 MW	$ 4,970	$ 22,921
5-24.9 MW	$ 3,741	$ 17,247
25-39.9 MW	$ 2,234	$ 10,264
40-259.9 MW	$ 2,349	$ 11,113
>259.9 MW	$ 2,043	$ 9,469
Annual Non-Fuel Operating and Maintenance Costs for All Systems (thousand 2006 dollars)		
<1 MW	$ 1,796	$ 6,207
1-4.9 MW	$ 1,772	$ 7,671
5-24.9 MW	$ 1,252	$ 6,098
25-39.9 MW	$ 520	$ 2,025
40-259.9 MW	$ 498	$ 2,427
>259.9 MW	$ 516	$ 2,512

Total Non-Fuel Costs for All Systems (thousand 2006 dollars)		
<1 MW	$ 5,701	$ 23,138
1-4.9 MW	$ 6,742	$ 30,592
5-24.9 MW	$ 4,993	$ 23,345
25-39.9 MW	$ 2,753	$ 12,289
40-259.9 MW	$ 2,847	$ 13,540
>259.9 MW	$ 2,559	$ 11,980
	$ 25,596	$ 114,885

Total Gross Fuel Costs for All Systems (thousand 2006 dollars)		
<1 MW	$ 7,332	$ 32,688
1-4.9 MW	$ 12,459	$ 55,545
5-24.9 MW	$ 9,905	$ 44,158
25-39.9 MW	$ 6,579	$ 29,329
40-259.9 MW	$ 7,883	$ 35,146
>259.9 MW	$ 8,159	$ 36,375
		$ 233,240

Total Fuel Cost Savings from Displaced Heating Fuels for All Systems (thousand 2006 dollars)		
<1 MW	$ 4,328	$ 19,375
1-4.9 MW	$ 7,354	$ 32,923
5-24.9 MW	$ 5,847	$ 26,174
25-39.9 MW	$ 3,883	$ 17,384
40-259.9 MW	$ 4,653	$ 20,832
>259.9 MW	$ 4,816	$ 21,560
		$ 138,249

Calculation and Results of Tax Exemption Implications	2012	2020/all	Units

Fraction of Systems by Size Class Qualifying for Sales Tax and Use Tax Exemption

Commercial systems meeting qualifying efficiency standards. Based on estimates of Technical Potential from document in Note 1. See Note 4 for derivation of fractions of potential systems by size class that are estimated to be in commercial/institutional applications.

<1 MW	43%
1-4.9 MW	27%
5-24.9 MW	30%
25-39.9 MW	18%
40-259.9 MW	5%
>259.9 MW	5%

Implied Capital Costs for Qualifying Systems (thousand 2006 dollars)

<1 MW	$ 5,596	$ 7,328
1-4.9 MW	$ 4,530	$ 6,853
5-24.9 MW	$ 3,775	$ 5,706
25-39.9 MW	$ 1,325	$ 1,988
40-259.9 MW	$ 390	$ 625
>259.9 MW	$ 340	$ 520
TOTAL, ALL SYSTEMS	$ 15,955	$ 23,020

Implied State Portion of Sales Tax and Use Tax Exemptions for Qualifying Systems (thousand 2006 dollars)

<1 MW	$ 364	$ 476
1-4.9 MW	$ 294	$ 445
5-24.9 MW	$ 245	$ 371
25-39.9 MW	$ 86	$ 129
40-259.9 MW	$ 25	$ 41
>259.9 MW	$ 22	$ 34
TOTAL, ALL SYSTEMS	$ 1,037	$ 1,496

Implied Total Annual Costs for Systems Qualifying for Tax Exemption, Net of Displaced Heating Fuel Savings (thousand 2006 dollars)

<1 MW	$ 3,752	$ 15,710
1-4.9 MW	$ 3,247	$ 14,587
5-24.9 MW	$ 2,747	$ 12,542
25-39.9 MW	$ 972	$ 4,324
40-259.9 MW	$ 304	$ 1,393
>259.9 MW	$ 295	$ 1,340
TOTAL, ALL SYSTEMS	$ 11,317	$ 49,895

Implied Total Annual Fuel Input to Systems Qualifying for Tax Exemption (billion Btu)

<1 MW	502	2,287
1-4.9 MW	471	2,026
5-24.9 MW	387	1,669
25-39.9 MW	164	728
40-259.9 MW	52	237
>259.9 MW	46	208
TOTAL, ALL SYSTEMS	1,621	7,155
Fraction of Fuel Input to from All Systems Modeled	22.6%	22.2%

Here "all systems modeled" Includes commercial systems meeting qualifying efficiency standards, systems not meeting efficiency standards, and industrial systems, including those that already qualify for existing (2008) tax exemption. This fraction is used to estimate the net emissions benefit of the systems receiving tax exemptions.

Implied Total Electricity Output by Systems Qualifying for Tax Exemption (GWh)

<1 MW	45	221
1-4.9 MW	49	239
5-24.9 MW	43	210
25-39.9 MW	17	82
40-259.9 MW	6	28
>259.9 MW	6	29
TOTAL, ALL SYSTEMS	166	809
Fraction of Electricity Output from All Systems Modeled	22.1%	22.1%

Here "all systems modeled" Includes commercial systems meeting qualifying efficiency standards, systems not meeting efficiency standards, and industrial systems, including those that already qualify for existing (2008) tax exemption. This fraction is used to estimate emissions benefit from electricity generation by the systems receiving tax exemptions.

Results	2012	2020	Units
Electricity			
TOTAL Reduction in Electricity Sales (electricity output from CHP plus avoided electricity use in boilers/space heaters/water heaters)	845	4,077	GWh (sales)
Reduction in Generation Requirements	911	4,386	GWh (generation)
Gross GHG Emission Savings	**0.46**	**2.19**	$MMtCO_2e$
Natural Gas			
Net Change in Gas Use (negative values denote increased use)	-3,358	-14,801	Billion BTU
Net GHG Emissions (negative values denote increased emissions)	**-0.18**	**-0.78**	$MMtCO_2e$
Biomass			
Net Change in Biomass Use (negative values denote increased use)	-586	-2,854	Billion BTU
Net GHG Emissions (negative values denote increased emissions)	**0.00**	**-0.01**	$MMtCO_2e$
		-178344	dry tons
Coal			
Net Change in Coal Use (negative values denote increased use)	0	0	Billion BTU
Net GHG Emissions (negative values denote increased emissions)	**0.00**	**0.00**	$MMtCO_2e$
Oil			
Net Change in Oil Use (negative values denote increased use)	0	0	Billion BTU
Net GHG Emissions (negative values denote increased emissions)	**0.00**	**0.00**	$MMtCO_2e$

NOTES AND DATA FROM SOURCES

Note 1:

From *Combined Heat and Power in the Pacific Northwest: Market Assessment*
Task 1 - Final Report. Submitted to Oak Ridge National Laboratory
This report can be found at:
http://www.chpcenternw.org/NwChpDocs/Chp_Market-Assessment_In_PNW_EEA_08_2004.pdf
Accelerated Case assumptions – 2020 cost and performance specs, no stand-by charges, financial incentives equal to about 15% of capital costs

Note 2:

Natural gas - cell AJ53 of SEDS workbook
Coal - cell AQ53 of SEDS workbook
Electricity - to be confirmed
Oil - pet. coke, pentanes plus, residential fuel, still gas, napthas, unfinished oils - cells AK53 to AP53 of SEDS workbook

Note 3:
From *Combined Heat and Power in the Pacific Northwest: Market Assessment*

Large industrial

From Table 4-1 (Washington only) On-site CHP Technical Potential		From Table 4-1 (Washington only) CHP Export Potential	
Food	27	Food	24
Lumber and Wood	33	Lumber and Wood	28
Paper	122	Paper	229
Chemicals	25	Chemicals	11
Petroleum Refining	81	Petroleum Refining	568
Primary Metals	28	Primary Metals	9
Electronic Equipment	0	Electronic Equipment	0
Transportation Equipment	45	Transportation Equipment	0
Instrumentation	0	Instrumentation	0
	361		869

Total Large Industrial CHP Technical Potential	1,230	MW

Techical Potential	
Existing facilities	MW
Large Industrial - On-site	360
Large Industrial - Export	870
Resource Recovery	27
Small Industrial	745
Commercial	2,885
New facilities	
Large Industrial - On-site	57
Small Industrial	304
Commercial	2,473
TOTAL	7,721

Technical Potential for Industries Assumed to use Biomass		
Food	51	MW
Lumber and Wood	61	MW
Paper	351	MW
Total	463	MW

Biomass as percentage of total technical potential	6.0%	
Amount of CHP economic potential from biomass	171	MW

Source: NW Council's Fifth Power Plan

			Capacity	
Landfill gas	100-200	aMW	176	MW
Washington % of population			51.20%	
Landfill gas in Washington			90	MW

Assume landfill gas in included in "Technical Potential" in CHP in the Pacific Northwest: Market Assessment

Landfill gas as percentage of total technical potential	1.2%	
Amount of CHP economic potential from landfill gas	33	MW

Note 4:

Economic Potential - Accelerated Case		
Upper limit of system size range	Potential (MW)	
500 kW	399	14.0%
1,000 kW	678	23.8%
5,000 kW	539	18.9%
20,000 kW	358	12.6%
50,000 kW	429	15.1%
260,000 kW	444	15.6%
	2,847	

From Table 5-1	Reciprocating Engine					Gas Turbine		
Size of System (kW - Electricity Capacity)	100	300	1,000	3,000	5,000	25,000	40,000	260,000
CHP Potential (MW)	79.8	319.2	678	323	216	358	429	444
Current Technology Specifications (2000)								
Electric_Heat_Rate_(Btu/kWh_HHV)	11,500	10,967	10,035	9,700	9,213	9,945	9,220	7,937
Electrical_Efficiency_(%)	29.70%	31.10%	34.00%	35.20%	37.00%	34.30%	37.00%	43.00%
Installed_Cost_--_CHP_(2003_$/kW)	$1,350	$1,160	$945	$935	$890	$800	$702	$590
Installed_Cost_--_CHP_(2003_$/kW)	$1,424	$1,223	$997	$986	$939	$844	$740	$622
O&M_Costs	$0.02	$0.01	$0.01	$0.01	$0.01	$0.01	$0.00	$0.00
Fuel_Input	1.15	3.29	10.04	29.1	46.07	248.63	368.8	2063.67
Total_Recoverable_Heat_(MMBtu/hr)	0.56	1.52	3.7	9.84	16.66	89.9	127.3	443.56
Economic_Life_Years	10	10	15	15	15	15	15	15
Net_Power_Costs	$0.08	$0.07	$0.06	$0.06	$0.05	$0.05	$0.05	$0.05
Advanced Technology Specifications (2020)								
Electric_Heat_Rate_(Btu/kWh_HHV)	10,500	10,185	8,638	8,322	7,935	8,865	8,595	7,300
Electrical_Efficiency_(%)	32.50%	33.50%	39.50%	41.00%	43.00%	38.50%	39.70%	46.80%
Installed_Cost_--_CHP_(2003_$/kW)	$1,000	$930	$840	$830	$790	$705	$660	$530
Installed_Cost_--_CHP_(2005_$/kW)	$1,055	$981	$886	$875	$833	$744	$696	$559
O&M_Costs	$0.01	$0.01	$0.01	$0.01	$0.01	$0.00	$0.00	$0.00
Fuel_Input	1.05	3.06	8.64	24.97	39.68	221.63	343.8	1898
Total_Recoverable_Heat_(MMBtu/hr)	0.49	1.35	2.9	8	13	77.3	115.5	409.24
Economic_Life_Years	10	10	15	15	15	15	15	15
Net_Power_Costs	$0.06	$0.06	$0.05	$0.05	$0.05	$0.05	$0.04	$0.04

Technical Potential By Type of System, Existing Facilities (Data from report in Note 1, Appendix E, and Tables 4-1 and 4-2). Breakdown for Large Industrial category is estimated based on Northwest Data

Upper limit of system size range	Large Industrial	Small Industrial	Commercial	TOTAL	Commercial as % of Total
500 kW		131.00	643.40	774	83%
1,000 kW		137.00	836.30	973	86%
5,000 kW	283.0	478.00	755.00	1,516	50%
20,000 kW	329.5		425.00	755	56%
>20,000 kW	563.5		225.00	789	29%
TOTAL	1176	746.00	2,884.70	4,807	60%

Allocation of Commercial System Potential into Size Ranges Used in Calculations	Commercial as % of Total
<1 MW	85%
1-4.9 MW	50%
5-24.9 MW	56%
25-39.9 MW	29%
40-259.9 MW	0%
>259.9 MW	0%

Estimate of Mitigation Option Costs and Benefits for Washington EE/GB IWG GHG Analysis

EE/GB-2 **EE/GB Action 2: Energy Efficiency in Existing, New and Renovated Public Buildings**

Date Last Modified: 10/31/2008 D. Von Hippel

Key Data and Assumptions	2012	2020/all	Units
First Year Results Accrue for Existing Public Buildings Elements *Assumed to be start of phase-in, based on Action Description.*		2012	
First Year Results Accrue for New Public Buildings Elements *Based on Action Description.*		2012	
Levelized Cost of Electricity Savings *Preliminary estimate based on 7-year payback as estimated in WGA CDEAC EE Report. See Note 1. This figure may need to be revisited in consideration of existing requirements, at least for new buildings, in WA.*		$32	$/MWh
Levelized Cost of Natural Gas Savings *Preliminary estimate based on 7-year payback as estimated in WGA CDEAC EE Report. See Note 1. This figure may need to be revisited in consideration of existing requirements, at least for new buildings, in WA.*		$6.6	$/MMBtu
Avoided Electricity Cost *See "Common Factors" worksheet in this workbook.*		$66	$/MWh
Avoided Natural Gas Cost *See "Fuel prices aeo2008" and "Common Factors" worksheets in this workbook.*		$7.6	$/MMBtu

Other Data, Assumptions, Calculations	2012	2020/all	Units
Inputs to/Intermediate Results of Calculation of Electricity and Gas Savings			
Total Commercial Floorspace in Washington (million square feet) *Draft estimates from Northwest Power Planning Council for "6th Power Plan" (see "WA_Activities_Est" worksheet in this workbook). An estimate in the same worksheet, based on USDOE EIA CBECS (commercial survey) data for the Pacific region, extrapolated using projected Washington population as a driver, yields quite similar results.*	1,881	2,072	
Est. area of new commercial space per year in WA (million square feet) *Calculated based on annual floorspace estimates above.*	33.1	23.6	
Fraction of statewide commercial space owned or leased by the State, Universities, or Schools *Placeholder estimate. US DOE Commercial Building Energy Consumption Survey (CBECS) data for the Pacific States suggests that about 20 percent of commercial building space is government owned, of which about 1% is federal, over 7 percent is state-owned, and the rest is locally-owned. It is assumed that a significant fraction of the local government floorspace recorded in CBECS is in public schools. Draft estimates from the Northwest Power Planning Council (see above) for floorspace by building type in Washington suggests that nearly 14 percent of total commercial/institutional building floorspace was in the categories "K-12" and "University" alone.*		18%	
Fraction of existing space owned or leased by the State, Universities, or Schools in buildings of greater than 10,000 square feet. *Placeholder estimate--see above. CBECS national and regional data (Energy Information Administration, 2003 Commercial Buildings Energy Consumption Survey: Building Characteristics Tables, Tables B6, B7, B4, B5 of file b1-b46.pdf, downloaded from http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/pdf2003/b1-b46.pdf) suggest that this fraction is likely to be between 80 and 90 percent.*		80%	
Fraction of statewide commercial space in other public buildings *Placeholder estimate--see discussion of CBECS data above.*		5%	

Fraction of space in other public buildings that are greater than 10,000 square feet. *Placeholder estimate--see above. CBECS data suggest that this fraction is likely to be between 80 and 90 percent.*		80%	
Total Residential Housing Units in Washington *Draft estimates from Northwest Power Planning Council for "6th Power Plan" (see "WA_Activities_Est" worksheet in this workbook). An estimate in the same worksheet, which assumes 2005 ratio of new homes to increase in population holds through 2020, based on 2005 WA housing units as provided in U.S Census Bureau annual data, http://www.census.gov/popest/housing/HU-EST2005.html, produces similar results.*	**3,054,060**	**3,383,726**	
Implied persons per housing units in Washington (for reference only)	**2.23**	**2.22**	
Actual number of new housing units in Washington in 2007		44,944	
Estimated number of new residential units per year *Calculated based on estimates above.*	**44,994**	**40,584**	
Fraction of statewide residential units publicly-owned *Placeholder estimate.*		5%	
Implied Average Electricity Consumption per Square Foot Commercial Space in Washington as of 2005 (see ***Note 2***)		17.04	kWh/yr
Implied Average Natural Gas Consumption per Square Foot Commercial Space in Washington as of 2005 (see ***Note 2***)		27.58	kBtu/yr
Electricity consumption per square foot in publicly-owned or leased commercial space relative to average in WA *Placeholder estimate--to be set at a value different than 100% if needed.*		100%	
Gas consumption per square foot in publicly-owned or leased commercial space *Placeholder estimate--to be set at a value different than 100% if needed.*		100%	
Implied Average Electricity Consumption per Square Foot Publicly-owned or -leased Space in Washington as of 2005		17.04	kWh/yr
Implied Average Gas Consumption per Square Foot Publicly-owned or -leased Space in Washington as of 2005		27.58	kBtu/yr
Implied Average Electricity Consumption per Housing Unit in Washington as of 2005 (see ***Note 2***)		**12.08**	MWh/yr
Implied Average Natural Gas Consumption per Housing Unit in Washington as of 2005 (see ***Note 2***)		**27.58**	MMBtu/yr
Electricity consumption per square foot in publicly-owned or leased housing relative *Placeholder estimate--to be set at a value different than 100% if needed.*		100%	
Gas consumption per square foot in publicly-owned or leased housing relative to *Placeholder estimate--to be set at a value different than 100% if needed.*		100%	
Implied average electricity consumption per publicly-owned or leased housing unit in Washington as of 2005		12.08	MWh/yr
Implied average gas consumption per publicly-owned or leased housing unit in Washington as of 2005		27.58	MMBtu/yr

PROGRAM ASSUMPTIONS FOR EE/GB-2	2012	2020/all	Units
Energy Efficiency Improvements in Existing Public Buildings			
Average Electricity and Gas Savings for Buildings Participating in Program (existing commercial and residential buildings)	20.0%	25.0%	
The description for this option currently includes the following: "Emission reductions in existing buildings when buildings reach the ENERGY STAR level of 75 will result in an average reduction in CO_2 of 20% to 25%. This would be further reduced as buildings recertify with ENERGY STAR level of 75, because the overall building energy use will go down thus raising the bar for all buildings."			
Date program of improvement of existing state, university, and school buildings fully "ramped up" *Specified as October 1, 2016 in the Action Description*		2017	
Date program of improvement of other existing public buildings fully "ramped up" *Specified as October 1, 2018 in the Action Description*		2019	
Fraction of existing (as of 2005) of public buildings participating in program through target dates *Program Goal.*		100%	/yr
Average annual ongoing efficiency improvement in existing public buildings following "ramp-up" *Program Goal (placeholder value). Intended to reflect ongoing efforts to improve energy efficiency once initial target of Energy Star rating of 75 (or equivalent) has been met.*		1%	/yr
Fraction of existing (as of 2005) public housing units participating in program through target date (uses target date for "other existing public buildings"). *Assumes that public housing included in program (currently placeholder value).*		80%	
Fraction of existing (as of 2005) state, university, and school buildings participating in program annually. *Calculated from above.*	16.7%	0.0%	/yr
Implied existing state, university, and school buildings floorspace included in program annually (million square feet)	39.574	-	/yr
Fraction of existing (as of 2005) other public buildings participating in program annually. *Calculated from above.*	12.5%	0.0%	/yr
Implied other public buildings floorspace included in program annually (million square feet)	8.245	-	/yr
Fraction of existing (as of 2005) public housing units participating in program annually. *Calculated from above.*	10.0%	0.0%	/yr
Implied number of public housing units included in program annually	13,750	-	/yr

Energy Efficiency Improvements in New Public Buildings

Fraction of new qualifying public buildings participating in program through target dates *Program Goal.*		100%	/yr
Fraction of new space owned or leased by the State, Universities, or Schools in buildings of greater than 10,000 square feet. *Placeholder estimate.*		80%	
Fraction of new space owned or leased in other public buildings of greater than 10,000 square feet. *Placeholder estimate.*		80%	
Fraction of new public housing units included in program. *Placeholder estimate.*		80%	
Annual **reduction** in energy use relative to 2005 existing buildings (for all building types, including public housing), based on Architecture 2030 goals. *From http://www.architecture2030.org/pdfs/2030Blueprint.pdf, The 2030 Blueprint: Solving Climate Change Saves Billions , Architecture 2030, page 6. Action document specifies that Architecture 2030 goals should be met for new and rennovated public buildings.*	**64.0%**	**80.0%**	
Ratio of substantially rennovated public building space (also covered under program) to new public building space. *Placeholder estimate, but consistent with that applied in the Achitecture 2030 document referenced above for the United States as a whole.*		1.00	
Ratio of substantially rennovated public housing (also covered under program) to new public housing space. *Placeholder estimate, but consistent with that applied in the Achitecture 2030 document referenced above for the United States as a whole.*		1.00	
Implied new state, university, and school buildings floorspace included in program annually (million square feet)	**9.543**	**6.796**	/yr
Implied new other public buildings floorspace included in program annually (million square feet)	**2.651**	**1.888**	/yr
Implied number of new residential public housing units included in program *Calculated from above.*	**1,800**	**1,623**	/yr

CALCULATION OF SAVINGS

Energy Efficiency Improvements in Existing Public Buildings

	2012	2020/all	Units
Implied total electricity savings in existing existing state, university, and school buildings participating in program annually. *First-year savings--not cumulative.*	134.9	50.8	GWh/yr
Implied total electricity savings in existing other public buildings participating in program annually. *First-year savings--not cumulative.*	28.1	14.1	GWh/yr
Implied total gas savings in existing existing state, university, and school buildings participating in program annually. *First-year savings--not cumulative.*	218.3	82.3	GBtu/yr
Implied total gas savings in existing other public buildings participating in program annually. *First-year savings--not cumulative.*	45.5	22.9	GBtu/yr
Implied total electricity savings in existing public housing *First-year savings--not cumulative.*	33.2	20.4	GWh/yr
Implied total gas savings in existing public housing	75.8	46.7	GBtu/yr
Implied cumulative electricity savings in existing existing state, university, and school buildings	134.9	1,044.4	GWh/yr
Implied cumulative electricity savings in existing other public buildings	28.1	268.4	GWh/yr
Implied cumulative gas savings in existing existing state, university, and school buildings	218.3	1,690.3	GBtu/yr
Implied cumulative gas savings in existing other public buildings	45.5	434.5	GBtu/yr
Implied cumulative electricity savings in existing public housing	33.2	321.0	GWh/yr
Implied cumulative gas savings in existing public housing	75.8	733.0	GBtu/yr

	2012	2020/all	Units
Energy Efficiency Improvements in New Public Buildings			
Average 2009 Energy Use Index for new commercial space relative to 2005 average energy use (electric and gas) per unit floor area in existing commercial space.		1.00	
Placeholder value. Value of 1.0 indicates that 2009 average for new buildings will be similar to 2005 average for all existing buildings			
Annual **reduction** in energy use relative to 2005 existing buildings (for all building types, including public housing), based on improvements in building energy codes through Action EE/GB-3.	**38.0%**	**70.0%**	
Based on EE/GB-3 goals for new buildings.			
Implied additional reduction relative to 2005 energy intensity to meet Architecture 2030 goals	**26.0%**	**10.0%**	
Implied required intensity improvement to meet Architecture 2030 goals, public sector (non-residential) buildings, electricity use per square foot	**4.43**	**1.70**	kWh/yr
Implied required intensity improvement to meet Architecture 2030 goals, public sector (non-residential) buildings, gas use per square foot	**7.17**	**2.76**	kBtu/yr
Average Fraction of Improvement in Electric Energy Intensities for Public (non-residential) Buildings from:			
Energy Efficiency Improvement	90%	85%	
Solar Thermal Energy (hot water/space heat/space cooling)	3%	5%	
On-site Solar PV	1%	2%	
On-site Biomass/Biogas/Landfill Gas Energy Use	1%	3%	
Green Power Purchase (from off-site, beyond electricity supply RPS)	5%	5%	
All "placeholder" assumptions, except on-site biomass/biogas/landfill gas energy use calculated so that values sum to 100%.			
Average Fraction of Improvement in Gas Energy Intensities for Public (non-residential) Buildings from:			
Energy Efficiency Improvement	96%	92%	
Solar Thermal Energy (hot water/space heat/space cooling)	3%	5%	
On-site Solar PV	0%	0%	
On-site Biomass/Biogas/Landfill Gas Energy Use	1%	3%	
Green Power Purchase (from off-site, beyond electricity supply RPS)	0%	0%	
All "placeholder" assumptions, except on-site biomass/biogas/landfill gas energy use calculated so that values sum to 100%.			
Implied Cumulative Impacts of Action, New (non-residential) Public Building Space (Electricity savings)			
Energy Efficiency Improvement	**48.08**	**227.48**	GWh
Solar Thermal Energy (hot water/space heat/space cooling)	**1.84**	**10.38**	GWh
On-site Solar PV	**0.65**	**3.89**	GWh
On-site Biomass/Biogas/Landfill Gas Energy Use	**0.76**	**5.18**	GWh
Green Power Purchase (from off-site, beyond electricity supply RPS)	**2.70**	**13.00**	GWh
Implied Cumulative Impacts of Action, New (non-residential) Public Building Space (Natural Gas savings)			
Energy Efficiency Improvement	**83.25**	**395.52**	GBtu/yr
Solar Thermal Energy (hot water/space heat/space cooling)	**2.97**	**16.81**	GBtu/yr
On-site Solar PV	**-**	**-**	GBtu/yr
On-site Biomass/Biogas/Landfill Gas Energy Use	**1.22**	**8.39**	GBtu/yr
Green Power Purchase (from off-site, beyond electricity supply RPS)	**-**	**-**	GBtu/yr
Implied required intensity improvement to meet Architecture 2030 goals, public housing, electricity use per unit	**3.14**	**1.21**	MWh/yr
Implied required intensity improvement to meet Architecture 2030 goals, public housing, gas use per unit	**7.17**	**2.76**	kBtu/yr

Average Fraction of Improvement in Electric Energy Intensities for Public Housing from:

Energy Efficiency Improvement	90%	85%
Solar Thermal Energy (hot water/space heat/space cooling)	3%	5%
On-site Solar PV	1%	2%
On-site Biomass/Biogas/Landfill Gas Energy Use	1%	3%
Green Power Purchase (from off-site, beyond electricity supply RPS)	5%	5%

All "placeholder" assumptions, except on-site biomass/biogas/landfill gas energy use calculated so that values sum to 100%.

Average Fraction of Improvement in Gas Energy Intensities for Public Housing from:

Energy Efficiency Improvement	96%	92%
Solar Thermal Energy (hot water/space heat/space cooling)	3%	5%
On-site Solar PV	0%	0%
On-site Biomass/Biogas/Landfill Gas Energy Use	1%	3%
Green Power Purchase (from off-site, beyond electricity supply RPS)	0%	0%

All "placeholder" assumptions, except on-site biomass/biogas/landfill gas energy use calculated so that values sum to 100%.

Implied Cumulative Impacts of Option, New Public Housing (Electricity savings)

Energy Efficiency Improvement	**5.03**	**29.35**	GWh
Solar Thermal Energy (hot water/space heat/space cooling)	**0.19**	**1.35**	GWh
On-site Solar PV	**0.07**	**0.51**	GWh
On-site Biomass/Biogas/Landfill Gas Energy Use	**0.08**	**0.68**	GWh
Green Power Purchase (from off-site, beyond electricity supply RPS)	**0.28**	**1.68**	GWh

Implied Cumulative Impacts of Option, New Public Housing (Natural Gas savings)

Energy Efficiency Improvement	**12.28**	**72.00**	GBtu/yr
Solar Thermal Energy (hot water/space heat/space cooling)	**0.44**	**3.09**	GBtu/yr
On-site Solar PV	**-**	**-**	GBtu/yr
On-site Biomass/Biogas/Landfill Gas Energy Use	**0.18**	**1.56**	GBtu/yr
Green Power Purchase (from off-site, beyond electricity supply RPS)	**-**	**-**	GBtu/yr

Additional Inputs to/Intermediate Results of Costs Analyses

	2012	2020/all	Units
Estimated annual levelized cost of residential solar hot water per unit output	**41.19**	**30.60**	$/MMBtu

Based on inputs to/results of solar hot water heating analysis included in EE/GB-Solar_Data

Estimated annual levelized cost of commercial solar hot water per unit output	**38.89**	**28.89**	$/MMBtu

Based on inputs to/results of solar hot water heating analysis included in EE/GB-Solar_Data

Adjustment to solar thermal costs for inclusion of space heat/cooling measures	1.00	1.00

Placeholder assumption--Value of 1.0 implies that solar space heat and cooling will cost the same per unit output as solar water heating.

Implied Per Unit Cost Electricity Avoided by residential Solar WH/SH/Cooling	**130.70**	**97.09**	$/MWh
Implied Per Unit Cost Natural Gas Avoided by residential Solar WH/SH/Cooling	**28.83**	**21.42**	$/MMBtu

Assumes delivered solar WH/SH/Cooling replaces electric with EF of 0.93, gas with EF of 0.70 (and therefore one MMBtu of delivered solar heat is the equivalent of more than one MMBtu of each fuel).

Implied Per Unit Cost Electricity Avoided by Solar WH/SH/Cooling (Commercial)	**123.40**	**91.67**	$/MWh
Implied Per Unit Cost Natural Gas Avoided by Solar WH/SH/Cooling (Commecial)	**27.22**	**20.22**	$/MMBtu

Assumes delivered solar WH/SH/Cooling replaces electric with EF of 0.93, gas with EF of 0.70 (and therefore one MMBtu of delivered solar heat is the equivalent of more than one MMBtu of each fuel).

Estimated annual levelized cost of on-site Solar PV, Commercial *Based on inputs to/results of solar PV analysis included in EE/GB-Solar_Data.*	546	353	$/MWh
Estimated annual levelized cost of on-site residential Solar PV *Based on inputs to/results of solar PV analysis included in EE/GB-Solar_Data.*	506	327	$/MWh
Fuel Cost for On-site Biomass/Biogas/Landfill Gas Energy Use *Based on costs for Biomass fuel, which will likely dominate this category of fuel inputs. See "Common Assumptions" worksheet in this workbook. If significantly processed biomass fuels (such as pelletized fuels) are required, this cost may need to be increased.*		3.41	$/MMBtu
Relative Efficiency of On-site Biomass/Biogas/Landfill Gas displacing electricity *Placeholder assumption.*		0.75	
Factor to reflect probable higher costs of on-site Biomass/Biogas/Landfill Gas Equipment Relative to Electric Equipment *Placeholder assumption--In most cases, heating/water heating equipment designed to use biomass-derived fuels will be more expensive than equipment designed to use electricity. This factor loads these incremental capital costs into estimated fuel costs.*		1.50	
Implied Per Unit Cost Electricity Avoided by Biomass/Biogas/Landfill Gas	23.16	23.16	$/MWh
Incremental Cost for Green Power Purchase (from off-site, beyond supply RPS) *Placeholder assumption.*	25.00	20.00	$/MWh

	2012	2020/all	Units
Implied Annual Net Costs of Action, New Public (non-residential) Buildings (Electricity savings)			
Energy Efficiency Improvement	$ (1,632)	$ (7,723)	$ thousand
Solar Thermal Energy (hot water/space heat/space cooling)	$ 105	$ 433	$ thousand
On-site Solar PV	$ 311	$ 1,523	$ thousand
On-site Biomass/Biogas/Landfill Gas Energy Use	$ (33)	$ (223)	$ thousand
Green Power Purchase (from off-site, beyond electricity supply RPS)	$ 68	$ 301	$ thousand
Implied Annual Net Costs of Action, New Public (non-residential) Buildings (Gas savings)			
Energy Efficiency Improvement	$ (87)	$ (412)	$ thousand
Solar Thermal Energy (hot water/space heat/space cooling)	$ 58	$ 271	$ thousand
On-site Solar PV	$ -	$ -	$ thousand
On-site Biomass/Biogas/Landfill Gas Energy Use	$ (5)	$ (35)	$ thousand
Green Power Purchase (from off-site, beyond electricity supply RPS)	$ -	$ -	$ thousand
Implied Annual Net Costs of Action, New Public Housing (Electricity savings)			
Energy Efficiency Improvement	$ (171)	$ (996)	$ thousand
Solar Thermal Energy (hot water/space heat/space cooling)	$ 11	$ 55	$ thousand
On-site Solar PV	$ 33	$ 197	$ thousand
On-site Biomass/Biogas/Landfill Gas Energy Use	$ (3)	$ (29)	$ thousand
Green Power Purchase (from off-site, beyond electricity supply RPS)	$ 7	$ 39	$ thousand
Implied Annual Net Costs of Action, New Public Housing (Gas savings)			
Energy Efficiency Improvement	$ (13)	$ (75)	$ thousand
Solar Thermal Energy (hot water/space heat/space cooling)	$ 9	$ 49	$ thousand
On-site Solar PV	$ -	$ -	$ thousand
On-site Biomass/Biogas/Landfill Gas Energy Use	$ (1)	$ (7)	$ thousand
Green Power Purchase (from off-site, beyond electricity supply RPS)	$ -	$ -	$ thousand
Implied Annual Net Costs of Option, Existing Public (non-residential) Buildings (Electricity savings)	$ (5,533)	$ (44,569)	$ thousand
Implied Annual Net Costs of Option, Existing Public (non-residential) Buildings (Gas savings)	$ (275)	$ (2,214)	$ thousand
Implied Annual Net Costs of Option, Existing Public Housing (Electricity savings)	$ (1,128)	$ (10,898)	$ thousand
Implied Annual Net Costs of Option, Existing Public Housing (Gas savings)	$ (79)	$ (764)	$ thousand

Results	2012	2020	Units
Electricity (Conventional)			
Reduction in Electricity Sales: Public Housing	39	355	GWh (sales)
Reduction in Electricity Sales: Public Sector Buildings (non-residential)	217	1,573	GWh (sales)
TOTAL Reduction in Electricity Sales	256	1,927	GWh (sales)
Reduction in Generation Requirements	276	2,073	GWh (generation)
GHG Emission Savings	**0.14**	**1.04**	$MMtCO_2e$
Economic Analysis			
Net Present Value (2008-2020)		**-$211**	$million
Cumulative Emissions Reductions (2008-2020)		5.8	$MMtCO_2e$
Cost-Effectiveness		**-$36.34**	$/tCO_2e$
Natural Gas			
Reduction in Gas Use, Public Housing	89	810	Billion BTU
Reduction in Gas Use, Public Sector Buildings (non-residential)	351	2,546	Billion BTU
TOTAL Reduction in Gas Sales	440	3,355	Billion BTU
GHG Emission Savings	**0.02**	**0.18**	$MMtCO_2e$
Economic Analysis			
Net Present Value (2008-2020)		**-$11**	$million
Cumulative Emissions Reductions (2008-2020)		1.0	$MMtCO_2e$
Cost-Effectiveness		**-$10.86**	$/tCO_2e$
Biomass/Biogas/Landfill Gas Fuel Use			
Added GHG Emissions from Biomass Fuels Use	**0.00001**	**0.00009**	$MMtCO_2e$
Cumulative added Emissions from Biomass Fuels (2007-2020)		0.0005	$MMtCO_2e$

Summary Results for EE/GB-2	2012	2020	Units
Total for Option (Natural gas and Electricity less Biomass)			
GHG Emission Savings	**0.16**	**1.21**	$MMtCO_2e$
Net Present Value (2008-2020)		**-$221.9**	$million
Cumulative Emissions Reductions (2008-2020)		6.8	$MMtCO_2e$
Cost-Effectiveness		**-$32.63**	$/tCO_2e$

Additional Summary Results for EE/GB-2 for Reporting	2012	2020	Units
Total Green Power Purchased Under EE/GB-2	3	15	GWh (sales)
Total Green Power Generation to Serve EE/GB-2	3	16	GWh (generation)
GHG Emission Savings from Green Power Component	**0.0016**	**0.0079**	$MMtCO_2e$
Net Present Value (2008-2020) of Green Power component of EE/GB-2		**$1**	$million
Total Renewable Electricity Under EE/GB-2	1	4	GWh (at consumer site
Total Reduction in Conventional Generation due to Renewable Electricity Under EE/GB-2 (displacement from Solar PV)	1	5	GWh (equivalent at central generator)
GHG Emission Savings from Renewable Power Component	**0.0004**	**0.0023**	$MMtCO_2e$
Net Present Value (2008-2020) of renewable electricity component of EE/GB-2		**$6**	$million

NOTES AND DATA FROM SOURCES

Note 1:

From The Energy Efficiency Task Force Report to the Clean and Diversified Energy Advisory Committee of the Western Governors Association.
The Potential for More Efficient Electricity Use in the Western United States, January, 2006. This report is referred to here as the "WGA CDEAC EE report" and can be found at: http://www.westgov.org/wga/initiatives/cdeac/Energy%20Efficiency-full.pdf.
The CDEAC report provides a cost of saved energy (electricity) based on an average 7-year payback for code improvements (page 42). This is likely to be a lower bound for the cost of green building practices that yield a 50 percent improvement over existing buildings, but is used as a starting point for this analysis.

For Washington, the equivalent cost is estimated as follows for electricity and natural gas

payback	7	years, from CDEAC report
lifespan	25	years, conservative assumption
elec price	**$65**	$/MWh (weighted average levelized cost of residential and commercial electricity prices in WA--See Common Factors worksheet).
NG price	**$13.25**	$/MMBtu (weighted average levelized cost of residential and commercial natural gas prices in WA--See Common Factors worksheet).

Electricity levelized cost	$32.176	$/MWh
Natural Gas levelized cost	$6.583	$/MMBTU

Note 2:

Based on results from Table B.5 of the 2003 Commercial Buildings Energy Consumption Survey, Detailed Tables dated October 2006 and published by the US Department of Energy's Energy Information Administration, and available as http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/pdf2003/alltables.pdf, as described in "WA_Activities_Est" worksheet in this workbook.

Following data on electricity sales in Washington as of 2005 as described in "Utility_Sales" worksheet in this workbook. Downloaded from http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html (file sales_revenue.xls)

	MWh	Fraction of Total
Residential	33,212,197	40%
Commercial	28,099,583	34%
Industrial	22,111,773	27%
Total	83,423,553	100%

For natural gas use in Washington, consumption data are from the USDOE EIA downloaded from http://www.eia.doe.gov/oil_gas/natural_gas/applications/eia176query.html are are follows:
(See "EIA_NG_Data" worksheet in this workbook for raw EIA data)

	Sales (Million Cubic Feet of Natural Gas)			
	Residential	Commercial	Industrial	Total
2005	73,626	44,155	10,565	128,347
Fraction of 2005 Total	57%	34%	8%	100%

Estimate of Mitigation Option Costs and Benefits for Washington EE/GB IWG GHG Analysis

EE/GB-3 **EE/GB Action 3: State Energy Code Improvements and Establishment of 2030 Building Goals**

Date Last Modified: 10/31/2008 D. Von Hippel

Key Data and Assumptions	2012	2020/all	Units
First Year Results Accrue for Building Energy Code Elements *Based on Action Description.*		2012	
First Year Results Accrue for Existing Buildings and New Building "Beyond Code" Elements *Based on Action Description.*		2012	
Levelized Cost of Electricity Savings *Preliminary estimate based on 7-year payback as estimated in WGA CDEAC EE Report. See Note 1. This figure may need to be revisited in consideration of existing requirements, at least for new buildings, in WA.*		$32	$/MWh
Levelized Cost of Natural Gas and Oil Products Savings *Preliminary estimate based on 7-year payback as estimated in WGA CDEAC EE Report. See Note 1. This figure may need to be revisited in consideration of existing requirements, at least for new buildings, in WA.*		$6.6	$/MMBtu
Avoided Electricity Cost *See "Common Factors" worksheet in this workbook.*		$66	$/MWh
Avoided Natural Gas Cost *See "Fuel prices aeo2008" and "Common Factors" worksheets in this workbook.*		$7.6	$/MMBtu
Avoided Oil Products Cost *See "Common Factors" worksheet in this workbook. Rough weighted average of costs for distillate oil and LPG in the combined residential and commercial sectors.*		$14.8	$/MMBtu

Other Data, Assumptions, Calculations	2012	2020/all	Units
Inputs to/Intermediate Results of Calculation of Electricity and Gas Savings			
Total Commercial Floorspace in Washington (million square feet) *Draft estimates from Northwest Power Planning Council for "6th Power Plan" (see "WA_Activities_Est" worksheet in this workbook). An estimate in the same worksheet, based on USDOE EIA CBECS (commercial survey) data for the Pacific region, extrapolated using projected Washington population as a driver, yields quite similar results.*	1,881	2,072	
Est. area of new commercial space per year in WA (million square feet) *Calculated based on annual floorspace estimates above.*	33.1	23.6	
Total Residential Housing Units in Washington *Draft estimates from Northwest Power Planning Council for "6th Power Plan" (see "WA_Activities_Est" worksheet in this workbook). An estimate in the same worksheet, which assumes 2005 ratio of new homes to increase in population holds through 2020, based on 2005 WA housing units as provided in U.S Census Bureau annual data, http://www.census.gov/popest/housing/HU-EST2005.html, produces similar results.*	3,054,060	3,383,726	
Implied persons per housing units in Washington (for reference only)	2.23	2.22	
Actual number of new housing units in Washington in 2007		44,944	
Estimated number of new residential units per year *Calculated based on estimates above.*	44,994	40,584	
Residential Housing Units by type in Washington			
Single Family	70.8%	70.5%	
Multi-Family	20.7%	21.2%	
Manufactured Housing	8.5%	8.3%	
Derived from draft estimates from Northwest Power Planning Council for "6th Power Plan" (see "WA_Activities_Est" worksheet in this workbook).			
Implied Average Electricity Consumption per Square Foot Commercial Space in Washington as of 2005 (see ***Note 2***)		17.04	kWh/yr
Implied Average Natural Gas Consumption per Square Foot Commercial Space in Washington as of 2005 (see ***Note 2***)		27.58	kBtu/yr
Implied Average Oil Products Consumption per Square Foot Commercial Space in Washington as of 2005 (see ***Note 2***)		3.68	kBtu/yr

Electricity consumption per square foot in commercial space meeting 2006 WSEC relative to 2005 average in WA — 100%

Placeholder estimate--to be set at a value different than 100% if needed.

Gas and oil products consumption per square foot in commercial space meeting 2006 WSEC relative to average in WA in 2005 — 100%

Placeholder estimate--to be set at a value different than 100% if needed.

Implied average electricity consumption per square foot commercial space meeting 2006 WSEC — 17.04 kWh/yr

Implied average gas consumption per square foot commercial space meeting 2006 WSEC — 27.58 kBtu/yr

Implied Average Electricity Consumption per Housing Unit in Washington as of 2005 (see ***Note 2***) — **12.08** MWh/yr

Implied Average Natural Gas Consumption per Housing Unit in Washington as of 2005 (see ***Note 2***) — **27.58** MMBtu/yr

Implied Average Oil Products (Distillate/LPG) Consumption per Housing Unit in Washington as of 2005 — **5.43** MMBtu/yr

Based on data in WA GHG inventory--see "Inventory Data" worksheet in this workbook. Residential oil consumption in 2005 was roughly half distillate oil, somewhat less than half LPG, and a few percent kerosene. See, for example, http://www.eia.doe.gov/emeu/states/_seds_updates.html.

Average 2005 Energy Consumption Per Housing Unit, by Housing Type

Fuel	Single-family Homes	Mult-Familty Homes	Manufactured Homes	Weighted Average	Units
Electricity	12.16	11.00	14.00	12.08	MWh/yr
Natural Gas	36.00	5.35	10.00	27.58	MMBtu/yr
Oil Products	6.75	1.00	5.00	5.43	MMBtu/yr

Placeholder estimates at present (except averages, which are set to match utility sales per household), pending receipt of historical data or alternative estimates. Estimates are intended to roughly reflect dominance of electricity as a heating fuel in multi-family and manufactured housing in Washington (See, for example, NPPC workbook "PNWPop&HousingData.xls", "Housing Completion Summary" worksheet.

Electricity consumption per unit in new homes (all types) meeting 2006 WSEC relative to average in WA in 2005 — 100%

Placeholder estimate--to be set at a value different than 100% if needed.

Gas and oil consumption per unit in new homes (all types) meeting 2006 WSEC relative to average in WA in 2005 — 100%

Placeholder estimate--to be set at a value different than 100% if needed.

Implied average electricity consumption per new home in Washington meeting 2006 WSEC — 12.08 MWh/yr

Implied average gas consumption per new home in Washington meeting 2006 WSEC — 27.58 MMBtu/yr

PROGRAM ASSUMPTIONS FOR EE/GB-3	2012	2020/all	Units
Action Part 1: Washington State Building Energy Code Revision			
Average Electricity, Gas, and Oil Products Savings for New Residential Single-Family Buildings Covered by Revised Codes, Relative to 2006 WSEC	30.0%	30.0%	
Average Electricity, Gas, and Oil Products Savings for New Multi-Family Buildings Covered by Revised Codes, Relative to 2006 WSEC	15.0%	15.0%	
Average Electricity, Gas, and Oil Products Savings for New Manufactured Homes Covered by Revised Codes, Relative to 2006 WSEC	20.0%	20.0%	
Average Electricity, Gas, and Oil Products Savings for New Commercial Space Covered by Revised Codes, Relative to 2006 WSEC	20.0%	20.0%	
Estimates provided by Chuck Murray of CTED (except for manufactured housing, which is a placeholder estimate), roughly consistent with Action goals.			
Ratio of substantially rennovated commercial building space (also covered under codes) to new commercial building space.		1.00	
Placeholder estimate, but consistent with that applied in the Achitecture 2030 document referenced above for the United States as a whole.			
Ratio of substantially rennovated homes (also covered under codes) to new homes		1.00	
Placeholder estimate, but consistent with that applied in the Achitecture 2030 document referenced above for the United States as a whole.			
Action Part 2: Building Efficiency and Carbon Reduction Strategy			
Energy Efficiency Improvements in Existing Buildings			
Average Electricity and Gas Savings Targets for Buildings Participating in Program (existing commercial and residential buildings)	8.4%	26.0%	
As described in goals for Action EE/GB-3			
Date program of improvement of existing buildings "ramped up"		2017	
Placeholder Estimate			
Fraction of existing (as of 2006) commercial (non-public) and residential buildings (excluding public housing) participating in program through 2030		75%	
Program Goal (placeholder)			
Fraction of existing commercial and residential buildings participating annually after ramp-in		4.55%	/yr
Adjusted iteratively to meet final target above. Currently MATCHES targets.			
Implied non-public commercial building floorspace included in program annually (million square feet)	9.844	59.065	/yr
Calculated from above and from parameters in EE/GB-2. Excludes public sector floorspace.			
Implied number of existing homes included in program annually	20,149	120,894	/yr
Calculated from above and from parameters in EE/GB-2. Excludes public housing, which is covered in Action 2.			
Energy Efficiency Improvements in New Buildings			
Fraction of new residential and commercial buildings participating in program through target dates		100%	/yr
Program Goal, assuming that higher targets for energy efficiency will eventually be incorporated into the building energy code			
Date program of improvement of new buildings "ramped up"		2017	
Placeholder Estimate			
Annual **reduction** in energy use relative to revised energy code in Part 1 for new and renovated residential and commercial buildings	8.0%	30.0%	
From EE/GB-3 goals, based on http://www.architecture2030.org/pdfs/2030Blueprint.pdf, The 2030 Blueprint: Solving Climate Change Saves Billions, Architecture 2030, page 6.			
Ratio of substantially rennovated commercial space (also covered under program) to new commercial space.		1.00	
Placeholder estimate, but consistent with that applied in the Achitecture 2030 document referenced above for the United States as a whole.			
Ratio of substantially housing (also covered under program) to new housing.		1.00	

Implied new commercial floorspace meeting EE-3 beyond-code targets annually (million square feet) *Calculated from above. Excludes public-sector buildings covered under Action 2.*	8.505	36.338	/yr
Implied new residential units meeting EE-3 beyond-code targets annually *Calculated from above. Excludes public housing covered under Action 2.*	14,248	77,110	/yr

CALCULATION OF SAVINGS

Action Part 1: Washington State Building Energy Code Revision

	2012	2020/all	Units
Implied total electricity savings in new and renovated commercial buildings covered by codes in each year *First-year savings--not cumulative.*	225.9	160.8	GWh/yr
Implied total gas savings in new and renovated commercial buildings covered by codes in each year *First-year savings--not cumulative.*	365.6	260.3	GBtu/yr
Implied total oil products savings in new and renovated commercial buildings covered by codes in each year *First-year savings--not cumulative.*	48.8	34.8	GBtu/yr
Implied total electricity savings in new and renovated single-family housing covered by codes in each year *First-year savings--not cumulative.*	232.4	208.8	GWh/yr
Implied total gas savings in new and renovated single-family housing covered by codes in each year *First-year savings--not cumulative.*	688.0	618.0	GBtu/yr
Implied total oil savings in new and renovated single-family housing covered by codes in each year *First-year savings--not cumulative.*	129.0	115.9	GBtu/yr
Implied total electricity savings in new and renovated multi-family housing covered by codes in each year *First-year savings--not cumulative.*	30.7	28.3	GWh/yr
Implied total gas savings in new and renovated multi-family housing covered by codes in each year *First-year savings--not cumulative.*	14.9	13.8	GBtu/yr
Implied total oil savings in new and renovated multi-family housing covered by codes in each year *First-year savings--not cumulative.*	2.8	2.6	GBtu/yr
Implied total electricity savings in new and renovated manufactured housing covered by codes in each year *First-year savings--not cumulative.*	21.5	19.0	GWh/yr
Implied total gas savings in new and renovated manufactured housing covered by codes in each year *First-year savings--not cumulative.*	15.3	13.5	GBtu/yr
Implied total oil savings in new and renovated manufactured housing covered by codes in each year *First-year savings--not cumulative.*	7.7	6.8	GBtu/yr

Implied cumulative electricity savings in new and renovated commercial buildings covered by codes	225.9	1,526.0	GWh/yr
Implied cumulative gas savings in new and renovated commercial buildings covered by codes	365.6	2,469.9	GBtu/yr
Implied cumulative oil savings in new and renovated commercial buildings covered by codes	48.8	329.8	GBtu/yr
Implied cumulative electricity savings in new and renovated single-family homes covered by codes	232.4	1,971.2	GWh/yr
Implied cumulative gas savings in new and renovated single-family homes covered by codes	688.0	5,835.9	GBtu/yr
Implied cumulative oil savings in new and renovated single-family homes covered by codes	129.0	1,094.2	GBtu/yr
Implied cumulative electricity savings in new and renovated multi-family homes covered by codes	30.7	263.9	GWh/yr
Implied cumulative gas savings in new and renovated multi-family homes covered by codes	14.9	128.3	GBtu/yr
Implied cumulative oil savings in new and renovated multi-family homes covered by codes	2.8	24.0	GBtu/yr
Implied cumulative electricity savings in new and renovated manufactured homes covered by codes	21.5	180.9	GWh/yr
Implied cumulative gas savings in new and renovated manufactured homes covered by codes	15.3	129.2	GBtu/yr
Implied cumulative oil savings in new and renovated manufactured homes covered by codes	7.7	64.6	GBtu/yr

Action Part 2: Building Efficiency and Carbon Reduction Strategy

Energy Efficiency Improvements in Existing Buildings

Implied total electricity savings in existing existing commercial buildings participating in program annually. *First-year savings--not cumulative.*	14.1	261.7	GWh/yr
Implied total gas savings in existing existing commercial buildings participating in program annually. *First-year savings--not cumulative.*	22.8	423.6	GBtu/yr
Implied total oil savings in existing existing commercial buildings participating in program annually. *First-year savings--not cumulative.*	3.0	56.6	GBtu/yr
Implied total electricity savings in existing housing participating in program. *First-year savings--not cumulative.*	20.4	379.6	GWh/yr
Implied total gas savings in existing housing participating in program. *First-year savings--not cumulative.*	46.7	866.8	GBtu/yr
Implied total oil savings in existing housing participating in program. *First-year savings--not cumulative.*	9.2	170.8	GBtu/yr

Implied cumulative electricity savings in existing commercial buildings participating in program	14.1	1,272.9	GWh/yr
Implied cumulative gas savings in existing commercial buildings participating in program	22.8	2,060.3	GBtu/yr
Implied cumulative oil savings in existing commercial buildings participating in program	3.0	275.1	GBtu/yr
Implied cumulative electricity savings in existing housing	20.4	1,846.4	GWh/yr
Implied cumulative gas savings in existing housing	46.7	4,216.1	GBtu/yr
Implied cumulative oil savings in existing housing	9.2	830.7	GBtu/yr

	2012	2020/all	Units
Energy Efficiency Improvements in New Buildings			
Implied required intensity improvement beyond revised code to EE/GB-3 targets, commercial buildings, electricity use per square foot	1.36	5.11	kWh/yr
Implied required intensity improvement beyond revised code to EE/GB-3 targets, commercial buildings, gas use per square foot	2.21	8.27	kBtu/yr
Implied required intensity improvement beyond revised code to EE/GB-3 targets, commercial buildings, gas use per square foot	0.29	1.10	kBtu/yr

Average Fraction of Improvement in Electric Energy Intensities for commercial buildings from:

Energy Efficiency Improvement	90%	80%
Solar Thermal Energy (hot water/space heat/space cooling)	3%	7%
On-site Solar PV	1%	3%
On-site Biomass/Biogas/Landfill Gas Energy Use	1%	5%
Green Power Purchase (from off-site, beyond electricity supply RPS)	5%	5%

All "placeholder" assumptions, except on-site biomass/biogas/landfill gas energy use calculated so that values sum to 100%.

Average Fraction of Improvement in Gas and Oil Energy Intensities for commercial buildings from:

Energy Efficiency Improvement	96%	92%
Solar Thermal Energy (hot water/space heat/space cooling)	3%	5%
On-site Solar PV	0%	0%
On-site Biomass/Biogas/Landfill Gas Energy Use	1%	3%
Green Power Purchase (from off-site, beyond electricity supply RPS)	0%	0%

All "placeholder" assumptions, except on-site biomass/biogas/landfill gas energy use calculated so that values sum to 100%.

Implied Cumulative Impacts of Action, New Commercial Building Space (Electricity savings)

Energy Efficiency Improvement	10.20	772.08	GWh
Solar Thermal Energy (hot water/space heat/space cooling)	0.44	56.09	GWh
On-site Solar PV	0.16	23.37	GWh
On-site Biomass/Biogas/Landfill Gas Energy Use	0.21	37.38	GWh
Green Power Purchase (from off-site, beyond electricity supply RPS)	0.58	46.79	GWh

Implied Cumulative Impacts of Action, New Commercial Building Space (Natural Gas savings)

Energy Efficiency Improvement	17.87	1,408.53	GBtu/yr
Solar Thermal Energy (hot water/space heat/space cooling)	0.64	68.11	GBtu/yr
On-site Solar PV	-	-	GBtu/yr
On-site Biomass/Biogas/Landfill Gas Energy Use	0.26	37.82	GBtu/yr
Green Power Purchase (from off-site, beyond electricity supply RPS)	-	-	GBtu/yr

Implied Cumulative Impacts of Action, New Commercial Building Space (Oil Products savings)

Energy Efficiency Improvement	2.39	188.07	GBtu/yr
Solar Thermal Energy (hot water/space heat/space cooling)	0.09	9.09	GBtu/yr
On-site Solar PV	-	-	GBtu/yr
On-site Biomass/Biogas/Landfill Gas Energy Use	0.04	5.05	GBtu/yr
Green Power Purchase (from off-site, beyond electricity supply RPS)	-	-	GBtu/yr

Implied required intensity improvement to meet Architecture 2030 goals, housing, electricity use per unit	**0.97**	**3.62**	MWh/yr
Implied required intensity improvement to meet Architecture 2030 goals, housing, gas use per unit	**2.21**	**8.27**	MBtu/yr
Implied required intensity improvement to meet Architecture 2030 goals, housing, oil use per unit	**0.43**	**1.63**	MBtu/yr

Average Fraction of Improvement in Electric Energy Intensities for Housing from:

Energy Efficiency Improvement	90%	80%
Solar Thermal Energy (hot water/space heat/space cooling)	3%	7%
On-site Solar PV	1%	3%
On-site Biomass/Biogas/Landfill Gas Energy Use	1%	5%
Green Power Purchase (from off-site, beyond electricity supply RPS)	5%	5%

All "placeholder" assumptions, except on-site biomass/biogas/landfill gas energy use calculated so that values sum to 100%.

Average Fraction of Improvement in Gas and Oil Energy Intensities for Housing from:

Energy Efficiency Improvement	96%	92%
Solar Thermal Energy (hot water/space heat/space cooling)	3%	5%
On-site Solar PV	0%	0%
On-site Biomass/Biogas/Landfill Gas Energy Use	1%	3%
Green Power Purchase (from off-site, beyond electricity supply RPS)	0%	0%

All "placeholder" assumptions, except on-site biomass/biogas/landfill gas energy use calculated so that values sum to 100%.

Implied Cumulative Impacts of Option, New Housing (Electricity savings)

Energy Efficiency Improvement	**12.11**	**1,206.58**	GWh
Solar Thermal Energy (hot water/space heat/space cooling)	**0.52**	**87.60**	GWh
On-site Solar PV	**0.19**	**36.49**	GWh
On-site Biomass/Biogas/Landfill Gas Energy Use	**0.25**	**58.36**	GWh
Green Power Purchase (from off-site, beyond electricity supply RPS)	**0.69**	**73.11**	GWh

Implied Cumulative Impacts of Option, New Housing (Natural Gas savings)

Energy Efficiency Improvement	**29.92**	**3,105.18**	GBtu/yr
Solar Thermal Energy (hot water/space heat/space cooling)	**1.07**	**150.09**	GBtu/yr
On-site Solar PV	**-**	**-**	GBtu/yr
On-site Biomass/Biogas/Landfill Gas Energy Use	**0.44**	**83.32**	GBtu/yr
Green Power Purchase (from off-site, beyond electricity supply RPS)	**-**	**-**	GBtu/yr

Implied Cumulative Impacts of Option, New Housing (Oil Products savings)

Energy Efficiency Improvement	**5.89**	**610.89**	GBtu/yr
Solar Thermal Energy (hot water/space heat/space cooling)	**0.21**	**29.53**	GBtu/yr
On-site Solar PV	**-**	**-**	GBtu/yr
On-site Biomass/Biogas/Landfill Gas Energy Use	**0.09**	**16.39**	GBtu/yr
Green Power Purchase (from off-site, beyond electricity supply RPS)	**-**	**-**	GBtu/yr

	2012	2020/all	Units
Additional Inputs to/Intermediate Results of Costs Analyses, Part 2 Beyond Code Elements			
Estimated annual levelized cost of residential solar hot water per unit output	**41.19**	**30.60**	$/MMBtu
Based on inputs to/results of solar hot water heating analysis included in EE/GB-Solar_Data.			
Estimated annual levelized cost of commercial solar hot water per unit output	**38.89**	**28.89**	$/MMBtu
Based on inputs to/results of solar hot water heating analysis included in EE/GB-Solar_Data.			
Adjustment to solar thermal costs for inclusion of space heat/cooling measures	1.00	1.00	
Placeholder assumption--Value of 1.0 implies that solar space heat and cooling will cost the same per unit output as solar water heating.			
Implied Per Unit Cost Electricity Avoided by residential Solar WH/SH/Cooling	**130.70**	**97.09**	$/MWh
Implied Per Unit Cost Natural Gas Avoided by residential Solar WH/SH/Cooling	**28.83**	**21.42**	$/MMBtu
Assumes delivered solar WH/SH/Cooling replaces electric with EF of 0.93, gas with EF of 0.70 (and therefore one MMBtu of delivered solar heat is the equivalent of more than one MMBtu of each fuel).			
Implied Per Unit Cost Electricity Avoided by Solar WH/SH/Cooling (Commercial)	**123.40**	**91.67**	$/MWh
Implied Per Unit Cost Natural Gas Avoided by Solar WH/SH/Cooling (Commecial)	**27.22**	**20.22**	$/MMBtu
Assumes delivered solar WH/SH/Cooling replaces electric with EF of 0.93, gas with EF of 0.70 (and therefore one MMBtu of delivered solar heat is the equivalent of more than one MMBtu of each fuel).			
Estimated annual levelized cost of on-site Solar PV, Commercial	**546**	**353**	$/MWh
Based on inputs to/results of solar PV analysis included in EE/GB-Solar_Data.			
Estimated annual levelized cost of on-site residential Solar PV	**506**	**327**	$/MWh
Based on inputs to/results of solar PV analysis included in EE/GB-Solar_Data.			
Fuel Cost for On-site Biomass/Biogas/Landfill Gas Energy Use		3.41	$/MMBtu
Based on costs for Biomass fuel, which will likely dominate this category of fuel inputs. See "Common Assumptions" worksheet in this workbook. If significantly processed biomass fuels (such as pelletized fuels) are required, this cost may need to be increased.			
Relative Efficiency of On-site Biomass/Biogas/Landfill Gas displacing electricity		0.75	
Placeholder assumption.			
Factor to reflect probable higher costs of on-site Biomass/Biogas/Landfill Gas Equipment Relative to Electric Equipment		1.50	
Placeholder assumption--In most cases, heating/water heating equipment designed to use biomass-derived fuels will be more expensive than equipment designed to use electricity. This factor loads these incremental capital costs into estimated fuel costs.			
Implied Per Unit Cost Electricity Avoided by Biomass/Biogas/Landfill Gas	**23.16**	**23.16**	$/MWh
Incremental Cost for Green Power Purchase (from off-site, beyond supply RPS)	25.00	20.00	$/MWh
Placeholder assumption.			

	2012	2020/all	Units
Results of Costs Analyses, Part 1 Code Revision Elements			
Implied Annual Net Costs of Option, Code Revision Element, New and Renovated Commercial Buildings (Electricity savings)	$ (7,668)	$ (51,807)	$ thousand
Implied Annual Net Costs of Option, Code Revision Element, New and Renovated Commercial Buildings (Gas savings)	$ (381)	$ (2,573)	$ thousand
Implied Annual Net Costs of Option, Code Revision Element, New and Renovated Commercial Buildings (Oil savings)	$ (400)	$ (2,700)	$ thousand
Implied Annual Net Costs of Option, Code Revision Element, New and Renovated Residential Buildings (Electricity savings)	$ (9,661)	$ (82,021)	$ thousand
Implied Annual Net Costs of Option, Code Revision Element, New and Renovated Residential Buildings (Gas savings)	$ (748)	$ (6,348)	$ thousand
Implied Annual Net Costs of Option, Code Revision Element, New and Renovated Residential Buildings (Oil savings)	$ (1,142)	$ (9,683)	$ thousand
Results of Costs Analyses, Part 2 Beyond Code Elements			
Implied Annual Net Costs of Option, Beyond Code Elements, Existing Commercial Buildings (Electricity savings)	$ (478)	$ (43,216)	$ thousand
Implied Annual Net Costs of Option, Beyond Code Elements, Existing Commercial Buildings (Gas savings)	$ (24)	$ (2,146)	$ thousand
Implied Annual Net Costs of Option, Beyond Code Elements, Existing Commercial Buildings (Oil savings)	$ (25)	$ (2,252)	$ thousand
Implied Annual Net Costs of Option, Existing Housing (Electricity savings)	$ (694)	$ (62,686)	$ thousand
Implied Annual Net Costs of Option, Existing Housing (Gas savings)	$ (49)	$ (4,392)	$ thousand
Implied Annual Net Costs of Option, Existing Housing (Oil savings)	$ (75)	$ (6,801)	$ thousand
Implied Annual Net Costs of Action, New Commercial Buildings (Electricity savings)			
Energy Efficiency Improvement	$ (346)	$ (26,212)	$ thousand
Solar Thermal Energy (hot water/space heat/space cooling)	$ 25	$ 1,785	$ thousand
On-site Solar PV	$ 78	$ 7,777	$ thousand
On-site Biomass/Biogas/Landfill Gas Energy Use	$ (9)	$ (1,606)	$ thousand
Green Power Purchase (from off-site, beyond electricity supply RPS)	$ 14	$ 1,009	$ thousand
Implied Annual Net Costs of Action, New Commercial Buildings (Gas savings)			
Energy Efficiency Improvement	$ (19)	$ (1,467)	$ thousand
Solar Thermal Energy (hot water/space heat/space cooling)	$ 13	$ 957	$ thousand
On-site Solar PV	$ -	$ -	$ thousand
On-site Biomass/Biogas/Landfill Gas Energy Use	$ (1)	$ (160)	$ thousand
Green Power Purchase (from off-site, beyond electricity supply RPS)	$ -	$ -	$ thousand
Implied Annual Net Costs of Action, New Commercial Buildings (Oil savings)			
Energy Efficiency Improvement	$ (20)	$ (1,540)	$ thousand
Solar Thermal Energy (hot water/space heat/space cooling)	$ (1)	$ (134)	$ thousand
On-site Solar PV	$ -	$ -	$ thousand
On-site Biomass/Biogas/Landfill Gas Energy Use	$ (1)	$ (75)	$ thousand
Green Power Purchase (from off-site, beyond electricity supply RPS)	$ -	$ -	$ thousand
Implied Annual Net Costs of Action, New Housing (Electricity savings)			
Energy Efficiency Improvement	$ (411)	$ (40,963)	$ thousand
Solar Thermal Energy (hot water/space heat/space cooling)	$ 30	$ 2,792	$ thousand
On-site Solar PV	$ 92	$ 12,161	$ thousand
On-site Biomass/Biogas/Landfill Gas Energy Use	$ (11)	$ (2,508)	$ thousand
Green Power Purchase (from off-site, beyond electricity supply RPS)	$ 17	$ 1,577	$ thousand
Implied Annual Net Costs of Action, New Housing (Gas savings)			
Energy Efficiency Improvement	$ (31)	$ (3,235)	$ thousand
Solar Thermal Energy (hot water/space heat/space cooling)	$ 21	$ 2,111	$ thousand
On-site Solar PV	$ -	$ -	$ thousand
On-site Biomass/Biogas/Landfill Gas Energy Use	$ (2)	$ (352)	$ thousand

Results	2012	2020	Units
Electricity (Conventional)			
Reduction in Electricity Sales: Residential Sector	319	5,725	GWh (sales)
Reduction in Electricity Sales: Commercial Sector	252	3,735	GWh (sales)
TOTAL Reduction in Electricity Sales	570	9,459	GWh (sales)
Reduction in Generation Requirements	615	10,174	GWh (generation)
GHG Emission Savings	**0.31**	**5.09**	$MMtCO_2e$
Economic Analysis			
Net Present Value (2008-2020)		**-$724**	$million
Cumulative Emissions Reductions (2008-2020)		21.2	$MMtCO_2e$
Cost-Effectiveness		**-$34.12**	$/tCO_2e$
Natural Gas			
Reduction in Gas Use: Residential Sector	796	13,648	Billion BTU
Reduction in Gas Use: Commercial Sector	430	6,468	Billion BTU
TOTAL Reduction in Gas Use	1,226	20,116	Billion BTU
GHG Emission Savings	**0.06**	**1.06**	$MMtCO_2e$
Economic Analysis			
Net Present Value (2008-2020)		**-$45**	$million
Cumulative Emissions Reductions (2008-2020)		4.5	$MMtCO_2e$
Cost-Effectiveness		**-$10.10**	$/tCO_2e$
Oil Products			
Reduction in Oil Use: Residential Sector	155	2,670	Billion BTU
Reduction in Oil Use: Commercial Sector	9	534	Billion BTU
TOTAL Reduction in Oil Use	163	3,204	Billion BTU
GHG Emission Savings	**0.01**	**0.22**	$MMtCO_2e$
Economic Analysis			
Net Present Value (2008-2020)		**-$72**	$million
Cumulative Emissions Reductions (2008-2020)		0.9	$MMtCO_2e$
Cost-Effectiveness		**-$79.77**	$/tCO_2e$
Biomass/Biogas/Landfill Gas Fuel Use			
Added GHG Emissions from Biomass Fuels Use	**0.00001**	**0.00139**	$MMtCO_2e$
Cumulative added Emissions from Biomass Fuels (2007-2020)		0.0043	$MMtCO_2e$

Summary Results for EE/GB-3	2012	2020	Units
Total for Part 1 of Action (WSEC Revision) (natural gas, electricity, and oil)			
GHG Emission Savings	**0.35**	**2.68**	$MMtCO_2e$
Net Present Value (2008-2020)		**-$487**	$million
Cumulative Emissions Reductions (2008-2020)		13.8	$MMtCO_2e$
Cost-Effectiveness		**-$35.34**	$/tCO_2e$
Total for Existing Buildings Improvement portion of Part 2 of Action (natural gas, electricity, and oil)			
GHG Emission Savings	**0.02**	**2.09**	$MMtCO_2e$
Net Present Value (2008-2020)		**-$242**	$million
Cumulative Emissions Reductions (2008-2020)		7.1	$MMtCO_2e$
Cost-Effectiveness		**-$33.86**	$/tCO_2e$
Total for New Buildings Efficiency Targets portion of Part 2 of Action (natural gas, electricity, and oil less biomass)			
GHG Emission Savings	**0.02**	**1.60**	$MMtCO_2e$
Net Present Value (2008-2020)		**-$112**	$million
Cumulative Emissions Reductions (2008-2020)		5.6	$MMtCO_2e$
Cost-Effectiveness		**-$19.76**	$/tCO_2e$
Total for All Parts of Option (natural gas, electricity and oil less biomass)			
GHG Emission Savings	**0.38**	**6.37**	$MMtCO_2e$
Net Present Value (2008-2020)		**-$840.9**	$million
Cumulative Emissions Reductions (2008-2020)		26.6	$MMtCO_2e$
Cost-Effectiveness		**-$31.63**	$/tCO_2e$

Additional Summary Results for EE/GB-3 for Reporting	2012	2020	Units
Total Green Power Purchased Under EE/GB-3	1	120	GWh (sales)
Total Green Power Generation to Serve EE/GB-3	1	129	GWh (generation)
GHG Emission Savings from Green Power Component	**0.0007**	**0.0647**	$MMtCO_2e$
Net Present Value (2008-2020) of Green Power component of EE/GB-3		**$5.2**	$million
Total Renewable Electricity Under EE/GB-3	0	60	GWh (at consumer site
Total Reduction in Conventional Generation due to Renewable Electricity Under EE/GB-3 (displacement from Solar PV)	0	65	GWh (equivalent at central generator)
GHG Emission Savings from renewable electricity component	**0.0002**	**0.0309**	$MMtCO_2e$
Net Present Value (2008-2020) of renewable electricity component of EE/GB-3		**$39.8**	$million
Reduction in Electricity Sales and Emissions from Existing Buildings Component of EE/GB-3			
Reduction in Electricity Sales: Residential Sector	20	1,846	GWh (sales)
Reduction in Electricity Sales: Commercial Sector	14	1,273	GWh (sales)
TOTAL Reduction in Electricity Sales	35	3,119	GWh (sales)
Reduction in Generation Requirements	37	3,355	GWh (generation)
GHG Emission Savings	**0.02**	**1.68**	$MMtCO_2e$

Estimated savings in 2030 (Existing Buildings Component only) as a fraction of 2030 Forecast Demand by sector (for comparison with, for example, utility I-937 Targets--see "GHG Totals" Worksheet).

Residential Sector	15.0%
Commercial Sector	13.0%

NOTES AND DATA FROM SOURCES

Note 1:

From The Energy Efficiency Task Force Report to the Clean and Diversified Energy Advisory Committee of the Western Governors Association.
The Potential for More Efficient Electricity Use in the Western United States, January, 2006. This report is referred to here as the "WGA CDEAC EE report" and can be found at:
http://www.westgov.org/wga/initiatives/cdeac/Energy%20Efficiency-full.pdf.
The CDEAC report provides a cost of saved energy (electricity) based on an average 7-year payback for code improvements (page 42). This is likely to be a lower bound for the cost of green building practices that yield a 50 percent improvement over existing buildings, but is used as a starting point for this analysis.

For Washington, the equivalent cost is estimated as follows for electricity and natural gas

payback	7	years, from CDEAC report
lifespan	25	years, conservative assumption
elec price	**$65**	$/MWh (weighted average levelized cost of residential and commercial electricity prices in WA--See Common Factors worksheet).
NG price	**$13.25**	$/MMBtu (weighted average levelized cost of residential and commercial natural gas prices in WA--See Common Factors worksheet).

Electricity levelized cost	$32.176	$/MWh
Natural Gas levelized cost	$6.583	$/MMBTU

Note 2:

Based on results from Table B.5 of the 2003 Commercial Buildings Energy Consumption Survey, Detailed Tables dated October 2006 and published by the US Department of Energy's Energy Information Administration, and available as http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/pdf2003/alltables.pdf, as described in "WA_Activities_Est" worksheet in this workbook.

Following data on electricity sales in Washington as of 2005 as described in "Utility_Sales" worksheet in this workbook. Downloaded from http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html (file sales_revenue.xls)

	MWh	Fraction of Total
Residential	33,212,197	40%
Commercial	28,099,583	34%
Industrial	22,111,773	27%
Total	83,423,553	100%

For natural gas use in Washington, consumption data are from the USDOE EIA downloaded from http://www.eia.doe.gov/oil_gas/natural_gas/applications/eia176query.html are are follows:
(See "EIA_NG_Data" worksheet in this workbook for raw EIA data)

	Sales (Million Cubic Feet of Natural Gas)			
	Residential	Commercial	Industrial	Total
2005	73,626	44,155	10,565	128,347
Fraction of 2005 Total	57%	34%	8%	100%

Estimate of Mitigation Option Costs and Benefits for Washington EE/GB IWG GHG Analysis

EE/GB-Solar Data **Supplemental to Actions 2 and 3: Assumptions and Intermediate Results for Cost and Performance of Solar Water/Space Heating, Solar PV, and Biomass Measures**

Date Last Modified: 10/17/2008 D. Von Hippel

Data, Assumptions, Calculations	2012	2020/all	Units

Additional Inputs to/Intermediate Results of Costs Analyses

	2012	2020/all	Units
Incremental Capital Cost of Solar Water Heater (relative to electric or gas unit)	$5,000	$4,000	
Assumption for residential unit, and assumes costs will decrease over time. Due to high prices for metals, current retail costs of solar hot water systems are higher than 2012 value shown.			
Fraction of household hot water needs provided by solar HW units	65.0%	70.0%	
Rough Estimate, but consistent with rule of thumb from Puget Sound Solar Inc (http://www.pugetsoundsolar.com/starthere.html) for Seattle area installation.			
Average annual water heating energy used per household (hot water output)		12.69	MMBtu
Based on assumption of household with electric water heater using 4000 kWh/yr at average efficiency (EF) of 93% heat in hot water/electrical energy input.			
Inputs to Cost Estimates for Residential Solar PV Systems (Data from Source in Note 4)			
Average Capacity of Solar PV System Installed on New Homes (kW)	2.00	2.00	
*Assumption, consistent with capacity assumption used in Source in **Note 1**.*			
Capital Costs for PV Systems for New Homes			
Module	$ 3,019	$ 2,003	
BOS (Balance of System)	$ 1,115	$ 739	
Installation	$ 331	$ 143	
Total System - $/kW	$ 4,465	$ 2,885	
Total System - $	$ 8,929	$ 5,769	
Average full-capacity-equivalent hours of operation for Solar PV Systems:	1,200	1,200	
Rough estimate, but consistent, for example, with rule-of-thumb from Puget Sound Solar, Inc. (http://www.pugetsoundsolar.com/starthere.html) for Seattle area installation.			
Factors for Annualizing Capital Costs (Residential PV and Solar Hot Water Systems)			
Interest Rate (real)		7%	/yr
Economic Life of System		20	years
Implied Annualization Factor		9.44%	%/yr
Marginal Federal Tax Rate, Residential		28%	
Federal Solar Tax Credits: Residential Sector--See ***Note 2.***	0%	0%	
Capital Cost per Unit Capacity (and output) of Commercial Versus Residential Solar HW Heaters		70%	
Placeholder Assumption. Assumes economies of scale for materials and installation for commercial units relative to (significantly smaller, on average) residential units.			
Commercial System Capital costs/kW Relative to New Residential	80%	80%	
*Rough assumption, but similar to values in literature--See **Note 3**.*			
Federal Solar Tax Credits: Commercial Sector--See ***Note 2.***	10%	10%	
Other Factors for Annualizing Capital Costs (Commercial PV and Solar Hot Water Systems)			
Interest Rate (real)		8%	/yr
Economic Life of System		20	years
Implied Annualization Factor		10.19%	%/yr

Estimated annual levelized cost of residential solar hot water per unit output	**41.19**	**30.60**	$/MMBtu
Calculated based on inputs above.			
Estimated annual levelized cost of commercial solar hot water per unit output	**38.89**	**28.89**	$/MMBtu
Calculated based on inputs above.			
Adjustment to solar thermal costs for inclusion of space heat/cooling measures	1.00	1.00	
Placeholder assumption--Value of 1.0 implies that solar space heat and cooling will cost the same per unit output as solar water heating.			
Implied Per Unit Cost Electricity Avoided by Solar WH/SH/Cooling (Residential)	**130.70**	**97.09**	$/MWh
Implied Per Unit Cost Natural Gas Avoided by Solar WH/SH/Cooling (Residential)	**28.83**	**21.42**	$/MMBtu
Assumes delivered solar WH/SH/Cooling replaces electric with EF of 0.93, gas with EF of 0.70 (and therefore one MMBtu of delivered solar heat is the equivalent of more than one MMBtu of each fuel).			
Implied Per Unit Cost Electricity Avoided by Solar WH/SH/Cooling (Commercial)	**123.40**	**91.67**	$/MWh
Implied Per Unit Cost Natural Gas Avoided by Solar WH/SH/Cooling (Commercial)	**27.22**	**20.22**	$/MMBtu
Assumes delivered solar WH/SH/Cooling replaces electric with EF of 0.93, gas with EF of 0.70 (and therefore one MMBtu of delivered solar heat is the equivalent of more than one MMBtu of each fuel).			
Estimated annual levelized cost of on-site Solar PV, Residential	**565**	**327**	$/MWh
Calculated based on inputs above.			
Estimated annual levelized cost of on-site Solar PV, Commercial	**610**	**353**	$/MWh
Calculated based on inputs above.			
Fuel Cost for On-site Biomass/Biogas/Landfill Gas Energy Use		3.41	$/MMBtu
Based on costs for Biomass fuel, which will likely dominate this category of fuel inputs. See "Common Factors" worksheet in this workbook. If significantly processed biomass fuels (such as pelletized fuels) are required, this cost may need to be increased.			
Relative Efficiency of On-site Biomass/Biogas/Landfill Gas displacing electricity		0.75	
Placeholder assumption.			
Factor to reflect probable higher costs of on-site Biomass/Biogas/Landfill Gas Equipment Relative to Electric Equipment		1.50	
Placeholder assumption--In most cases, heating/water heating equipment designed to use biomass-derived fuels will be more expensive than equipment designed to use electricity. This factor loads these incremental capital costs into estimated fuel costs.			
Implied Per Unit Cost Electricity Avoided by Biomass/Biogas/Landfill Gas	**23.16**	**23.16**	$/MWh
Incremental Cost for Green Power Purchase (from off-site, beyond supply RPS)	25.00	20.00	$/MWh
Placeholder assumption, but should be linked to assumptions for relevant EEGB options, as necessary.			

NOTES AND DATA FROM SOURCES

Note 1:

Source: Worksheet "Solar Homes Summary table.xls", with calculations in support of the California Million Solar Homes Initiative, authored by XENERGY, Inc., and provided by M. Lazarus. Selected annual data provided.

Note 2:

A description of the new Federal Solar Tax Credits for businesses and residences as contained in the Energy Policy Act of 2005 (EPAct 2005) (see, for example, http://www.seia.org/getpdf.php?iid=21) provides for 30% (of system cost) tax credits for solar PV investments by businesses in 2006 and 2007, reverting to 10% thereafter. For residences, the credit in 2006 and 2007 is 30% with a "cap" of $2000, reverting to zero after 2007. For the purpose of this analysis, we are modeling the federal tax credit at its long-term (10% business, 0% residential) level, as no systems are added in 2006 and 2007.
See also, for Example,
http://www.sdenergy.org/uploads/PV-Federal%20Tax%20Credits%20Summary%206-01-04%20FINAL.pdf.

Note 3:

Source: International Energy Agency (IEA), TRENDS IN PHOTOVOLTAIC APPLICATIONS
Survey report of selected IEA countries between 1992 and 2004. Report #IEA-PVPS T1-14:2005.
Page 18.
"Indicative costs" in 2004 in USD per kWp (assumedly DC output) for on-grid PV systems in the US:

<10 kW	7000 to 10,000
>10 kW	6300 to 8500

In EIA Projections of Renewable Energy Costs, presented in "Forum on the Economic Impact Analysis of NJ's Proposed 20% RPS" by Chris Namovicz of the USDOE EIA (Energy Information Administration), dated February 22, 2005, and available as http://www.eia.doe.gov/oiaf/pdf/rec.pdf, a wind power average cost of

6000	dollars/kW is provided for a 25 kW Commercial system, or
8200	dollars/kW for a 2 kW Residential system, with

"Large potential for cost reduction".

Reducing Greenhouse Gas Emissions and Increasing Transportation Choices for the Future

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Introduction

Emissions from transportation-related activities account for nearly half of the total greenhouse gas (GHG) emissions in Washington. Achieving significant reductions in transportation-related GHG emissions is critical for Washington and it will require meeting its short and long term vehicle miles traveled (VMT)[1] benchmarks.

At the same time, there is a transportation funding crisis in Washington that requires urgent action. The challenge facing the state is implementing appropriate strategies to reach Washington's GHG emission reductions and VMT reduction benchmarks while addressing the impacts of the current revenue shortage on state and local transportation infrastructure and operating expenses and on the ability of transit agencies to provide appropriate levels of service. This challenge is compounded by the paradox that transportation funding is dependent on the gas tax; as the state achieves progress in reducing the amount of miles traveled, the funding available to provide appropriate levels and quality of transportation service throughout will further diminish.

The Transportation Implementation Working Group (IWG)[2] recognized an opportunity to reconceptualize transportation in Washington. The Transportation IWG was formed under the Climate Action Team (CAT) to address the ESSHB 2815 requirements regarding "most promising" GHG reduction strategies and VMT reduction strategies for transportation.[3] To work towards collaborative solutions, the Washington State Department of Transportation (WSDOT) combined its responsibilities in Section 8 of ESSHB 2815 with the CAT effort, expanding the charge to the Transportation IWG to include recommended tools and best practices to achieve the VMT-reduction benchmarks.

This collaborative report represents the recommendations of the Transportation IWG that were developed using a consensus process, and is intended to meet WSDOT's requirement to report back to the legislature based on the direction of ESSHB 2815. Through these recommendations, the Transportation IWG seeks to move Washington towards a future travel environment where citizens can choose public transportation,[4] walking, bicycling, or ridesharing for their daily activities; a future transportation system that supports transportation choices that are environmentally-friendly, easier to use, more reliable, safer, and less expensive for the user than the current system; and future funding decisions that support and encourage reductions in GHG and VMT, further Washington's economic competitiveness and minimize expenditures on imported fuels. The ultimate goal is to build, operate and maintain a transportation infrastructure that is efficient and effective at moving people and goods. To achieve this vision, Washington must reexamine how investments in transportation infrastructure and services are made at all levels of government. Washington State should make funding decisions and pursue revenue generating strategies that stimulate behaviors that support climate change solutions and that discourage behaviors that contribute to the problem.

The Transportation IWG is proposing short and long-term VMT and GHG-reduction strategies that must be implemented immediately and coordinated to account for long-term changes in behavior. A portfolio of strategies is needed that evolves over time as the transportation infrastructure becomes available and as demand shifts, with

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[1] As referred to in ESSHB2815 vehicle miles traveled (VMT) is the number of miles that vehicles less than 10,000lbs are driven. VMT is a surrogate for GHG emissions from the transportation sector. Reducing VMT per person reduces emissions and improves the overall efficiency of the transportation system.

[2] The Transportation IWG Scope is at: http://www.ecy.wa.gov/climatechange/2008CATdocs/iwg/tran/050908_tran_scope.pdf

[3] For the more information on the overall CAT process and final recommendations, see the 2008 CAT report, *Leading the Way: Implementing Practical Solutions to the Climate Change Challenge.*

[4] The term "public transportation" in this document refers to all non-single occupancy vehicle (SOV) transportation options. "Transit" refers specifically to motor bus services, unless otherwise indicated. "Ridesharing" refers to carpool and vanpool services.

strategies tailored to meet different types of users. Recognizing different user types (e.g. large urban, small urban, and rural) in the design and timing of strategies is an important component of maximizing their effectiveness.

To reduce VMT, with the ultimate goal of reducing GHG emissions, the Transportation IWG is recommending a package of strategies that fall into three broad categories, but which are synergistically more beneficial when integrated and implemented in conjunction with each other:

- Transit, Ridesharing, and Commuter Choice Programs, including recommendations to expand and enhance current programs to increase viable transportation options available to Washington residents to conduct the activities, trips, and travel needed and desired for daily life.
- Compact and Transit Oriented Development (CTOD) and Bicycle and Pedestrian Accessibility that supports the development of compact walking, bicycling, and public transportation-friendly communities and to increase the travel choices available.
- Transportation Funding and Pricing Strategies that identify and create potential pricing mechanisms to support and incentivize GHG and VMT reductions, and stress key considerations for revenue use to support transportation infrastructure maintenance and operations.

Given the need for a scalable multi-pronged approach to address the climate impacts of the transportation sector, the Transportation IWG has also defined and advanced specific non-VMT transportation policy proposals, including recommendations related to freight railroads; diesel engine emission reductions and fuel efficiency; vehicle electrification; and a low carbon fuel standard.

The recommendations of the Transportation IWG are described in the following five sections. Background and supporting detail for each area are followed by the specific recommendations and supporting actions.

1. EXPANDING AND ENHANCING TRANSIT, RIDESHARE, AND COMMUTER CHOICE

By 2035, Washington's transportation system will:

- Enable users to make transportation choices that are environmentally-friendly, easier to use, more reliable, safer, and less expensive than the current system.
- Make single vehicle households an attractive option.
- Be driven by targeted investments that reduce VMT by at least 30 percent[5] and lowers GHG emissions at least 25 percent below 1990 levels.

In this travel environment citizens will choose public transportation, walking, bicycling, or ridesharing[6] for their daily activities.

The Transportation IWG is proposing a set of Transit, Rideshare, and Commuter Choice recommendations that, if implemented in conjunction with the CTOD and Transportation Pricing recommendations (see section 2 and 4, respectively), will enable Washington State to realize this vision.

The Transportation IWG recommendations to expand and enhance Transit, Rideshare, and Commuter Choice are 1A) development of a Washington State Transportation Access Network (WSTAN), 1B) enhancements to existing urban Commute Trip Reduction (CTR) and rideshare programs, and 1C) implementation of a statewide Residential Trip Reduction[7] (RTR) program. The implementation of these three programs must be tailored to meet the demands of three different types of users: Large Urban, Small Urban, and Rural. Recognizing these different user types in the design and timing of strategies is an important component of maximizing their effectiveness. Successful implementation also requires a coordinated effort between Regional Transportation Planning Organizations (RTPOs), cities, counties, WSDOT, Transit Agencies, and transportation stakeholders.

These three recommendations are complimentary and should be implemented concurrently. The WSTAN (1B)would be a statewide effort to assure public transportation infrastructure is coordinated and exists where appropriate. The enhancements to the CTR and Rideshare programs (1B) benefit from the existence of a WSTAN and assume some urban commute trips will use the WSTAN, but focus on reducing the number of single occupant vehicle (SOV) urban commute trips by promoting alternative work arrangements and ridesharing. The RTR Program (1C) is an attempt to reduce the number of residential, also known as non-commute, trips statewide. These residential trips account for a majority of trips taken statewide and any meaningful reduction of VMT must include fewer SOV residential trips. Success of the RTR Program is tied, in part, to the success of the WSTAN in providing a viable means of transportation.

The Transportation IWG recommends that WSDOT, in conjunction with metropolitan planning organizations, transit agencies, and others, work to improve the reporting and estimating of VMT and GHG using regional transportation modeling tools to better understand the impact of various strategies and their interactions. The Transportation IWG has identified targets for each commute mode. The purpose of these targets are to enable effective monitoring of the strategies to ensure that progress is being made to achieve the VMT benchmarks and the overall GHG emission limits. Through frequent monitoring, changes can be made to the implementation to allow a continued focus on the targets.

[5] 30% decrease in VMT is consistent with the benchmarks in WA ESSHB 2815
[6] "Transit" refers specifically to motor bus services, unless otherwise indicated. "Public transportation" refers to all non-SOV vehicle transportation options. "Ridesharing" refers to vanpool and carpool services.
[7] The RTR Program represents non-commute trips.

1A: Washington State Transportation Access Network

The WSTAN is a deliberate and coordinated strategy to assure that public transportation provides vital transportation connections to enable travel throughout Washington and provide affordable alternatives to a car-dependent lifestyle. The most significant component of the WSTAN is a statewide approach to transit. However, to significantly reduce VMT and GHG emissions in Washington State, the majority of people in Washington State will need to live and work in places that both support bicycling and walking for shorter trips and provide reliable and convenient public transportation that meets mobility needs for longer trips. Given the diversity of land use and transportation demands in Washington, the WSTAN will have different characteristics in the various transportation operating environments throughout Washington.

Primary Markets for Public Transportation in Washington

Reduction of VMT will be the most achievable in denser areas of Washington that have land use and development patterns which support bicycling, walking and public transportation use and also have a higher proportion of statewide VMT. Although typically associated with urban areas, some rural areas have small, yet dense areas of development as well. Investments in public transportation are most effective in areas that have a population density of over 3,000 people per square mile. WSTAN operating environments are defined as follows:

- **Best WSTAN Operating Environments** exist where the population per square mile exceeds 4,000 people. In areas such as these, locations are generally close together, pedestrian infrastructure often exists or could be improved to create connections, and there is often a diversity of land uses. All of these attributes contribute to a successful environment for transit. Land use changes and development patterns that support bicycling and walking can have the most impact in these areas. These areas also warrant the most significant investments in transit, including all-day service, as there is the highest potential to reduce dependence on SOV travel.

- **Good WSTAN Operating Environments** exist where the population per square mile is between 3,000 and 3,999. These areas share many of the characteristics described in the best WSTAN operating environments, but have lower density. These areas should be the focus of infill and smart growth initiatives to improve the ability of transit to serve these markets.

- **Less Optimal WSTAN Operating Environments** exist where the population per square mile is between 2,000 and 2,999. These areas are generally not dense enough to support transit as a primary mode of public transportation. Even though there is not a sufficient level of demand to provide all-day service, people still need to be able to access transit for some of their travel needs. Service in these types of areas should occur several times a day to allow people to make necessary connections. Increasing density of these areas should also be a focus, particularly for places that are close to the good WSTAN operating environment threshold of 3,000 people per square mile.

- **Least Optimal WSTAN Operating Environments**: exist where the population per square mile is less than 1,999. These areas are the least able to support transit as a mode of transportation. A potential successful alternative to transit would be ridesharing programs.

The population of Washington State is distributed as follows in these WSTAN operating environments:[8]

[8] Office of Financial Management, 2008. *Population, Land Area and Density for Cities and Towns, Apr 1.* Accessed from http://www.ofm.wa.gov/popden/default.asp.

	Best WSTAN Operating Environment	Good WSTAN Operating Environment	Less Optimal WSTAN Operating Environment	Least Optimal WSTAN Operating Environment	Total
Urban (More than 50,000 people)	849,940	788,440	545,595	52,290	2,235,265
Suburban/Small Urban (Between 10,000 and 49,999 people)	20,930	373,370	577,090	325,440	1,296,830
Rural (Between 1,500 and 9,999 people)	20,890	18,265	180,640	256,914	476,709
Total	890,760	1,161,810	1,303,325	634,644	3,990,539

Over half of Washington State's population that live in cities over 1,500 already live in a best or good WSTAN operating environment.

Transit Elements of the Washington State Transportation Access Network

Depending on the travel market, statewide transit can be provided contextually- as an array of clearly defined services that allow travelers to determine how best to make their trips. These choices will be made in a similar way that drivers consider the tiered system of streets and highways as they choose a route that best connects them to their destination. The WSTAN Map in Exhibit 1 (page 11), with insets in Exhibits 2 and 3, provides a visual description of these service options:

- **Intercounty Service:** Numbered in the 400s and shown in yellow on the map, these services provide rapid, long distance connections between cities and county seats with a population of more than 1,500 in rural areas of Washington that are not located within a short distance to a large urban area with other service connections. Service will be provided at least three times a day, seven days a week.

- **Regional Service**: Numbered in the 500s and shown in blue on the map, this service will connect major destinations in a metropolitan area, typically in suburban and urban areas. Service will be offered every 30 minutes or less, for 15 hours a day, every day. Stops could be as far as 10 miles apart on limited access corridors, and one to two miles elsewhere.

- **Rapid Suburban/Urban Service**: These routes are Bus Rapid Transit (BRT) routes that generally operate on limited access corridors and serve urban and suburban destinations within an urbanized area with stops between one-quarter and one mile apart. These routes will operate at a minimum of every 15 minutes for 18 hours a day, seven days a week.

- **Local Urban Service:** Underlying the longer-distance, faster routes, a robust local network will connect more places. This network will frequently connect to the specialized express, regional and intercounty services, and augment high-demand peak-hour express service to employment centers. This local service, numbered in the 700s and shown in green on the map, will be provided in urban areas with a minimum of 10 minute headways, 18 hours a day, every day.

Additional services include community connectors that provide local service and rural connections, and specialized peak hour express service to serve commute markets. These types of services are not described as part of the WSTAN but are important supplementary local services that will contribute to the overall success of the Transportation Access Networks. When taken together with bicycling, walking, alternative commute, and ridesharing, the services that make up this WSTAN provide a web of integrated mobility options that will allow people to better meet their mobility needs with transit.

How the Washington State Transportation Access Network will Reduce GHG Emissions

Since transportation accounts for nearly half of the GHG emissions in Washington State, any effort to mitigate the effects of climate change must include a focus on the transportation sector. All trends point to a continued rise in transportation emissions as population and employment increase, and if land use patterns continue to favor automobile travel to access jobs and other needs of daily life. A reduction in transportation-related GHG emissions will require significant changes in how we live, travel, and think about mobility, addressing not just GHG emissions per mile, but also the number of VMT.

In order for significant GHG emission reductions to occur, transit, ridesharing, bicycling, and walking must become the modes of choice for more of our travel needs. Land use patterns that facilitate these modes of travel, combined with an enhanced fleet of energy-efficient transit vehicles, are essential components of a public transportation system that will ultimately contribute to GHG reductions. This public transportation system must be attractive and a viable choice for people by providing adequate speed, access and frequency. The WSTAN, in combination with an increased focus on sustainable, compact development and other modes of transportation, will provide the necessary infrastructure to make non-car travel practical for most residents in Washington State.

System Design of the Transportation Access Network

Daily per capita VMT in Washington is estimated to be 31 miles in 2008. ESSHB 2815 specifies a reduction of per capita VMT of 30 percent by 2035, which translates to daily VMT per capita of 22 miles in 2035. The proposed WSTAN achieves this reduction by implementing two sets of improvements to the public transportation system.

First, the system would be designed to increase service dramatically within all areas, with a particular emphasis on those areas that can best support transit. For example, the percent of high density urban trips occurring on transit increases from 9 percent to 22 percent with similar increases in other non-SOV and high occupancy vehicle (HOV) modes. SOV decreases from 39 percent to 26 percent of the trips. The following table presents the mode share assumptions for 2035.

Mode Share by Density and Urbanization, 2035

Density	Urbanization	Transit	Walk	Other	HOV	SOV
High	Urban	22%	16%	14%	22%	26%
Good	Urban	20%	16%	10%	24%	30%
Less Optimal	Urban	7%	15%	15%	26%	37%
Least Optimal	Urban	3%	7%	8%	34%	48%
High	Suburban	20%	16%	14%	22%	28%
Good	Suburban	15%	20%	20%	20%	25%
Less Optimal	Suburban	3%	8%	8%	25%	56%
Least Optimal	Suburban	2%	8%	8%	18%	64%
High	Rural	13%	12%	10%	35%	30%
Good	Rural	10%	17%	15%	28%	30%
Less Optimal	Rural	2%	6%	7%	20%	65%
Least Optimal	Rural	2%	6%	7%	20%	65%

Second, population is assumed to be concentrated in those areas that are most supportive of transit. Thus, trip growth occurs overwhelmingly in urban high-density areas and much less in low-density rural areas.

These two sets of assumptions provide the basis for meeting the VMT-reduction benchmarks in ESSHB 2815. The following table present the mode split for all trips—commute and non-commute—that would occur on each mode to meet the VMT-reduction benchmarks of ESSHB 2815:

Washington State Estimated Current and Projected Mode Split and Per Capita Miles, 2008 and 2035

	Current		Status Quo, 2035		Proposed Scenario	
	Trips	% by Mode	Trips	% by Mode	Trips	% by Mode
Transit (Including commuter rail)	575,000	3.7%	690,000	3%	2,813,000	13.1%
Walk	1,188,000	7.5%	1,621,000	8%	2,930,000	13.7%
Other	774,000	4.9%	1,056,000	5%	2,561,000	12.0%
HOV	4,475,000	28.4%	6,112,000	29%	4,889,000	22.9%
SOV	8,738,000	55.5%	11,914,000	56%	8,200,000	38.3%
Total Trips	15,750,000	100.0%	21,393,000	100%	21,393,000	100.0%
VMT (SOV + HOV) per capita		31				23

These reductions are consistent with the public transportation environment currently found in many major metropolitan areas. For example, in Copenhagen, transit accounts for 33 percent of trips, with 36 percent on bikes, 5 percent walk, and 27 percent of trips by automobile.[9] Though this city has a long history of transit use and a focus on alternative modes of transportation, especially bike and walk, there are more localized examples. In Vancouver 11 percent of trips are by transit and 13 percent by bike and walk. Nearly a quarter of current trips are not by car, and as land uses change and transportation improves, it is expected that the number will increase. The City of Seattle's Transportation Plan lays out a goal reducing SOV use. By 2010, the goal is to have 48 percent of trips in cars, 27 percent on transit, and 19 percent by bicycle and walking.[10]

WSTAN RECOMMENDATIONS

The WSTAN, if implemented in conjunction with the CTOD and Transportation Pricing recommendations (see section 2 and 4, respectively), sets forth a means and an idea to achieve the VMT-reduction benchmarks identified in ESSHB 2815. If implemented, Washington would become like other locations around the world that are renowned for their good public transportation. Achieving the targets in ESSHB 2815 requires a coordinated approach to land use and public transportation. By targeting public transportation improvements to the best operating environments, significant GHG emission and VMT reductions can be achieved.

There are barriers that would need to be overcome. Implementing a public transportation system of this scope and scale would be a difficult undertaking. Coordination with local jurisdictions and among statewide agencies to promote consistent branding and types of services would require a significant amount of oversight and collaboration. In addition, ensuring that land use patterns, development, and laws contribute to and improve the WSTAN would require statewide buy-in and support. The following are specific barriers to implementing the WSTAN and specific recommendations to overcome them:

[9] Nelson, Alysse, 2008. Livable Copenhagen: The Design of a Bicycle City. Accessed from: http://www.sightline.org/research/sprawl/res_pubs/Livable_Copenhagen_reduced.pdf

[10] Department of Planning and Development, City of Seattle. Mode Split Targets for Urban Centers. Accessed from: http://www.cityofseattle.net/dpd/stellent/groups/pan/@pan/@plan/@proj/documents/Web_Informational/dpd_001015.pdf.

WSTAN RECOMMENDATIONS TO OVERCOME THE BARRIER OF OPERATING COSTS/COST EFFICIENCY

- Request WSDOT and General Administration, in conjunction with the Washington State Transit Association (WSTA), to explore state purchasing contract for transit buses.
- Provide statewide guidance/assistance on types of buses to purchase with the potential to offset the 35 percent cost premium of hybrid buses.
- During fleet replacement planning, local transit agencies should identify the incremental increase in expenses to migrate the infrastructure to cleaner-technologies, including maintenance and base capacity. The incremental cost of choosing the cleaner technologies may be offset by a state funding program.
- Expand the definition of Renewable Energy Credits (under Initiative 937) to include connection to local transit system with a focus on migration to hybrid or electrification of system.
- Prioritize the energy efficiency block grants for transit projects by including a statewide policy statement for a prioritization of uses.
- Develop WSDOT policy that recommends Federal Transit Administration to resume the bus research program.

WSTAN RECOMMENDATIONS TO OVERCOME THE BARRIER OF RECRUITMENT AND RETENTION OF DRIVERS AND MECHANICS

- Under authorization from ESSHB 2815 (Section 9), WSDOT should serve as the lead organization and coordinate with the Employment Security Department to perform labor market research to establish a job training grant program for transit operators, mechanics, and transit planners, and assure these professions are included in the green jobs definition.
- Establish a center of excellence at a community college for transit operators, schedulers, mechanics, and planners.
- Request King County Metro to develop a module on how to use federal funding such as the Job Access and Reverse Commute Program to recruit and train operators and mechanics from low income communities.

WSTAN RECOMMENDATIONS TO OVERCOME THE BARRIER OF MAINTENANCE/BASE FACILITIES THAT ARE AT CAPACITY AND/OR ARE OUTDATED

- Allow transit agencies to use design/build procedures to construct transit facilities.
- Request WSTA to explore current status of efforts to expedite permitting process for essential public facilities.

WSTAN RECOMMENDATIONS TO OVERCOME THE BARRIER OF PARK AND RIDE LOT CAPACITY

- Provide incentives to move vanpool and carpoolers away from park and ride lots served by transit to park and pool locations.
- Develop more park and pool and lease lots.
- Develop traveler information for park and rides at state-owned facilities, e.g., roadside signs that show the number of available spaces.

WSTAN RECOMMENDATION TO OVERCOME THE BARRIER OF CONGESTION ON THE TRANSIT NETWORK[11]

- Explore bus only lanes, queue jumping, signal prioritization, and opportunities to increase HOV capacity direct access.

[11] Congestion on the transit network degrades service efficiency and eliminates any travel time advantage.

WSTAN RECOMMENDATIONS TO OVERCOME INEFFECTIVE INTERMODAL CONNECTIONS

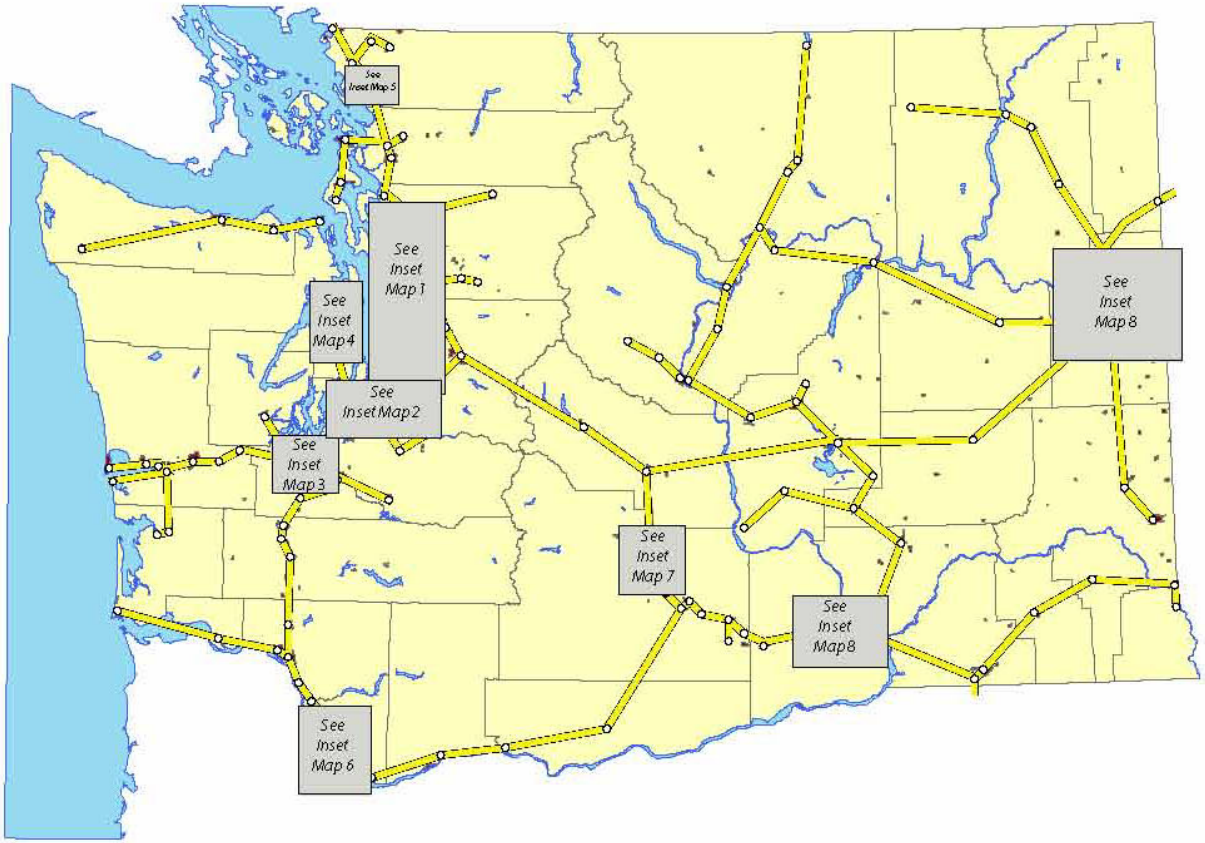
- Encourage WSTA to sponsor a strategic planning and scenario planning session to propose additional investments to improve intermodal connections in support of the WSTAN.
- Create a program that provides matching funds to local governments to enhance non-SOV intermodal connections, e.g., bicycling amenities, to improve access to the WSTAN.

WSTAN RECOMMENDATIONS TO OVERCOME THE BARRIER THAT TRANSIT ROUTES AND SERVICES CAN BE CONFUSING OR INTIMIDATING TO NEW USERS

- Improve marketing and outreach for first-time users through CTR and Growth and Transportation Efficiency Centers[12] (GTEC) residential-based individualized marketing efforts.
- Identify a role for Washington's software industry in providing real-time information to transit agencies (to assist in bus flow and movement) and customers (for routes, connection, availability, etc.).

[12] A GTEC is a defined boundary of dense mixed development with major employers, small businesses and residential units, within an established urban growth area. The goal of the GTEC program is to provide greater access to employment and residential centers while decreasing the proportion of commuters driving alone during peak periods on the state highway system. GTECs are intended to more closely integrate the local jurisdiction land use and transportation planning, as well as requiring a stronger partnership with local transit agencies.

Exhibit 1: Washington State Transportation Access Network Map



WSTAN service numbered in the 700s provide access to most urban neighborhoods of the state. Service is every 10 minutes or less, 18 hours a day, 7 days a week. Stops are about every quarter-mile.

WSTAN service numbered in the 600s provide access to many urban and suburban destinations throughout the urbanized areas of the state. Service is every 15 minutes or less, 18 hours a day, 7 days a week. Stops are between one-quarter and one mile apart.

WSTAN service numbered in the 500s connect urban centers and major destinations scattered throughout a metropolitan area. Service is every 30 minutes or less, 15 hours a day, 7 days a week. Stops can be as far as 10 miles apart on limited access corridors, and one-half to two miles elsewhere.

WSTAN service numbered in the 400s connect every county seat and city of 1500 population and over within a short distance to a large urban area with other rural and regional destinations. Service is at least three times per day, seven days a week.

Exhibit 2: Inset Map 1—King County

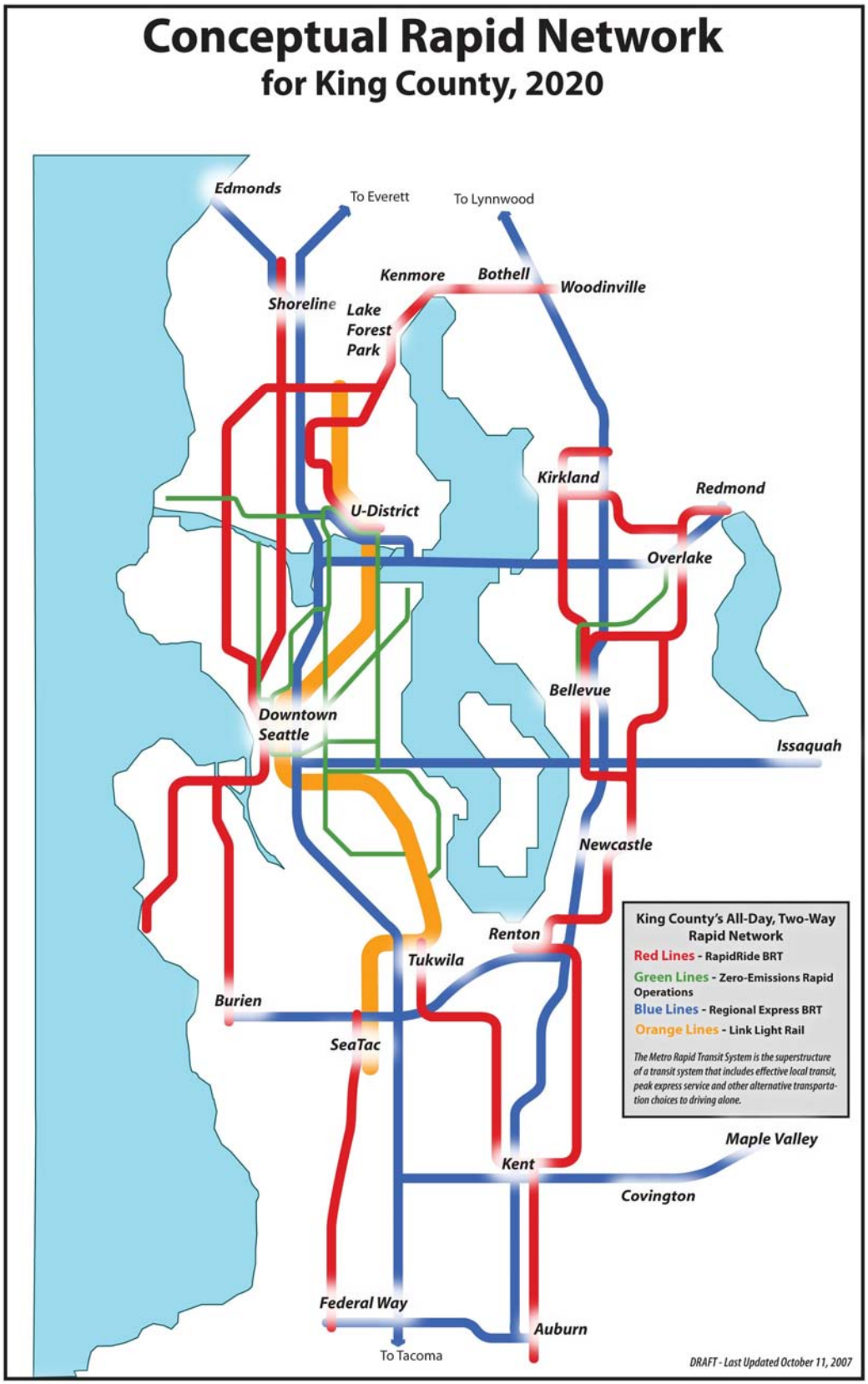
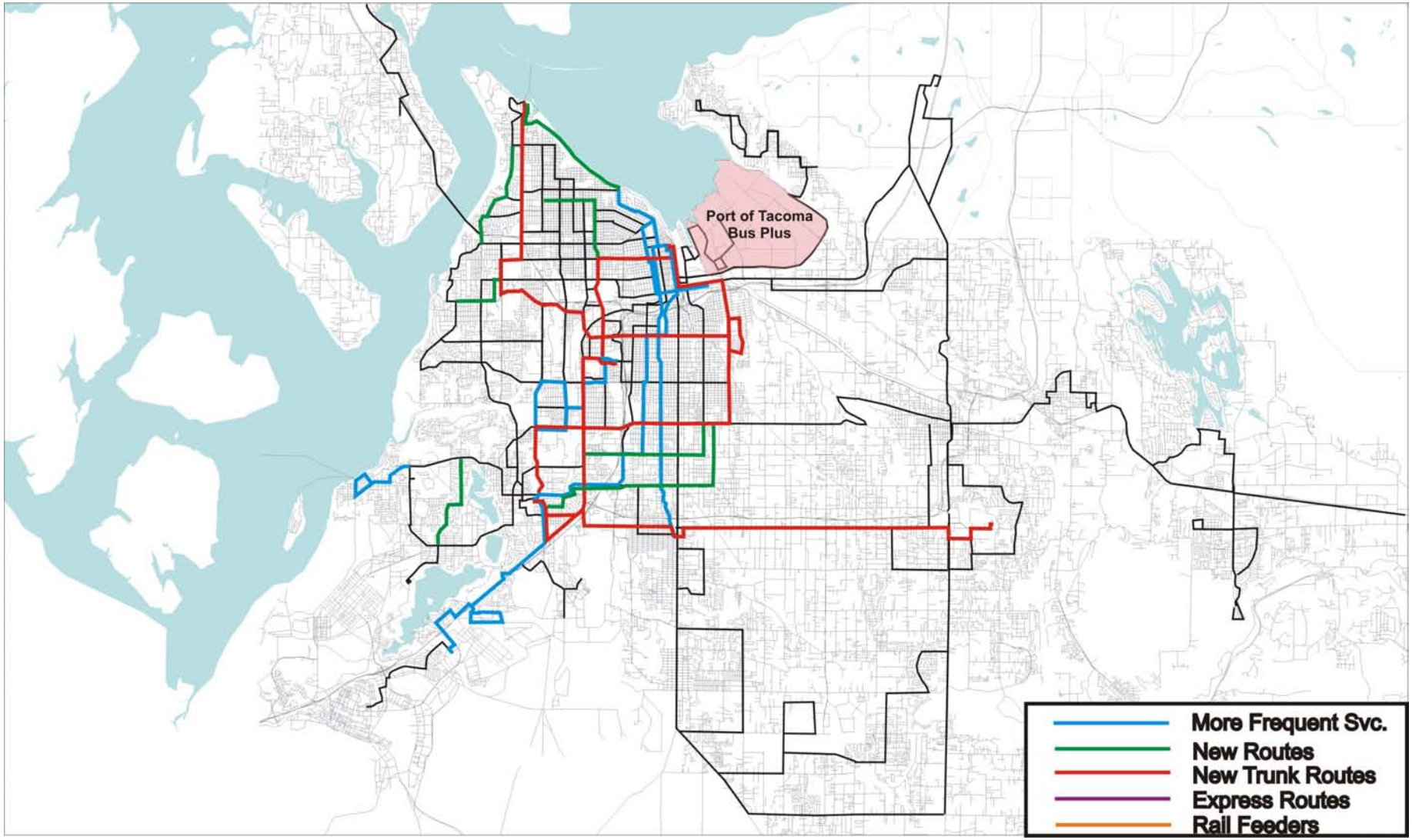


Exhibit 3: Inset Map 2—Pierce County



1B: Enhancements to Urban Commute Trip Reduction and Rideshare Programs

This strategy focuses primarily on urban commute trips. It emphasizes expanding the number of commute trips by vanpool, carpool, and telework, and implementation of compressed work week (CWW) schedules statewide. Supply-side investments in vans and "park and pool" capacity and demand-side investments in ride matching technology, outreach and incentive programs (such as CTR, GTEC, and residential-based trip reduction) would support growth in all commute options. Ridesharing (includes vanpool and carpool), telework, and CWW schedules are the most cost-effective and quickest strategies to implement. Ride matching and residential-based trip reduction programs support reductions in drive-alone trips for non-work purposes. This strategy builds the assumption that demand for non-SOV trips will increase due to successful implementation of CTOD strategies and implementation of pricing on major road networks. Enhancements to CTR and rideshare programs complement the WSTAN; the changes in travel behavior captured in the mode splits described for the WSTAN assume successful shifts away from SOV for commute trips.

Description of Current Urban CTR and Rideshare Programs

The state, transit agencies, local governments, employers, and other partners already invest in demand management strategies, primarily for work trips. These investments include ridesharing, Rideshareonline.com (the on-line ride matching service), outreach and incentive programs to major employers in congested urban growth areas and smaller employers and residents in seven downtown areas of the state, and RTR programs in Bellingham and King County. The state and transit agencies also own and operate park and ride lots throughout Washington.

Implementing Program Enhancements

The goal of this strategy is to rapidly implement comparatively low cost strategies to increase the number of commute trips made by ridesharing and decrease the overall number of commute trips that occur through CWW and teleworking, to quickly produce effective reductions in SOV trips and VMT per capita.

Table 1, below, shows the projected growth in new daily passenger commute trips if only the Transportation Pricing (section 4) and CTOD (section 2) recommendations are implemented. Table 2 shows the projected growth in new daily passenger commute trips if when a rideshare strategy is implemented with the Transportation Pricing and CTOD recommendations.[13] The rideshare strategy assumes a combination of supply and demand side actions, including:

- Expanding the statewide vanpool fleet by 6,600 vehicles by 2035.
- Upgrading and promoting Rideshareonline.com to match more commuters into carpools and vanpools.
- Investing in park and pool (leased) lots to add more spaces for commuters to park and match up with their pools in the morning.
- Expanding state support for telework with toolkits, outreach, and technical assistance.
- Implementing a statewide marketing campaign to provide information, incentives and tools for commuters to choose commute options, integrating promotion of Rideshareonline.com and traveler information for park and pools.
- Enhancing and expanding the CTR, GTEC, and residential-based trip reduction strategies to deliver the statewide information and incentives campaign to commuters at major employers and downtown areas, as well as at their homes.
- Creating a VMT innovation grant program to fund creative ideas to reduce VMT.

[13] The trips and mode splits in Tables 1-3 represent only commute trips. These figures reflect only portion of the total number trips described in the supporting figures for the WSTAN.

Table 1- Projected Growth in New Daily Passenger Trips in Washington, Assuming Implementation of Pricing and Land Use Recommendations Only (Plus baseline)

New Daily Passenger Trips	Commute			
	2011	2015	2020	2035
Vanpool	8,300	10,500	12,700	16,300
CWW	4,900	11,500	17,900	30,500
Telework	7,200	17,000	26,300	44,900
Bus (including rail)	12,700	283,100	321,500	448,600
Carpool	110,600	140,700	169,600	217,300
Walk	44,900	64,900	84,400	118,800
Bike	40,100	49,700	60,000	83,800
Total non-drive alone daily trips	228,700	577,400	692,400	960,200
Vanpool Vehicles	**1,000**	**1,300**	**1,500**	**2,000**

Table 2- Projected Growth in New Daily Passenger Trips in Washington. Assuming Implementation of Transportation Pricing, Land Use and Rideshare Recommendations (Plus baseline)

	Commute			
Strategy Driven	**2011**	**2015**	**2020**	**2035**
Vanpool	18,400	35,300	45,400	54,300
CWW	9,600	22,500	33,400	49,800
Telework	9,800	24,200	38,100	65,800
Bus (Including rail)	245,300	299,200	348,700	485,500
Carpool	142,296	213,100	249,300	299,900
Walk	51,400	80,800	102,900	138,900
Bike	46,600	65,700	78,400	103,900
Total non-drive alone daily trips	523,396	741,000	896,200	1,198,100
Vanpool Vehicles	**2,200**	**4,300**	**5,500**	**6,600**

Table 3- Mode Splits assuming implementation of Transportation Pricing, Land Use, and Rideshare Recommendations (Plus baseline)

New Daily Passenger Trips	Commute				
	2006	2011	2015	2020	2035
Drive Alone	74.8%	61.2%	58.7%	57.8%	56.6%
Vanpool	0.5%	1.3%	1.4%	1.5%	1.5%
CWW	2.2%	2.3%	2.5%	2.6%	2.6%
Telework	3.2%	3.3%	3.4%	3.5%	3.6%
Bus (including rail)	7.9%	14.4%	14.8%	14.9%	16.0%
Carpool	6.7%	10.3%	11.4%	11.5%	11.1%
Walk	3.1%	4.4%	4.8%	5.0%	5.2%
Bike	1.6%	2.8%	3.1%	3.2%	3.4%

Cost Estimates (all costs in 2008 dollars)

- Vanpool capital: $171 million to purchase 6,600 vehicles by 2035.
- Vanpool operating: The estimated gap between costs and revenues for the new vans is $1700. Assuming this gap goes forward through 2035, the annual cost of operations not covered by fares and other revenues for the new vans would be $11 million by 2035.
- Rideshareonline.com: Costs include outreach and promotion of the system, and upgrades to the system in 2009-2011 and 2017-2019:
    - 2009-2011: $1.7 m
    - 2011-2015: $3.4 m
    - 2015-2020: $5.7 m
- Park and ride/park and pool: Annual cost of providing roughly 170,000 to 350,000 leased park and pool spaces in 2035 to support expanded vanpooling and carpooling is between $11 million and $21 million ($60 per space per year).
- Statewide technical assistance, promotions and outreach:
    - Umbrella campaign: $3 per household per year, approximately $8 million per year in 2009-2011
    - CTR and GTEC: $9 million/year in 2009-2011 and $12 million/year in 2019-2021
    - Residential-based TDM: $500,000 in program development costs, ongoing cost is approximately $20 per household per year or approximately $54 million per year in 2009-2011
    - VMT innovation grants: Scalable at roughly 4.3 cents per vehicle mile reduced

URBAN COMMUTE TRIP REDUCTION AND RIDESHARE PROGRAM RECOMMENDATIONS

The following are specific barriers to implementing this urban CTR and ridesharing strategy. Many of these barriers are a result of limited funding. Recommendations to overcome these barriers include a mix of funding ideas, staff work, and policy work.

URBAN COMMUTE TRIP REDUCTION AND RIDESHARE PROGRAM RECOMMENDATIONS TO OVERCOME THE BARRIER OF THE LACK OF FUNDING[14]

- Perform a statewide analysis of the vanpool program to identify possibilities for efficiencies and economies of scale for maintenance and program delivery. As part of the analysis, document best practices in fare structures, cost recovery models and agency budgeting for vanpooling.
- Convene the general managers of the transit agencies to discuss best practices and encourage changes that allow for expansion. Require that transit agencies adopt best practices to be eligible for state-purchased vans to expand their programs.

URBAN COMMUTE TRIP REDUCTION AND RIDESHARE PROGRAM RECOMMENDATION TO OVERCOME THE BARRIER OF THE LACK OF PARKING CAPACITY AT THE ORIGIN AND DESTINATION OF A POOL[15]

- Support utilization of existing “park and pool” lots for their intended purposes with traveler information improvements and incentives. Develop partnerships between state and local transit agencies, and parking providers such as churches and grocery stores, to provide additional “park and pool” capacity statewide.

[14] The primary growth constraint faced by vanpool operators is a lack of funding to significantly expand maintenance facilities and staff support, including mechanics and vanpool coordinators, and to sustainably fund maintenance, administration, and capital replacement as fleet expands.

[15] “Park and pool” capacity and worksite parking is limited, and increasingly a barrier as programs expand.

URBAN COMMUTE TRIP REDUCTION AND RIDESHARE PROGRAM RECOMMENDATION TO OVERCOME THE BARRIER OF INEFFECTIVE RIDE MATCHING SERVICES[16]

- Expand and update RideshareOnline.com to improve travel options for customers and increase effectiveness of rideshare service administrators. WSDOT and its partners have released an RFP to improve RideshareOnline.com, with the goal of having a vendor in place by January 1, 2009 to develop an updated commute management system that combines ride matching, commute tracking, and a web-based incentive distribution system to provide an integrated, streamlined, enhanced and technologically superior commuter/user and administration experience compared with the existing system.

URBAN COMMUTE TRIP REDUCTION AND RIDESHARE PROGRAM RECOMMENDATION TO OVERCOME THE BARRIER OF A LACK OF AWARENESS OF RIDESHARING OPTIONS[17]

- Launch a statewide awareness campaign to promote all CTR, GTEC, and RTR programs and emphasize the new Rideshareonline.com as a tool for all types of trips.

URBAN COMMUTE TRIP REDUCTION AND RIDESHARE PROGRAM RECOMMENDATION TO OVERCOME THE BARRIER PRESENTED BY EXISTING POLICIES[18]

- Provide resources and direction to RTPOs to gather commute and travel data and work with transit, employers and local governments to identify underserved markets. Use this information to guide partnership creation and investment decisions.

URBAN COMMUTE TRIP REDUCTION AND RIDESHARE PROGRAM RECOMMENDATIONS TO OVERCOME THE BARRIER OF THE LACK OF RESOURCES[19]

- Rapidly expand state support for telework with toolkits, outreach, and technical assistance.
- Re-establish Washington State University (WSU) as a statewide telework technical assistance center for private employers and local governments.
- Monitor and implement the recommendations developed through the Kitsap Telework Project funded in the 2007-2009 biennium.
- Emphasize telework and compressed work week schedules in awareness campaigns and outreach to employers. Set goals for state agency worksites.

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[16] RideshareOnline.com was introduced in 2001 to assist commuters in finding and contacting potential vanpool matches. RideshareOnline.com is used and promoted by transit agencies, jurisdictions, Transportation Management Associations (TMAs) and employers in Washington and Idaho. RideshareOnline.com needs to be updated and expanded to incorporate improvements in ride match technology and offer travelers access to better service and better commute management tools.

[17] Statewide campaigns promoting commute options have been moderately successful, but the legislature has not provided funding for this outreach in recent years. Local campaigns, such as residential-based marketing and employer-based campaigns such as Wheel Options (http://wheeldb.cssnw.com/) have proven successful at raising awareness and increasing ridesharing.

[18] Current land use practices, service orientation, and funding prioritization decisions at the local and regional level may limit the potential to convert drive-alone trips into high occupancy and non-motorized trips.

[19] Limited resources exist for state technical support, enhanced CTR/GTEC programs, particularly ridesharing, telework and compressed work week schedules, and broader RTR programs.

1C: Statewide Residential Trip Reduction Program

This outreach and incentive strategy is designed to encourage all travelers, not just commuters, to try ways other than driving alone for their trips. A RTR program would use individualized marketing strategies to educate travelers on their options and broaden the state's trip reduction efforts beyond the commute. The RTR is substantially supported by the WSTAN concept and the ridesharing investments that are part of the enhancements to urban CTR and rideshare programs (see descriptions, above).

Over 75 percent of all trips taken are not for work. In urban areas, many trips are short trips (five miles or less), and over 50 percent of the shortest trips (one mile or less) are made in cars. Changing the way these trips are made requires reaching out to the residents of target communities and engaging them to consider how they can change any of the trips that they make. The approach should be inclusive of all trip types and all potential modes of travel, with the goal of getting people started changing the easy trips first and building on that success.

An example of a successful program is King County's *In Motion* trip reduction program.[20] *In Motion* uses a community-based social marketing model that employs communication, education, pledging and incentives to change individual travel behavior (social marketing campaigns have been piloted in public health and have spread to recycling, energy conservation and other arenas). This program has been implemented in ten communities within King County over the past four years, with an average participation rate of 8 percent to 10 percent of households targeted. Total reported VMT reduced is about 750,000 miles, representing 55,000 trips. A variety of outreach techniques are used to encourage individuals to learn more about their travel options and to incorporate less driving in their daily habits. Individuals who reduce their driving and report on their changed behavior can earn rewards and prizes. Local organizational and business support increases visibility and ownership of the program by target residents. Each program lasts about 3 months, by which time the changed travel behaviors have become somewhat established. Over 90 percent of participants surveyed at the end of the program indicate they are very likely to continue the new travel behaviors.

The *In Motion* program shares common elements with other broad based trip reduction programs: inclusion of all trip types as candidates for change, community identification, inclusion of a pledge and reward system to encourage sustained behavior change, and ongoing communication and education about options and program results.

STATEWIDE RESIDENTIAL TRIP REDUCTION PROGRAM RECOMMENDATION

The Transportation IWG recommends implementation of a statewide RTR program on two levels. State level support would consist of a program brand, an implementation model, and tools (such as a website and calendaring system) to reduce costs for communities that partner in implementation. Focused implementation within each target community would incorporate community-based messaging, support and outreach, key elements to increasing receptivity of residents and overall participation rates.

A residentially-based trip reduction program could include multiple levels of outreach, such as:

- Direct mail to each target household.
- Non-traditional outreach such as list serves and blogs.
- Broad promotion regarding the program on a sustained basis (monthly ads, local email newsletters, posters, etc).
- Ongoing communication (email or regular mail) with program participants.

[20] www.kingcounty.gov/inmotion

The program would be branded to reflect each target community in which it is implemented. Local business sponsors would be solicited to contribute prizes and other rewards, and mechanisms for identifying participants to their peers would be identified.

Specific information and tools would be provided to residents to help them choose how they can travel differently. Targeting information delivery based on interest will increase overall receptivity, and ultimately behavior change. Examples of key types of information and support include:

- Availability of bus, bike, walk, car share, and rideshare options.
- Assistance on trying new modes—bus, bike and walk buddies.
- Personal trip planning assistance.
- Local accessibility (e.g. bike, walk, bus) maps.

To encourage actual behavior change, a pledge component would be incorporated. This element could be structured in several ways, and combined with rewards and incentives for completing the pledged actions. A trip reporting element would facilitate ongoing encouragement and accounting.

The state could conduct broad outreach to support efforts in target communities on an annual or more frequent basis. A coordinated evaluation would occur in each target community.

GHG Emissions Reduction and Net Social Cost of the Transit, Rideshare, and Commuter Choice Program Expansions

	Reductions ($MMTCO_2e$)		
Policy	**2012**	**2020**	**Cumulative Reductions (2008–2020)**
Transit, Rideshare, and Commuter Choices	0.70	2.58	15.5

GHG emission reductions were calculated for these recommendations based on the anticipated reduction in automobile travel and increase in public transportation and rideshare travel. Benefits would be partially offset by an increase in emissions from transit and vanpools. Daily VMT would be reduced[21] by approximately 66.5 million by 2035 as a result of this set of strategies. Daily transit person-miles would increase by 25 million by 2035. The net effect is a reduction of 2.58 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) in 2020 and 6.10 $MMTCO_2e$ in 2035 (GHG emission reductions were assumed to increase linearly between 2010 and 2035).

Total Costs

The Transportation IWG was not able to complete a full analysis of the net costs[22] of implementing the Transit, Rideshare, and Commuter Choice recommendations. Cost savings from reduced VMT come primarily from a

[21] Calculated using the assumed mode split changes described in the WSTAN section (1A).
[22] The total net cost of public transportation expansions in Washington State could be estimated according to the following formula: *Cost of investment = (operating, capital maintenance, and capital expansion costs) – (cost savings from reduced vehicle travel)*

reduction in the variable costs of owning and operating a vehicle[23] and from a reduction in congestion costs.[24] Other external cost savings include a reduction in vehicle crashes, air pollution costs, and parking costs.[25]

Capital and operating costs were estimated for each year from 2010 to 2035 for all of Transit, Rideshare, and Commuter Choice recommendations except for the WSTAN.[26] More study is needed to understand the gaps and resource required to fully implement the WSTAN to accurately estimate costs. Results are shown in the table below. A preliminary analysis has indicated that a substantial net cost savings could result from successful implementation of the Transit, Rideshare, and Commuter Choice recommendations. As these recommendations move forward, it is important to complete this type of analysis to help clarify the total impact of investments in public transportation.

	Net Present Value of Total Costs 2010-2035
Transit (bus and paratransit)	Not Available
Vanpool	$202,000,000
CTR/GTEC	$180,000,000
Residential Trip Reduction	$961,000,000
VMT Reduction Innovation Grants	$34,000,000
Amtrak	$4,328,000,000
LRT and Commuter Rail	$6,684,000,000

[23] Cost components that vary with VMT include fuel, depreciation, and maintenance, and tires.
[24] The reduction in congestion cost could be estimated using the Texas Transportation Institute's (TTI) Urban Mobility Report, which provides comprehensive data on roadway congestion in urban areas. The cost savings reflect reflect the time savings from reduced roadway congestion and the fuel savings from the reduction in congested traveling conditions.
[25] For detail, see: Anderson, David and Gerard McCullough. The Full Cost of Transportation in the Twin Cities Region. University of Minnesota, August 2000. These external costs were not included in the total cost estimate in order to be consistent with the methodology employed by other CAT sectors.
[26] Costs were summed and discounted at 5% to obtain a net present value (NPV) in 2006 dollars.

2. COMPACT AND TRANSIT ORIENTED DEVELOPMENT (INCLUDING BICYCLE AND PEDESTRIAN) RECOMMENDATIONS

Compact and Transit Oriented Development (CTOD) is an integral part of this set of Transportation recommendations. CTOD provides the necessary density, infrastructure, and amenities to encourage the use of non-SOV forms of transportation that are in part recommended in this document. Washington's Growth Management Act (GMA) already enables, but does not require, local government planning to promote centers or CTODs.[27]

As part of their deliberations, the Transportation IWG identified some of the transportation-related characteristics of a typical CTOD district, corridor, or node[28] including:

- Street facilities for walking and bicycling (sidewalks, bike lanes, or routes).
- High employment *and* residential density development within an identified area or a 10 minute walking circle around a CTOD center which has—or is planned to have—a transit station or transit access, and enough density (at *minimum* 8-10 units/acre[29] area-wide) to support transit service.[30] Higher density is preferred in order to create very active, full service CTODs that encourage use of alternative modes and maximize decreased VMT.[31]
    - This level of density is a goal and requires significant time and investment. Many areas will not achieve this for a period of time.
- Transit access and facilities with headways[32] of 15 minutes or less with the most transit intensive areas providing Bus Rapid Transit and High Capacity Transit.
- Street connectivity and traffic calming features to control vehicle speeds (average block perimeter no greater than 1,350 ft.).
- Mixed-use/Mixed-income development that includes retail, commercial/office, various types and affordability levels, and possibly schools in a form that encourages walking and bicycling from one place to another.
- Parking management that results in reduction of the amount of land devoted to parking (no minimum parking standards and full market rates charged for all parking spaces).
- Subsidized housing within CTODs for low income and otherwise vulnerable constituents who may be displaced during transition to CTOD.
- Bike share and car share opportunities, e.g., Zipcar.
- Building design, street design, and amenities (parks and cultural opportunities) that attract everyone living, working or visiting the area to walk rather than move a vehicle from one place to another, i.e., daycare and grocery facilities near employment centers.

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[27] "Town Centers" are the most likely compact, or compact and transit oriented development that will occur over time in the majority of cities planning under GMA.

[28] The terms district, corridor and node refer to locally defined and delineated areas where CTOD type growth is targeted.

[29] The 2007 CAT CTOD recommendation was 8-10 net units/acre – total CTOD acreage minus critical areas.

[30] Residential densities of at least 7 dwelling units per acre are considered necessary to economically justify use of local bus routes operating 30 minutes headways. As residential density rises to 30 dwelling units per acre, transit use has been found to triple and at 50 units per acre becomes more numerous than auto trips. Likewise, transit ridership increases significantly as employment density exceeds approximately 50 employees per acre or in activity centers having more than 10,000 jobs.

[31] Another alternative measure for density is to use gross density. The PSRC publication, "Developing Your Center – A Step by Step Approach," identifies different gross density goals for different types of "centers" (synonymous with CTODs). These included; Regional Center – 20 units/acre, 80 jobs/acre (300,000 jobs); Metropolitan Center – 15 units/acre, 50 jobs/acre (30,000 jobs); Smaller Urban Center – 10 units/acre, 25 jobs/acre (15,000 jobs); Town Center – 7 units/acre, 15 jobs/acre (2,000 jobs).

[32] The headway between vehicles in public transit systems is the time between two vehicles passing the same point traveling in the same direction on a given route.

Based on the elements of a CTOD as described above, the Transportation IWG recommends promoting housing and employment density, parking incentives and management, transportation concurrency, bicycle and pedestrian accessibility, and leveraging urban brownfield development. The Transportation IWG focused on these specific CTOD elements because they represent the most promising opportunities to reduce VMT.

- **Housing and Employment Density:** Dense housing and employment promotes fewer and shorter SOV trips and makes providing non-SOV service more cost efficient.

  There are several overlapping and complimentary recommendations with the Land Use and Climate Change (LUCC) Committee. The LUCC recommendations that support the Transportation IWG Housing and Employment Density recommendations include:
  - Coordinate to ensure consistency with regional transportation plans.
  - Modify the GMA environment goal to require climate change impacts.
  - Encourage the use of financing tools as developer incentives.
  - Encourage the use of new funding and existing targeted to urban centers.

- **Parking Incentives and Management**: Parking in CTODs should be managed to support commercial needs while encouraging employees to use alternatives to driving alone. Different sizes and types of CTODs require different parking incentives and management. As CTODs evolve and become higher density live, work, shop, and play areas, the parking management will have to evolve. Parking incentives and management for VMT and GHG emission reductions would be designed to decrease trips within and to CTODs.

- **Urban Brownfield Redevelopment**: Currently, EPA provides assessment grants on a nationally competitive basis, and the state's brownfield revolving loan program is $5.9 million federally funded.[33] Urban brownfield re-development is a key strategy in evolving communities to more CTOD.

- **Transportation Concurrency:** GMA defines a specific transportation concurrency requirement. First, local governments must set level of service standards, or minimum benchmarks of performance, for transportation facilities and services. Once the level of service standard is established, the local government must adopt an ordinance to deny proposed developments if they cause the level of service for a locally-owned transportation facility to decline below the adopted standard, unless transportation improvements or strategies to accommodate the impacts of development are made concurrent with development.

- **Bicycle and Pedestrian Accessibility:** Bicycling and walking are essential components of achieving reduced VMT and complete CTODs. Half of all trips in Washington are less than three miles: 80 percent of such trips are made by automobile.[34] Trips of up to 3 miles are easily within the capability of any physically-able adult to bicycle, or to walk for trips up to 1 mile. Bicycling and walking modes can be used for a greater portion of trips up to three miles if conditions for making those trips are appealing. The Victoria Transport Policy Institute[35] estimates VMT savings of 5 to 15 percent as a result of bicycling and walking improvements. An inclusive approach to designing roads and streets increases the walking and bicycling share of short trips, thereby reducing overall VMT. The approach called Universal Access or *Complete Streets*[36] complements these goals of promoting compact and relatively dense urban development.

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[33] http://cted.wa.gov/site/790/default.aspx
[34] Washington State Bicycling and Walking Plan, 2008
[35] http://www.vtpi.org/leed_rec.pdf
[36] Complete Streets is a comprehensive approach to designing, building and maintaining roads and streets. The central tenet of Complete Streets is to routinely accommodate all potential users, be they transit rider, bicyclist, walker, wheelchair user, truck or automobile. Complete Streets takes context-sensitive design (a criteria for applying standards based on anticipated usage on

2A: Promote and Support Housing and Employment Density

HOUSING AND EMPLOYMENT DENSITY RECOMMENDATION TO EXPAND USE OF THE MULTI-FAMILY TAX EXEMPTION

Legislatively expand use of the Multi-Family Tax Exemption in HB 1910[37] to allow any city planning under GMA to leverage and maximize the use of this tool. The change would likely attract multi-family development and innovative types of housing strategies such as accessory dwelling units, lot size averaging, cottage and other types of infill developments to existing, emerging or planned CTOD areas. This tool should be made available for any city planning under GMA to encourage the emergence of at least one CTOD (city center or activity center).

HOUSING AND EMPLOYMENT DENSITY RECOMMENDATIONS TO ADJUST GRANT FUNDING CRITERIA, ESTABLISH NEW REVENUE SOURCES AND IDENTIFY NEW FINANCE MECHANISMS

Adjust grant funding criteria to support applications and expenditures in CTODs, establish new revenue sources (tax credits, loans, revolving funds) and identify new finance mechanisms that support increased density in CTODs, including:

Infrastructure

- Transit grants that support facilities in CTOD district, corridors or nodes.
- Federal and state transportation grants—with grant criteria that encourage applications that focus funding in CTOD (district, corridor, or node).

Development Supportive Financing (including grants)

- Federal and State Housing Grants and Tax Credits that add density to CTOD areas. This will include the Washington State Housing Finance Commission grant and loan programs (wherever possible, new housing units for lower income households should be built where car ownership is a choice—not a necessity).
- Loans (low interest and revolving funds that help achieve density goals).
- New financing mechanisms,[38] i.e., fees for development outside of CTODs that support development inside CTODs—or that support the multimodal transportation improvements identified as part of the CTOD network.

HOUSING AND EMPLOYMENT DENSITY RECOMMENDATIONS TO LEVERAGE PARTNERSHIPS

Leverage Public/Private partnerships and relationships. Clarify and publicize possibilities for using public land in urbanized areas for private development that contribute density or necessary uses or facilities to the CTOD. Use private development projects for some public use (park and ride as part of a development).

- Community, Trade, and Economic Development (CTED) should work with the Association of Washington Cities (AWC) to publicize opportunities for using public land in urbanized areas for private development

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a particular project) and applies it system-wide. Complete Streets has been endorsed by, among others, The American Public Transportation Association; American Planning Association and the Institute of Transportation Engineers. Four communities in Washington have enacted ordinances or directives on Complete Streets.

[37] HB 1910 – *Modifying property tax exemption provisions relating to new and rehabilitated multiple-unit dwellings in urban centers to provide affordable housing requirements.* http://apps.leg.wa.gov/documents/billdocs/2007-08/Pdf/Bills/Session%20Law%202007/1910-S2.SL.pdf

[38] Funds to create a CTOD support network are going to be needed and the subgroup has not identified any "new" funds – just prioritizing funds that are already stressed.

that contribute density, necessary uses, or facilities to the CTOD, including working with developers, elected officials, and government agencies.

- Local governments and the development community should draft model ordinances for housing choices that both address the demands of housing consumers and that meet density objectives in a variety of settings, and also develop education and technical assistance tools and models that show how to market developable properties.
- Explore opportunities, including possible state legislation, to ensure surplus state or local government properties are prioritized for housing, or joint, mixed purposes.
- Transit agencies should work with WSDOT and local governments to coordinate increased density around park and ride lots. This should include not only density around park and ride lots but included as part of the actual proposal with housing/commercial uses utilizing the air space over the park and ride lots.

HOUSING AND EMPLOYMENT DENSITY RECOMMENDATIONS FOR EDUCATION AND OUTREACH

Educate and reach out to decision makers to overcome barriers to CTOD development.

- CTED should take the lead on clarifying land aggregation tools and concurrency options for use in CTODs and offer resources that support community discussions about the role of CTODs in sustainable communities.
- AWC should publicize information and offer workshops to inform cities about the options and tools to increase successful CTODs.

HOUSING AND EMPLOYMENT DENSITY RECOMMENDATIONS TO DEVELOP VMT MEASURES

WSDOT should work with RTPOs and Metropolitan Planning Organizations to develop measures to reduce per capita VMT and assure involvement of the public in preparing and updating those measures for inclusion in the Regional Transportation Plan.

2B: Develop and Provide Parking Incentives and Management

PARKING INCENTIVES AND MANAGEMENT RECOMMENDATIONS FOR EDUCATION

Provide direction and education at the state level that recognizes the importance of parking management in CTODs. WSDOT should take the lead on parking management education programs and collaborate with CTED and AWC on educational programs and assistance:

- Illustrate successful implementations of 'climate friendly' parking management through case studies.
- Assist CTODs in forming Transportation Management Associations to work toward self sustaining parking management and Commute Trip Reduction organizations. WSDOT is the lead organization.
- Describe the role of car-sharing, e.g., zip car, for parking management in dense areas.
- Educate developers and publicize the cost of 'free parking' (i.e., ability to have better/more revenue generating units in the same building.)

PARKING INCENTIVES AND MANAGEMENT RECOMMENDATION TO REQUIRE REGIONAL PARKING MAXIMUMS IN REGIONAL TRANSPORTATION PLANS

To address minimum/maximum parking thresholds at the state/regional level, regional parking maximums should be made a requirement of Regional Transportation Plans to address minimum/maximum parking thresholds at the state/regional level.

This would raise public understanding about the importance of parking management and help eliminate jurisdictional fear of losing part of the tax base revenue by having more rigorous parking standards.

PARKING INCENTIVES AND MANAGEMENT RECOMMENDATION TO EXPLORE REVENUE AND FUNDING OPTIONS

Explore revenue and funding options, i.e., parking tax for dense urban locations, with funds made available for projects and programs in the CTOD and tax credits for lower parking ratios.

PARKING INCENTIVES AND MANAGEMENT RECOMMENDATION TO PROVIDE FUNDING FOR TRANSIT AND MULTIMODAL INFRASTRUCTURE FACILITIES

Provide regional transportation funding for transit and multimodal infrastructure facilities (including transit, bicycle/pedestrian improvements, rideshare, etc.) in return for developer(s) maximizing development density and minimizing project parking. The purpose of this action is to link transportation improvements to land use decisions and projects that help maximize density, and to include strong parking management in CTODs.

PARKING INCENTIVES AND MANAGEMENT RECOMMENDATION TO ALLOW SHARED PARKING

Prohibit the construction of principal-use long term parking, and allow shared parking.

PARKING INCENTIVES AND MANAGEMENT RECOMMENDATION TO MAINTAIN STATE GRANT SUPPORT

WSDOT, with support from CTED, should maintain state grant support for focused trip reduction programs in CTODs, modeled after the GTEC projects currently being implemented in seven urban centers throughout the state.

PARKING INCENTIVES AND MANAGEMENT RECOMMENDATIONS THAT MERIT FURTHER RESEARCH

The Transportation IWG identified several other parking management strategies that merit further research. WSDOT and CTED should work together to research and identify the most promising of these strategies:[39]

- Change state legislation authorizing a commercial parking tax to allow monthly reserved parking to be taxed, and require parking tax revenues to be spent on transportation alternatives to driving (2007 CAT Recommendation).
- Create the ability to charge a higher parking tax for monthly, long-term or commuter parking than for short-term parking (2007 CAT Recommendation).
- Develop and implement congestion pricing for special-events parking.
- Implement variable parking pricing for different areas and times of day, including local rates for parking.
- Consider charging at high use park and ride lots as a way to manage demand and raise revenue. Identify opportunities for funding incentives to developers who develop housing facilities that reduce or intercept traffic impacts on already overburdened major roadways.
- Increase density and reduce parking requirements for valet parking.
- Reduce parking rates or provide priority parking for ridesharing/HOVs.
- Provide incentives to employees and employers for parking management (e.g., employees cash out their free parking or employers provide mini fleet for employees).

[39] Research should consider impact on businesses including tourism as well as housing projects and account for how implementation would impact the different sizes of CTOD that exist and/or planned for in the various counties throughout the state.

- Restrict 'early bird specials' in congested downtown areas.
- Reconfigure street parking for bicycles/scooters and angled vs. parallel parking.

2C: Encourage Bicycle and Pedestrian Accessibility

RECOMMENDATIONS TO ENCOURAGE BICYCLE AND PEDESTRIAN ACCESSIBILITY

The Washington State Legislature should affirm that walking and bicycling for transportation purposes offer many benefits to individuals, their communities, and the state, including improved health for individuals and no harmful pollution. As part of a balanced transportation system, walking and bicycling will reduce the amount of trips made by car, thereby reducing GHG emissions caused by motor vehicles.

The Washington State Legislature should adopt a policy based on the broad concepts identified by the Complete Streets[40] national movement. Exceptional conditions should be recognized and accommodated, such as:

- Excessive cost to include Complete Street elements (>20 percent of total).
- No identified need (quiet neighborhood streets with sidewalks and parking).
- Exempt projects as approved by the Secretary of Transportation.

To provide sufficient lead time for planning and budgeting in communities throughout Washington, improvements should be prioritized as follows:

By 2009: The Office of Superintendent of Public Instruction shall review its school-siting policies and practices, and report to the Washington Legislature on recommendations to reduce VMT to and from schools by Dec. 15, 2009.

By September 1, 2010, the Superintendent of Public Instruction and local communities should develop, in cooperation with local school districts, an investment strategy, that:

- Ensures all elementary and middle schools in urban areas are connected to pedestrian routes within a 1.5 mile circumference of the school entrance; and
- Ensures all high schools in urban areas are connected to pedestrian routes within a 2.0 mile circumference of the school entrance.

By 2009: The Legislature shall identify a funding strategy to fulfill all elements in the adopted Washington State Bicycle and Walking Plan,[41] published in 2008, including training, and facility funding.

By 2009: WSDOT, counties and cities in Washington shall have begun training all traffic engineers and planners on the design and engineering elements that promote walking and bicycling and ADA, through courses developed in conjunction with the WSDOT Bicycle and Pedestrian Program. By 2013, the Secretary of Transportation shall require that all planners and engineers working for WSDOT have completed an approved course on walking and bicycling.

By 2010: All state transportation funds and state public works transportation funding shall include Complete Streets criteria when completing state projects or awarding state funding for local projects.

By 2011: The Legislature shall identify funds to fulfill all elements in the adopted Washington State Bicycle and Walking Plan published in 2008.

[40] http://www.completestreets.org/
[41] http://www.wsdot.wa.gov/BIKE/PDF/BikePedPlan.pdf (7.67mb)

By 2011: All cities shall adopt policies (through rule or by ordinance) modeled on the broad concepts identified in Complete Streets. Cities opting to not develop policies shall have to justify their decision in terms of alternative plans for reducing VMT when applying for state transportation grant and loan funding.

By 2012: The Legislature should implement the recommendations from WSDOT's Transportation Demand Strategies for Schools study. All school districts in the state shall develop transportation plans which identify strategies to encourage non-SOV driving to school.

By 2014: All urban areas designated under the GMA shall have produced a bicycle and walking master plan (or two separate plans) and identify funding strategies to complete the execution of the plan(s) in their six year "capital facilities" plans. By 2018, these urban areas shall have demonstrated progress toward completing projects identified in their plans.

2D: Encourage Urban Brownfield Redevelopment

URBAN BROWNFIELD REDEVELOPMENT RECOMMENDATION

The Transportation IWG recommends including state funding for urban brownfield redevelopment and adding a grants component that augments the state's brownfield revolving loan. These actions will result in opportunities for land aggregation, promoting town centers, and promoting compact development.

2E: Transportation Concurrency

TRANSPORTATION CONCURRENCY RECOMMENDATIONS

These recommendations have been developed in conjunction with CTED's LUCC committee. The specific LUCC recommendations that align with the Transportation IWG concurrency recommendations are:

- Better enable GMA Transportation Concurrency to address all modes of transportation.
- Provide technical assistance and guidance on how to incorporate multimodal improvements or strategies in their transportation concurrency regulations.
- Require local government to consider multimodal improvements or strategies in their transportation concurrency regulations.

GHG Emission Reductions from the Compact and Transit-Oriented Development Strategy

Review of CTOD Impact Quantification during 2007 CAT

The CTOD strategy developed during the 2007 CAT process was estimated to reduce 2020 VMT by 7 percent and reduce annual GHG emissions by 1.6 $MMTCO_2e$ by 2020. The 7 percent VMT reduction was based on the Puget Sound Regional Council's Vision 2040,[42] which modeled "Metropolitan Cities Alternative," as well as from land use

[42] http://www.psrc.org/projects/vision/index.htm

scenario modeling in other metropolitan areas, and from the judgment of several travel modeling experts who have worked in the Pacific Northwest region.

Alternative Quantification Method

An alternative method for calculating CTOD GHG impacts is suggested in the *Growing Cooler* report released in September 2007 by the Urban Land Institute.[43] This method uses the following formula:

% Market Share of Compact Development
x
% of Total Development Built between 2010 and 2020
x
% VMT Reduction with Compact Development
x
Ratio GHG/VMT Reduction with Compact Development
x
Baseline Projection of Urban On-Road GHGs in 2020
=
GHG Reduction with Compact Development by 2020

Each of these factors is briefly described below.

- **% Market Share of Compact Development**: The first factor represents the portion of development built between 2010 and 2020 that will be compact (or transit-oriented). *Growing Cooler* notes that this market share is currently small but growing rapidly. Market share is likely to increase dramatically during the forecast period for two reasons; the current undersupply of compact development relative to demand, and changing demographics. Based on analyses of recent construction data in California, the 2010-2020 proportion of GHG emission reductions from compact development in California is estimated to be between 50 percent and 70 percent.[44] In its Draft AB 32 Scoping Plan, which describes how California will achieve its GHG emission limits, the California Air Resources Board (CARB) assumed this proportion would be 30 percent.

- **% of Total Development Built between 2010 and 2020**: The cumulative effect of compact development also depends on how much new development or redevelopment occurs relative to a region's existing development pattern. In the context of California, both CARB and Ewing estimate that one quarter (25 percent) of California's built environment in 2020 will be built between 2010 and 2020.

- **% VMT Reduction with Compact Development**: There is extensive literature on the effects of compact and transit-oriented development on VMT. *Growing Cooler* suggests this fraction is 20 percent to 40 percent. CARB's AB 32 Scoping Plan assumes 30 percent.

- **Ratio GHG/VMT Reduction with Compact Development**: Compact development may not reduce CO2 emissions by exactly the same proportion as VMT because of CO2 penalties associated with cold starts and reduced vehicle operating speeds. *Growing Cooler* estimates the ratio of CO2 to VMT reduction to be around 0.93.

- **Baseline Projection of Urban On-Road GHGs in 2020**: Total forecast Washington on-road GHG emissions in 2020 is 37.7 $MMTCO_2e$. CTOD would affect only urban VMT. Urban VMT currently accounts for 70.8 percent of total VMT in the state; therefore, 2020 urban on-road GHG emissions are estimated to be 70.8

[43] Reid Ewing et al, *Growing Cooler: The Evidence on Urban Development and Climate Change.* Urban Land Institute, 2007. http://sgusa.convio.net/site/DocServer/GrowingCooler9-18-07small.pdf?docID=4061
[44] Ewing, Reid and Arthur C. Nelson, "CO2 Reductions Attributable to Smart Growth in California," 2008.

percent of 37.7 or 26.7 $MMTCO_2e$. Since the state is urbanizing and the share of urban VMT will rise in the future, this is a conservatively low assumption.

Results

Total CTOD GHG reduction can be estimated by multiplying the factors described above. The table below shows these calculations using the high- and low-end estimates for each. The upper end of the range (1.7 $MMTCO_2e$) is very close to the CTOD estimate from the 2007 CAT (1.6 $MMTCO_2e$).

	Lower	Upper
% Market Share of Compact Development	30%	70%
x		
% of Total Development Built between 2010 and 2020	25%	25%
x		
% VMT Reduction with Compact Development	20%	40%
x		
Ratio GHG/VMT Reduction with Compact Development	90%	93%
x		
Baseline Forecast of Urban On-Road GHGs in 2020	26.7	26.7
=		
GHG Reduction with Compact Development by 2020 ($MMTCO_2e$)	0.4	1.7

3. CLIMATE CHANGE AND TRANSPORTATION FUNDING—CRISIS AND OPPORTUNITY

The climate change and transportation funding crisis requires urgent action. The challenge facing the state is implementing appropriate strategies to reach Washington's GHG emission and VMT reduction targets while addressing the impacts of the revenue shortage on state and local transportation infrastructure and operating expenses and on the ability of transit agencies to provide appropriate levels of service.

Existing Statewide Transportation Funding Sources Are Declining

Primary methods of funding transportation programs and projects in Washington include a portion of the sales tax on new and used vehicles, weight fees, and the gas tax. Seventy-nine percent of Washington's transportation funding is generated through Washington's 37.5 cent per gallon gas tax and the federal gas tax. County and city transportation funding also rely heavily on gas tax receipts and sales tax revenue.

The transportation sector's dependence on gas consumption for revenue creates a paradox: as citizens contribute to climate solutions by driving less and using more efficient vehicles, the revenue available for transportation projects, including those projects designed to reduce GHG emissions, declines. External factors, such as unstable fuel prices and improved fuel economy standards, can also result in less fuel usage and further reducing available revenue.

WSDOT estimates that it will receive $252 million less funding over the next three years due to reduced revenue from the gas tax and other sources. Budget experts predict a continued softening of gas tax revenue in the 09-11 biennium. The Washington State Multimodal Transportation Fund, which relies on the sales tax on new and used cars, rental car tax, and motor vehicle license fees, is not expected to maintain existing levels of revenue.

Shortage of Revenues for Transit Service

Transit agencies across the state are experiencing a growing demand for service, however; operations and fuel costs are increasing, while most transit agencies are experiencing unprecedented declines in sales tax revenue. A new funding source is needed.

Reexamining Investments Strategically to Leverage What We Have

The Transportation IWG believes that state, regional, and local transportation investments and operations should be aligned with the achievement of the VMT and GHG reduction provisions of ESSHB2815. This will mean reexamining not just proposed new investments, but also existing investments to ensure that we can achieve GHG and VMT reductions through our transportation policies, as well as meeting traditional objectives of transportation spending.

New Revenue Sources

In addition to making systemic improvements in the allocation of available capital to meet all the existing objectives of Washington's transportation sector, Washington needs a funding approach to transportation that generates revenue sufficient to provide those options - including support for transit - that are essential to meeting Washington's GHG emission reductions and VMT benchmarks. The current local and state transportation sources are not adequate or stable. The gas tax cannot supply revenue to support increased local transit necessary to reduce GHG emissions and VMT. The Transportation IWG believes that structuring additional transportation

funding options around user fees other than the gas tax provides the most promising opportunity to generate future revenue for system improvement, operation, and maintenance; to influence travel behavior through reduced demand for SOV capability; and to support the creation of transportation options, i.e. transit and other forms of non-SOV travel. The 2007 CAT identified a series of revenue tools for the Legislature to consider. A specific recommendation around one (transportation pricing) is being forwarded in 2008 (see Transportation Recommendation 4, below); however, the original list remains relevant and contains revenue tools that warrant further consideration, including user fees, local option taxes, and statewide revenue sources.

3A: Align Investments and Operations with the Achievement of the VMT and GHG Reductions of ESSHB 2815

TRANSPORTATION FUNDING RECOMMENDATION TO ALIGN INVESTMENTS WITH VMT AND GHG REDUCTION GOALS

The Transportation IWG believes that state, regional, and local transportation investments and operations should be aligned with the achievement of the VMT and GHG reduction provisions of ESSHB2815. This will mean reexamining not just proposed new investments, but also existing investments to ensure that we can achieve GHG and VMT reductions through our transportation policies, as well as meeting traditional objectives of transportation spending.

3B: Pursue New Revenue Sources to Support Transportation Choices

TRANSPORTATION FUNDING RECOMMENDATION TO PURSUE NEW REVENUE SOURCES

Washington State should continue to pursue new revenue sources to support transportation choices, particularly transit operations.

Discussion Points

- One Transportation IWG member believes that Washington needs to step back and take some time to assess the impacts and possible unintended consequences of the benchmarks in ESSHB 2815 for reducing VMT per capita. This member expressed concern that the VMT benchmark numbers adopted in ESSHB 2815 were not fully vetted during the 2008 legislative session, and may not be realistic. The member noted the following statement from the September 2008 edition of the Puget Sound Regional Council's 'Regional View' newsletter: "While total VMT increased in 2007, VMT per capita decreased over 2006 levels from 23.1 to 22.9 vehicle miles per capita per day… VMT per capita generally leveled off or increased minimally during the 1990s and has been declining slightly since 1999 when it peaked at 24.2 VMT per capita."
- One Transportation IWG member expressed concern that all of the potential user fees identified by the 2007 CAT are motor vehicle user fees, and stated that the approach to user fees needs to be balanced. Since the general population benefits from transportation investments, everyone—not just those who drive motor vehicles— needs to help fund the system.

4. USE TRANSPORTATION PRICING TO MEET THE GOALS

The Transportation IWG explored how transportation pricing can help meet the state's targets to reduce GHG emissions and VMT. Transportation pricing strategies are recommended to reduce per capita VMT and GHG emissions, raise needed revenue and manage the system for better efficiency and reliability. Usage-based pricing strategies such as tolls, parking charges, and per capita VMT or gasoline taxes, are all examples of strategies that cause travelers to adjust their travel habits and reduce per capita VMT and GHG emissions accordingly. Pricing strategies can contribute to further per capita VMT and GHG emission reductions when used to fund alternatives such as transit, ridesharing, bicycling, and walking, or provide an incentive to invest in a more efficient vehicle.

The 2007 CAT identified a series of revenue tools for the legislature to consider, of which the Transportation IWG is providing specific recommendations for only one: transportation pricing. Washington began using highway pricing with the introduction of tolls on the Tacoma Narrows Bridge to finance its expansion. Since then, the state has embarked on a pilot project to convert HOV lanes on State Route 167 into High Occupancy Toll (HOT) lanes, and tolling is anticipated as part of the financing plan for the SR 520 bridge replacement, the Columbia River Bridge crossing, and the I-405 express lanes, among other potential applications.

Pricing and Funding Policies

A legislative policy framework for tolling was established by ESSHB 1773.[45] This framework provides the legislature with authority to impose tolls and maintains the Washington Transportation Commission's role to set toll rates for tolled facilities. By law, Washington's objectives for tolling include both generation of revenues for transportation, as well as a mechanism to help manage traffic volumes and congestion.

The Transportation IWG recognizes that there are funding policy issues that need to be addressed by the Washington State Legislature, Washington Transportation Commission and WSDOT. Funding from all sources (federal, state, regional and local levels) will be required to implement the strategies to achieve the per capita VMT and GHG emission reductions. There needs to be clarity regarding the state's role in addressing the transportation funding shortfall facing the federal, state, regional and local levels, the use of tolling revenues to fund regional and local investments, and whether the state should help fund transit.

Effect of Pricing on VMT

The Transportation IWG believes it will be difficult for Washington to meet its GHG and per capita VMT reductions without usage-based transportation pricing. Tolls, parking charges, and VMT or gasoline taxes are all examples of usage-based pricing. From the traveler's point of view, each of these methods causes the driver to consider whether the trip they are making is worth the cost and to adjust their driving habits accordingly—some will choose to use transit, vanpools, or carpools, others will shift their trip to another time of day. Some will determine that the trip was not needed or a shorter trip will suffice. Road pricing can be structured to lower per capita VMT while managing traffic flows more efficiently and providing more trip time reliability.

Road pricing could further reduce VMT by funding alternatives such as transit, ridesharing, bicycling, and walking or providing an incentive to invest in a more efficient vehicle.

[45] A legislative policy framework for tolling was established by ESSHB 1773. This framework provides the legislature with authority to impose tolls and maintains the Transportation Commission's role to set toll rates for tolled facilities. By law, Washington State's objectives for tolling include both generation of revenues for transportation, as well as a mechanism to help manage traffic volumes and congestion.

Puget Sound Regional Council has estimated that full system road pricing (including arterial streets) could reduce per capita VMT by approximately 10 percent by 2020, and full freeway tolling could reduce GHG emissions by 6 percent compared to a no action option. The per capita VMT reduction could be greater (or less) with different toll rate assumptions and with additional investments in the transportation system.

Many factors influence the contribution of pricing to per capita VMT and GHG emissions reduction:

- **How toll rates are set**: Higher tolls provide a greater incentive to conserve travel. Toll charges that vary based on distance, congestion levels, or auto-occupancy, for example, could provide incentives to make shorter trips, to avoid congested periods, or to rideshare.
- **How revenues are spent**: Toll revenues that fund transit operations or other alternative modes will likely have a greater impact on GHG emissions reduction than if they are used for new freeway capacity expansion. In addition, revenues should be used to fund increased mobility for freight throughout the state, as more efficient cargo movement leads to reduced GHG emissions. Pricing and how revenues are spent should be considered together to determine the GHG emissions reduction potential of pricing.
- **How comprehensively tolling is implemented:** If tolls are applied on a corridor basis they are more likely to be tied to road expansion projects and will have a more constrained effect on demand management. A more comprehensive approach may cause drivers to make a more substantial change in travel decisions.
- **Effect on transportation performance**: Paradoxically, reducing demand typically results in improved speeds and increased throughput per lane per hour on congested roadways. Improved freeway performance may incent some people to make trips they would have avoided under more congested conditions.

Transportation Pricing Recommendations

The Transportation IWG recommends using transportation pricing as a strategy for raising needed revenue as well as a method to manage the system for better efficiency and reliability. Tolls would provide new revenues to supplement gas tax revenue.

The following recommended actions could increase the effect of pricing to achieve the per capita VMT and GHG emission reductions:

TRANSPORTATION PRICING RECOMMENDATION TO MAKE VMT AND GHG REDUCTIONS A TOLLING OBJECTIVE

Per capita VMT and GHG emissions reduction should be considered as a third objective to WSDOT's existing tolling objectives of revenue generation and efficient traffic management[46] in project design, development of pricing strategies and actions, and in the regulation of toll rates.

TRANSPORTATION PRICING RECOMMENDATION FOR TOLL REVENUE USE

Toll revenues should be used to fund more sustainable travel options (e.g. transit, ridesharing). The State Legislature should provide direction to include transit operations and other sustainable transportation

[46] A legislative policy framework for tolling was established by ESSHB 1773. This framework provides the legislature with authority to impose tolls and maintains the Transportation Commission's role to set toll rates for tolled facilities. By law, Washington State's objectives for tolling include both generation of revenues for transportation, as well as a mechanism to help manage traffic volumes and congestion.

investments, such as increased freight mobility throughout urban corridors, as part of individual tolling authorizations.[47]

TRANSPORTATION PRICING RECOMMENDATION FOR TOLL POLICY DESIGN

Toll strategies should be designed to incorporate incentives to individual actions that reduce per capita VMT and GHG emissions. The Washington Transportation Commission should establish toll rate policies that encourage drivers to make fewer and shorter trips, use less polluting vehicles, and consider alternative modes other than SOV driving (e.g. subsidize or exclude transit and carpools, provide incentives for new or retrofitted trucks with reduced emissions, and/or charge higher prices for more polluting vehicles).

TRANSPORTATION PRICING RECOMMENDATIONS FOR BROADER TOLLING APPLICATION

Tolling should be applied more broadly to promote greater achievement of revenue, efficiency, and GHG emission reductions (in addition, broad application also helps avoid geographic inequity due to tolling some roads and not others, and could set a context allowing more flexible use of revenues and greater consistency in the application of tolls from the customer's point of view). Two specific opportunities include:

- In 2009, the State Legislature should grant authority for tolling of the Cross-Lake corridor including SR 520 and I-90.
- In 2010, the State Legislature should establish a legislative task force to review tolling authority, and explore how to move towards a system-wide application of tolling, rather than on a project-by-project approach.

TRANSPORTATION PRICING RECOMMENDATIONS FOR OTHER MECHANISMS

- The State Legislature should establish a task force on state and local transportation funding to propose tolls and other pricing mechanisms that could fund transportation and transit needs and create price incentives to reduce per capita VMT and GHG emissions, with a goal of passing expanded transportation pricing and funding legislation. Tolls are not the only form of pricing that could address GHG and VMT reduction benchmarks. A low VMT future would encourage local travel, requiring greater investment in local infrastructure. Other pricing mechanisms should also be considered that may be more directly linked to GHG or VMT reduction and that could be applied at both the local and regional scale. The pricing mechanism should:
    - **Give priority to transit and freight operations**. Design of tolled facilities should incorporate priority measures where appropriate to facilitate fast and reliable transit and freight operations. Tolling policies should recognize that international trade depends on freight mobility to move goods to and from the state's ports. The states' competitiveness in the international marketplace is linked to speed and efficiency in moving cargo. Actions should be considered that increase movement of people and goods.
    - **Be fair, consistent and transparent.** Tolls should be managed fairly, consistently, and transparently so that users can see the value of the pricing mechanism. Pricing mechanisms should provide users with reasonable alternatives (e.g. improved transit service and reliability) and specific identifiable stakeholders (e.g., freight interests) should receive direct benefits from their user fees.

[47] Discussion point: Although most Transportation IWG members supported this recommendation, some members expressed concern about taking funding away from maintaining, repairing, and upgrading Washington's roads, highways, and bridges. Their preference is to have the legislature identify a dedicated funding source for transit, as they also believe that transit is a very important component in helping to solve the transportation congestion problem.

Discussion Points

- Although most members supported the recommendation for toll revenue use, above, some Transportation IWG members expressed concern about taking funding away from maintaining, repairing, and upgrading Washington's roads, highways, and bridges. Their preference is for the Legislature to identify a dedicated funding source for transit, as they also believe that transit is a very important component in helping to solve the transportation congestion problem.

- One Transportation IWG member does not support implementation of a broad-based set of pricing strategies to reduce VMT until policymakers have established a quantifiable service level threshold for acceptable transportation options.

- One member expressed concern that while tolling can certainly play a role in future transportation funding in Washington, it would be inappropriate to look to tolling to address all of the transportation funding challenges. This member felt that the greatest consistency in the application of tolls from the customer's point of view is to toll new facilities, use the revenues to pay for the construction, improvement and maintenance of the new facility from which the tolls are collected, and ensure that the tolls have a sound economic basis (i.e., reflect the actual costs of the facility).

- One member expressed concern that there is not enough validated cost effectiveness information to support the use of system-wide tolling as a traffic management strategy for reducing VMT and GHG emissions.

- One member indicated that using toll revenue to support highway expansion would set back ESSHB 2815 goal attainment. This member believed that at a minimum, new transportation investments that add capacity to the road system must be evaluated rigorously with respect to their human and environmental health costs and benefits that result from both construction and use. This member also felt that the Tolling Commission's research and analysis from the SR520 Tolling Outreach process clearly indicates that tolling policy aligned with the ESSHB 2815 targets will create sufficient revenue to fund operations and maintenance as well as transit enhancement and expansion.

- One member felt that the priority or parity of tolling policy drivers is much less important than whether or not pricing/tolling outcomes support the ESSHB 2815 emission limits. The Transportation IWG member emphasized that VMT and GHG emission impacts of all tolling projects should be assessed and reported to the public during design.

- One member felt that the discussion sidestepped the reality that the current transportation system is underfunded and that tolling is expected to provide the primary revenue source for building (and rebuilding) significant new infrastructure, such as the replacement bridges for SR 520 and the Columbia River Crossing in Vancouver, and the needed $2 billion repaving of I-5 through Seattle. This member felt that price elasticity limits how much can be charged before people find alternatives.

5. NON-VMT RECOMMENDATIONS TO REDUCE GHG EMISSIONS

Given the need for a scalable multi-pronged approach to address the climate impacts of the transportation sector, five specific non-VMT transportation strategies are described and recommended that build on the work of the 2007 CAT:

5A: Improvements to Freight Railroads and Intercity Passenger Railroads
5B: Diesel Engine Emission Reductions and Fuel Efficiency Improvements
5C: Transportation Systems Management
5D: Vehicle Electrification
5E: Low Carbon Fuel Standard

In addition, the Transportation IWG was unable arrive at a recommendation on Zero-Emission Vehicles, but has documented its deliberations to assist decision makers.

5A: Improvements to Freight Railroads and Intercity Passenger Railroads

Rail transport is one of the most energy efficient[48] ways to move people and goods along major corridors—in general, rail emissions are 2 to 4 times less than for the same trip or service by car or truck. The following provides a general overview of GHG emission reductions that can be achieved by moving freight from truck to rail and passengers from car or airplane to rail.

Background

Figure 1 estimates the energy efficiency of different freight transportation modes for a typical load factor. According to a 2006 Hydro-Quebec[49] report, the average truck trip generates between 42-111 grams of CO_2 per kilometer of metric ton of freight moved, a cargo plane between 476-1,020 grams, whereas the same ton moved by train releases 20-28 grams of CO_2.

[48] Efficiency is due to rail's ability to haul more cargo or people at a very low incremental energy requirement. For example, a commuter train with 1000 passengers and 8 cars takes a very small increase in fuel consumption over the same train with 25 passengers. Energy efficiency is not simply a mode question; load factor is as important if not more so.
[49] Luc Gagnon, Greenhouse Gas Emissions from Transportation Options, Hydro-Quebec, Direction-Environment, September 2006.

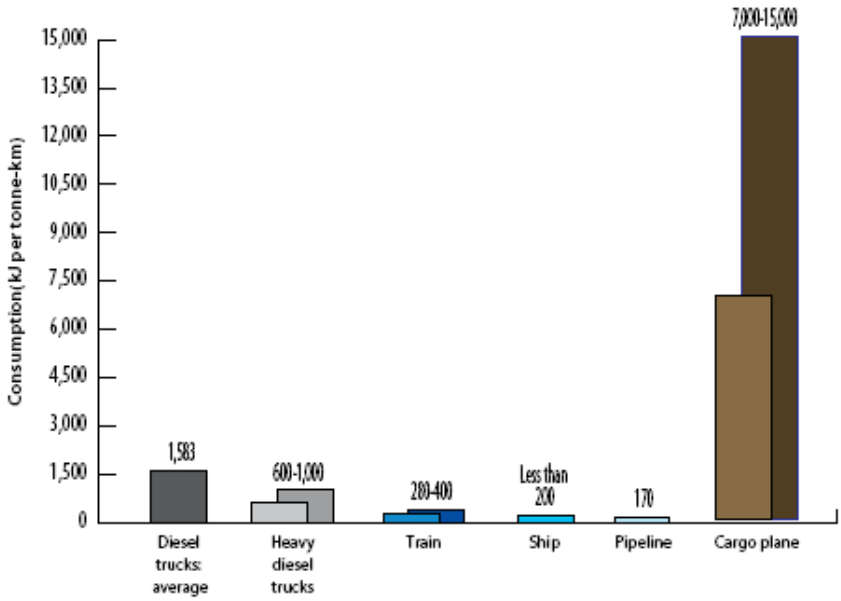

Figure 1: Efficiency of freight transportation modes for a typical load factor

Source: Luc Gagnon, Greenhouse Gas Emissions from Transportation Options, Hydro-Quebec, Direction-Environment, September 2006.

Passenger rail also has GHG advantages over other modes of transportation that are equal to that of well-used bus. Figure 2 illustrates the different CO_2 emission levels generated by various modes of transportation:

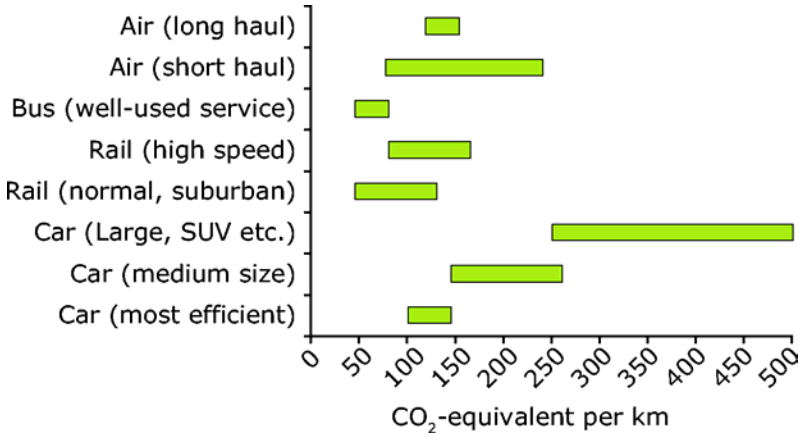

Figure 2: Range of emissions per passenger kilometer for different mode choices[50]

Source: EEA Report No1/2008: Climate for a transport change.

Increasing the use of rail for both the movement of passengers and freight can help Washington make progress towards its GHG emissions reductions. On a national level, freight demand is projected to almost double in the next 35 years. Without improvements in freight rail capacity, this increase in demand would need to be accommodated by trucks using the freeway system. Increasing the capacity of the freight rail system—which could include maintaining and improving the physical condition of certain short-line[51] railroads—so that it can absorb at

[50] EEA Report No1/2008: Climate for a transport change. Assumes one person per car, realistic load factors for air, bus, and rail based on European data.

[51] A short-line railroad is a railroad with an annual operating revenue of $28 M or less, providing service for a relatively short distance, or operating in a rail yard switching rail cars.

least part of the projected increase in freight will help reduce air emissions from movement of freight and goods. In the case of moving freight from trucks to trains, a net decrease in GHG emission reductions is tied to a permanent change in mode split: Freight volumes are forecast to grow, and if trucks shift one commodity to rail simply to haul another commodity on the road, there will not be a net decrease in GHG emissions.

As demand for passenger rail travel increases, reliable, fast service can be developed to meet demand and be competitive, competitive with the car or airplane. Washington is served by both intermediate and long-distance AMTRAK (Cascades, Coast Starlight and the Empire Builder) and Sounder commuter trains. With recent increases in gas prices, both systems have seen dramatic increases in ridership, and both systems are planning service expansions. Increasing commuter rail service can reduce shorter range drive-alone trips, while improving AMTRAK service can reduce reliance on air travel for intermediate length trips in the I-5 corridor between Eugene, Oregon and Vancouver, British Columbia.

However, developing the rail system of the future provides a number of challenges that must be addressed:

- **GHG reduction criteria:** Currently, Washington does not have the tools to consider GHG emissions when prioritizing transportation infrastructure investments at the state level. WSDOT is working on an approach to prioritize freight projects that includes mobility, environmental, economic, and other considerations. Some of the state's RTPOs, especially the Puget Sound Regional Council, have developed models that provide cost-benefit and environmental impact information on proposed projects and system adjustments. WSDOT will need to continue to work with Puget Sound Regional Council and other RTPOs to improve existing modeling tools and their application to consider a project's impact on GHG emissions appropriately in prioritizing investments.
- **Freight rail capacity assurances:** Almost all of the rail system infrastructure today is owned and operated by the private sector to serve the private sector's customer needs. Washington will need to continue working with the railroads to ensure reliable, competitive freight service while investing public resources to increase the capacity of the system for passenger rail.
- **Proprietary information:** Private ownership of rail infrastructure makes it more difficult to determine and establish a clear and effective role for the public sector when funding, operations, or related decisions about that infrastructure are made. Much of the information related to both is considered proprietary, so even determining project costs can be a difficult undertaking.
- **Revenue sources**: Rail is a capital-intensive mode of transportation. Developing reliable public sector funding sources that can provide the level of revenue required to implement the system improvements which provide a GHG emissions reduction benefits for both passenger and freight traffic is challenging. A long–term, consistent, public funding commitment is needed to make the necessary improvements and facilitate the potential GHG emissions reduction and economic competitiveness advantages of expanded rail use.

RAIL RECOMMENDATIONS TO ELIMINATE EXISTING BOTTLENECKS AND INCREASE RAIL SYSTEM CAPACITY TO ACCOMMODATE GROWTH IN BOTH FREIGHT AND PASSENGER MOVEMENT.

On a national level, freight demand is projected to almost double in the next 35 years. Without improvements in freight rail capacity, this increase in demand would need to be accommodated by trucks using the freeway system. Increasing the capacity of the freight rail system—which could include maintaining and improving the physical condition of certain shortline[52] railroads—so that it can absorb at least part of the projected increase in freight will help reduce air emissions from movement of freight and goods.

[52] A shortline railroad is a railroad with an annual operating revenue of $28 M or less, providing service for a relatively short distance, or operating in a railyard switching rail cars

There are two ways to improve the capacity of the freight rail system: by making operational changes, and by increasing the physical capacity of the system. Sometimes physical improvements are needed to maximize the benefits of operational changes and vice versa. (For example, increasing train lengths can provide benefits only if sidings along the mainline can accommodate the longer trains. On the other hand, increasing the length and number of sidings, for example along the Columbia River, allows for using the tracks along both sides of the river as a one-way couplet, increasing the operational capacity of the system even further). While both types of change are entirely in the purview of the commercial railroads, Washington State can help facilitate their implementation. Since freight railroads move freight with significantly less air emissions than trucks, it is important to ensure that they have the ability to increase service as freight volumes grow.

Passenger rail requires a capital investment in more train sets as well as right of way improvements. Increasing the capacity of the passenger rail system in such a way that it does not have a negative impact on freight rail can help reduce emissions by removing car and aircraft trips. Having completed the corridor improvements called for in the original Sound Move package[53] (1996), Sound Transit is currently negotiating a new agreement with Burlington Northern Santa Fe (BNSF) Railway for additional Sounder service between Seattle and Tacoma. The new agreement should commit to implementing projects that ensure mainline freight capacity in a timely fashion before additional Sounder trains are running.

In certain locations, separating the movement of passenger and freight trains maximizes the efficiency of both types of rail service. An example of such a project is the Point Defiance Bypass. Washington should begin to identify other locations where this separation might become necessary in the future.

Potential Projects

WSDOT is currently engaged in a process to develop a comprehensive approach to prioritizing and determining potential state action to implement freight and passenger rail projects. With the Washington State Long-Range Plan for AMTRAK Cascades, WSDOT has outlined long-term improvements needed to serve passenger rail demand in the long run. WSDOT's management of the AMTRAK Cascades service is currently identifying passenger rail service improvements and capacity with the Cascades Mid-Range Plan, which is due to the Legislature on Dec. 1st, 2008. The proposed approach includes an evaluation of the environmental, cost-benefit, safety, and other impacts on both rail users and the community at large. In coordination with the Cascades Mid-Range Plan, that process could be used to begin a dialogue with the railroads to implement the projects and operational changes that would increase the capacity of Washington's freight and passenger rail systems for east/west and north/south service in the short-, intermediate-, and long-term. For both freight rail using the Columbia River Gorge, and AMTRAK service, continued coordination with Oregon and British Columbia will be important in eliminating existing bottlenecks and increasing capacity.

The following list provides an overview of some of the projects and actions eliminating existing bottlenecks and increasing the capacity of the freight and passenger rail network in Washington State identified by previous planning and analytical efforts:

- Make improvements that support freight rail, AMTRAK, and Sounder service, including, but not limited to:
  - Triple-track the mainline between Seattle and Tacoma (This may be achieved with a new agreement between BNSF and Sound Transit as part of future Sounder service expansion)
  - West Vancouver Freight Access and other improvements in the Portland area, including a new bridge across the Columbia River
  - Point Defiance Bypass
  - Blakeslee Junction

[53] http://www.soundtransit.org/x2203.xml

  - Martin's Bluff Third Mainline
  - Green River Industrial Leads
  - Port of Seattle access and ARGO Yard operations—Duwamish Corridor and second lead improvements
  - Mainline access to the Port of Tacoma—North Wye Junction and Puyallup River Crossing
  - Improved east/west service

- Support the creation of joint operating and trackage agreements between the BNSF Railway and the Union Pacific (UP) Railroad to allow equal access to mainline infrastructure, such as the current and future Stampede Pass tunnel, and the Columbia River Gorge mainlines. Joint and directional operation on the Stevens Pass and Stampede Pass lines, and on the Columbia River Gorge lines, would facilitate an increase in the operational capacity of the state's freight rail system.

  The costs of implementing this recommendation are currently unknown.

- Improve the Stampede Pass line to allow for double-stack service:
  - Crown the existing tunnels or build a new tunnel.
  - Provide complementary track upgrades.
  - Mitigate the impacts on local communities (e.g. M Street in Auburn).
  - Re-establish service on the Ellensburg to Lind line.
  - Operate Stampede and Stevens Pass as directional running corridors (i.e. as a one-way couplet).

  The overall cost of making these improvements is unknown.

- Work with the Class 1 railroads to make the improvements needed to operate the BNSF and UP lines along the Columbia River as directional running corridors.
- Maintain a substantive program for improving and maintaining short line railroads that have sufficient projected freight to make a difference in air quality.
- Work to facilitate links to other rail forms of non-SOV travel.

RAIL RECOMMENDATIONS TO PRESERVE THE POTENTIAL FOR FUTURE EAST-WEST FREIGHT RAIL CAPACITY IMPROVEMENTS BY EXTENDING THE SUNSET DATE FOR THE ELLENSBURG-LIND SECTION OF THE OLD MILWAUKEE ROAD

In Washington, east-west rail capacity is limited by the Cascades. One of the three options to cross the mountains, Stampede Pass, currently carries only limited amounts of freight. Washington should retain the ability to convert this route to higher density use in the future, while avoiding negative air quality and community impacts from at-grade crossings along the route.

Farther east in this corridor, reactivating the Old Milwaukee Road line between Ellensburg and Lind can eliminate the need for grade crossings in the Yakima Valley. However, that opportunity will be lost unless the sunset date is extended during the 2009 Legislative Session. While reactivating that line is currently not financially viable, it is essential—coordinated with capacity increases at Stampede Pass—to increase competitive east-west freight rail service in the future. Preserving the Old Milwaukee Road line between Ellensburg and Lind is dependent on legislative action and does not have a capital cost. Ultimately, Stevens and Stampede Passes could be operated as a one-way couplet, further increasing the capacity of the system.

RAIL RECOMMENDATIONS TO COMPLETE THE FREIGHT ACTION STRATEGY CORRIDOR AND OTHER GRADE SEPARATION PROJECTS THAT SIGNIFICANTLY REDUCE IDLING OF CARS AND TRUCKS

At-grade rail crossings can slow trains and also cause cars and trucks to idle as they wait for trains to clear the crossing. The Freight Action Strategy (FAST) Corridor program was established with the express purpose of eliminating such at-grade crossings between Tacoma, Seattle and Everett, to both reduce the impact of rail freight on local communities and to speed the movement of freight rail. The Freight Mobility Strategic Investment Board's project list contains a number of other rail crossings in other parts of the state. Eliminating at grade crossings, particularly in densely populated areas where trains cause significant back-ups on the roads they cross, has the potential to significantly reduce emissions from idling cars and trucks. The current cost estimate to complete the remaining FAST Corridor projects is $890 million, of which $631 million is currently unfunded.[54]

RAIL RECOMMENDATIONS TO FURTHER IMPROVE THE FUEL EFFICIENCY AND REDUCE THE AIR EMISSIONS OF THE EQUIPMENT USED BY FREIGHT RAILROADS

Due to both environmental considerations and high fuel prices, the Class 1 railroads operating in Washington have already begun to invest heavily in technologies to reduce their fuel consumption and related air emissions. Class 1 railroads generally have access to the capital needed to make these types of investments, which pay off in relatively short periods of time. Working with the railroads, clean air agencies, and the federal government to provide funding for pilot projects to test new and emerging technologies might be the best way to help facilitate the efforts of Class 1 railroads. Smaller short-haul and switching locomotive operators may find it difficult to access the necessary funds to improve the efficiency of their older locomotives and/or install anti-idling and other fuel saving equipment. A state grant or loan program targeted toward these smaller operators could be useful. The costs of making these efficiency improvements vary depending on the engine and other factors.

Following are examples of new and emerging technologies that are already being implemented. Such clean rail technology should continue to be pursued and implemented:

- **Clean, efficient locomotive power:** BNSF has already installed anti-idling equipment on about 4,200 of its 6,500 locomotives. The installations have occurred on additional locomotives in BNSF's existing fleet and on all new locomotives. Approximately 40 percent (more than 3,500) of UP's locomotive fleet is now equipped with anti-idling technology. Tacoma Rail, a switching and short-haul operator, installed anti-idling devices on six of its 18 locomotive fleet. In addition, the use of Green Goats and Multiple Gen Set locomotives for switching operations by BNSF and UP can reduce emissions by 80-90 percent compared to conventional train engines.

- **Friction reduction:** The railroads are also using emerging technologies such as lubricating the wheel flange of locomotives (1-5 percent decrease in fuel use), lubricating the top of the rail on the track itself, as well as installing low torque bearings in rail car wheels (up to 8 percent reduction in fuel use per train set) to reduce friction. Expanding use of these and similar technologies can further increase fuel efficiency.

- **Use of electric equipment:** Another option for reducing emissions and increasing the capacity of the freight rail system is to use electric powered equipment where possible. Again, Class 1 railroads already implement these improvements where they are economically viable. In Spring of 2008, the BNSF reopened its North Seattle International Gateway intermodal yard after installing four electric powered, rail-mounted gantry cranes. The cranes move containers between trucks and rail cars, producing zero emissions, and reducing the need for diesel-powered trucks to move containers within the facility. There may be additional opportunities for use of electric equipment rather than diesel powered equipment at intermodal yards.

[54] A recent analysis of the benefits from completing FAST Corridor projects indicated a slightly negative environmental impact. However, that analysis did not include any benefits due to rail.

RAIL RECOMMENDATIONS TO DEVELOP A METHODOLOGY FOR DETERMINING WHEN RAIL ELECTRIFICATION MIGHT BECOME VIABLE IN WASHINGTON, INCLUDING HOW TO LEVERAGE FUTURE FEDERAL GRANTS AND INVESTMENTS OF RAIL ELECTRIFICATION.

Electric trains do not produce local emissions, and in areas where a significant portion of electricity comes from non-fossil sources, such as Washington, electric trains may produce fewer GHG emissions than diesel trains and are therefore an attractive option from a GHG emissions point of view.

However, a significant disadvantage for electric rail is the high cost of providing the necessary infrastructure. In North America, the flexibility of diesel-electric locomotives, and the relative low infrastructure cost led to their dominance over pure electric engines due to relatively low traffic densities (except for commuter service in dense urban corridors in the Northeast).

It is unlikely that the economics driving the use of diesel-electric engines today will change in the foreseeable future, especially for freight rail. However, Washington may reach passenger rail traffic densities that warrant a separation of passenger and freight rail service in the I-5 corridor. At that point, electric trains may be a viable alternative for providing passenger service.

5B: Diesel Engine Emission Reductions and Fuel Efficiency Improvements

Impacts on Goals

In addition to the stated benefits in the 2007 CAT *Diesel Engine Emission Reductions and Fuel Efficiency Improvements* strategy, diesel engine emission reductions may have additional climate protection benefits from the reduction in diesel soot. The Transportation IWG reviewed recent research and found the following:

- National experts identified black carbon emissions second only to carbon dioxide (CO_2) in causing global warming, and may have as much as 60 percent of the global warming effect of CO2.[55] Black carbon adds 2-3 orders of magnitude more energy to the climate system than an equivalent mass of CO_2.[56, 57]

- New research also suggests that black carbon emissions may explain a significant fraction of the observed arctic warming, which is approximately twice as rapid as the rest of the Earth.[58] Similarly, a recent analysis by the U.S. Climate Change Science Program finds that "by the year 2100, short-lived gases (e.g. soot) and particles may account for as much as 40 percent of the warming over the summertime continental US."[59]

- Unlike carbon dioxide, which remains in the atmosphere for several decades, black carbon remains in the atmosphere for ten days to two weeks. As a result, decreasing emissions of black soot by implementing programs such as those identified in the CAT 2007 Diesel Engine Emissions Reduction strategy may have immediate climate protection benefits. Installing diesel particulate filters and other soot reducing after-

[55] Ramanathan V. Scripps Institution of Oceanography University of California at San Diego. *Role of Black Carbon on Global and Regional Climate Change.* Testimony to the House Committee on Oversight and Government Reform. October 18, 2007.
[56] Jacobson, MZ. *Testimony for the Hearing on Black Carbon and Arctic, House Committee on Oversight and Government Reform*. United States House of Representatives. October 18, 2007.
[57] Bond TC. Testimony for the Hearing on Black Carbon and Climate Change. House Committee on Oversight and Government Reform. US House of Representatives, October 18, 2007.
[58] Zender CS. *Arctic Climate Effects of Black Carbon.* Written Testimony to the Oversight and Government Reform Committee. United States House of Representatives. October 18, 2007.
[59] Climate Change Science Program, 2008: *Climate Projections Based on Emissions Scenarios for Long-Lived and Short-Lived Radiatively Active Gases and Aerosols*, Executive Summary. H. Levy II, D.T. Shindell, A. Gilliland, M.D. Schwarzkopf, L.W. Horowitz, (eds.). Department of Commerce, NOAA's National Climatic Data Center, Washington, D.C., USA

treatment devices on diesel engines, retrofitting diesel engines in the marine industry, and transitioning to alternative fuels are a few examples of existing technologies that could be employed to reduce diesel particulate and black carbon.

Additional Benefits

In addition to the climate protection benefits associated with reducing black carbon, diesel particulate is associated with increased cancer risks and a variety of non-cancer health effects including respiratory diseases and increased mortality rates.[60,61] As a result, enhancing and strengthening the existing diesel emission reduction efforts throughout the state will have additional public health benefits. EPA analysis of new engine standards for on-road, off-road, inland marine and locomotive engines have shown a benefit to cost ration as high as 60 to 1 for cleaner diesel engines. Diesel retrofit programs provide a lesser benefit to cost ratio, but EPA has estimated that retrofit programs should provide a 10 to 1 benefit to cost ratio (that is, that $10 in public health benefits should be realized for every $1 invested in diesel retrofit cost). The specific benefits will vary for each engine type and project, but these are the best estimates that US EPA has put forward.[62]

Costs

Because exact estimates were not readily available, the following are general estimates of the costs of these strategies for the Puget Sound region from the Puget Sound Clean Air Agency (PSCAA). The PSCAA estimates there are approximately 22,500 on-road vehicles that are suitable for retrofit or replacement.[63] Similarly, the PSCAA estimates that there are approximately 7,200 non-road vehicles eligible for retrofit or replacement.[64,65] The PSCAA estimates that diesel retrofits cost anywhere between $1,000 to $15,000 to purchase and install. The PSCAA also believes that a focus on grants and incentives for vehicle replacement with new, lower emission and higher fuel economy vehicles will be a key strategy and that incentives similar to those already established for light duty vehicles have merit.

Grant funds available through the EPA, the West Coast Collaborative and the Washington State Legislature have allowed regional and state agencies to begin diesel reduction programs. However, additional funds would leverage reduction efforts that would not normally have occurred with the current levels of incentives. These estimates are examples of the Puget Sound region. State agencies should develop comprehensive cost analyses for state-wide programs.

Relationship to Other Efforts

The Transportation IWG fully recognized that a number of diesel retrofit programs are currently underway among local and state jurisdictions across Washington. These programs would provide additional climate protection benefits, based on emerging information around the climate impacts of black carbon. The Transportation IWG fully supports these existing programs and, as shown below, include additional recommendations that strengthen and enhance these initiatives.

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[60] Keill L and N Maykut. *Puget Sound Air Toxics Evaluation*. Puget Sound Clean Air Agency. October 2003.
[61] U.S. EPA. *Air Quality Criteria for Particulate Matter (October 2004)*. U.S. Environmental Protection Agency, Washington, DC, EPA 600/P-99/002aF-bF, 2004.
[62] Extensive information on the public health benefits versus costs of EPA diesel engine programs can be found at: www.epa.gov/otaq.
[63] The Puget Sound Clean Air Agency considers vehicles built prior to 1994 to be eligible for replacement, while vehicles manufactured between 1994 and 2006 may benefit from diesel emission retrofit technologies.
[64] Since non-road emission standards were implemented in 1996, the Agency recommends that diesel engines from model year 1996 and newer are considered suitable for retrofits, while those that are older than 1996 are better suited for replacement.
[65] Personal communication, L Stanton, Puget Sound Clean Air Agency, October 17, 2008.

DIESEL ENGINE EMISSION REDUCTIONS AND FUEL EFFICIENCY IMPROVEMENTS RECOMMENDATIONS TO IMPLEMENT THE ORIGINAL 2007 CAT *DIESEL ENGINE EMISSION REDUCTIONS AND FUEL EFFICIENCY IMPROVEMENTS* STRATEGY, WITH THE FOLLOWING ADDITIONS:

- **Support and promote a wide range of diesel emission reduction programs, including diesel retrofits**. These programs have the potential to provide climate benefits, especially if they are extended to private fleets, as most public fleets have now been retrofitted. These benefits are in addition to the public health benefits afforded by significant reductions in highly toxic diesel particulate.
- **Reduce engine-idling through regulatory and voluntary/education programs**. A number of states have implemented anti-idling requirements and programs, including increased awareness through education and recognition programs. Fleets using telematics, driver education, or auxiliary power units have reported considerable success in reducing idling. Anti-idling programs also provide direct fuel savings and air quality benefits.
- **Accelerate fleet turnover.** Washington should develop regulatory, incentive-based and voluntary approaches to speed introduction of new, cleaner engines, recognizing that this may be highly cost-effective with the unstable price of fuel. The Transportation IWG also recognizes that incentive-based programs may be needed to help small fleets and independent operators achieve regulatory requirements. Adequately-funded recognition programs provide education, and enable fleets to demonstrate leadership and highlight new technologies to Washington's communities, organizations and citizens.
- **Consider reducing emissions from other sources of black soot such as woodstoves and fireplaces**. By 2018, Ecology projects that diesel emissions will be 12 percent and that woodstove and fireplace emissions will be 29 percent of the PM2.5 emissions inventory, respectively.
- **Ensure additional state and local agency resources are available to monitor and quantify the potential climate benefits of diesel emission reduction programs.** While new information continues to emerge, recent analyses suggest that the global warming potential of black carbon has been underestimated.[66] The State of Washington and local air agencies should assess new data as it becomes available.
- **Provide additional funding through a combination of new grant programs and tax incentives, in addition to the existing funds for diesel retrofit.** The Transportation IWG recognizes that grants and loans have differing appeal and strengths. Grant funding makes money readily available for small business owners who may not have access to financial resources (e.g., loans) required to cover upfront investments. Revolving loans may be attractive to certain groups because they can make money available at low interest rates and monthly payments that may be attractive to owner/operators and other groups. For both grants and loans, the objective is to leverage private investment which might otherwise not occur due to market barriers, and not pay the full cost of retrofits for private fleets.

[66] Ramanathan V and G Carmichael, 2007.

5C: Transportation Systems Management

Background

Traffic Systems Management includes a broad array of strategies including: driver communication, incident response systems, and other approaches designed to reduce congestion on our existing network. The strategies fall into the following areas:

- **Active Traffic Management (ATM)**: The real-time variable control of speed, lane movement, hard shoulder use, and traveler information within a corridor. This strategy can be applied through:
    - *Speed Harmonization / Queue Warning / Lane Control*— manage traffic flows and speeds as vehicles approach congested areas and reduce the speed of vehicles as they approach queues. In Europe this strategy has been found to reduce primary and secondary collisions; non-recurrent congestion; congestion, queuing, and improve throughput.
    - *Traveler Information and Dynamic Re-Routing*— provide traveler information opportunities including travel times, ferry boat wait times, and the availability of alternative routes around incidents and congested areas. Dynamic re-routing uses modified destination guide-signs and other traveler information methods to assist drivers through alternative routes.

- **Traffic Management Centers**: These centers provide centralized data collection, analysis, and real-time management of the transportation system. System management decisions are based on in-road detectors, video monitoring, trend analysis, and incident detection.

- **Traffic Signal Synchronization**: The timing and operation of the traffic signal operations are synchronized to provide an efficient flow or prioritization of traffic, increasing the efficient operations of the corridor and reducing unwarranted idling at intersections. The system can also provide priority for transit and emergency vehicles. Traffic signal timing and operations are ongoing activities that need to be reviewed on a regular basis as traffic patterns change.

- **Arterial Traffic Management and ITS**: The arterial corridors are improved to include traffic signal interconnect, video monitoring, traveler information, transit signal priority, and remote access from the Traffic Management Centers for remote monitoring and operation. The system will provide in-route traveler information via variable message signs to the traveling public. The system provides the communication infrastructure and Intelligent Transportation System (ITS) equipment necessary to provide communication to the corridors, which is the basis to provide the benefits of Traffic Management Centers, Traffic Signal Synchronization, and Traveler Information (arterial). The system will require multi-jurisdictional cooperation and include center to center communication between jurisdictions.

- ***Managed Lanes***: Lanes which have special operational characteristics and restrictions are intended to manage the operations of the lane(s). Management of the facility is typically a combination of physical design which limits access and regulation, and may include pricing. Examples are:
    - *HOV Lanes*—Lane(s) exclusively used by transit, vanpools, and carpools (vehicles with a minimum number of occupants, typically a minimum of two or three).
    - *Reversible Express Lanes*—Lane(s) that change directions during peak periods to manage peak demand periods.
    - *Direct Access Ramps*—Highway ramps which provide direct access to a managed lane, e.g., a direct access ramp that links a HOV lane with a park and ride facility.
    - *Ramp Bypass Lane*—A lane that provides priority bypass of ramp meters for vehicles.
    - *Transit Only or Truck Only Lanes*—Lane(s) that are exclusively used by transit or trucks.
    - *Green Lanes*—Lane(s) exclusively for vehicles which meet specified environmental impact levels.

  - *Limited Access Highways*—Highways with limited access points.
  - *HOT or Tolled Express Lane*—Lane(s) that charges tolls as a means of regulating access to or the use of the facility, to maintain travel speed and reliability.
  - *Vessel Reservations*—Passage for vehicles purchased in advance for specific sailings.

- **Pricing**: The use of direct user fees (tolls) to manage demand on the transportation system
  - *Fixed Toll*—Toll is fixed and may vary by vehicle class or other set of variables.
  - *Time of Day Schedule*—Toll varies by time of day, rising during set peak periods and lowering during non-peak periods.
  - *Dynamic or Variable Toll*—Toll changes to maintain a set operation performance based on time traffic conditions. Toll would increase to reduce demand.

- **Increase Incident Response Opportunities**: Increase the detection, assistance, and clearing of incidents on the highway to increase safety and reduce non-reoccurring delay caused by incidents.

- **Improve Traveler Information**: Provide real time and projection of travel conditions and transit information to the public to aid in their decision about how, when and where to travel.

- **Increase the number of multi-modal connection points**: Improve system coordination by jointly locating bus, ferry vessel, light-rail terminals in proximity to park and ride, bicycle, and pedestrian facilities.

GHG emissions reduction estimates for transportation management strategies, other than traffic signal synchronization, are difficult to identify. Each transportation strategy is designed to reduce congestion and improve travel time. Reduced congestion and improved travel times reduce the amount of idling and the length of motor vehicle emissions. The difficulty identifying GHG emission reductions is because of the assumptions that need to be made: what impacts the improvements will have on traffic, what vehicle travel speeds are before the improvements, what vehicle travel speeds are after the improvements, and the number of hours of current congestion vs. future (post improvement congestion).

TRANSPORTATION SYSTEMS MANAGEMENT RECOMMENDATIONS

The Transportation IWG has augmented the work of the 2007 CAT and identified the potential GHG emissions reduction potential of transportation system management strategies. The Transportation IWG has not prioritized implementation and is not making a recommendation beyond that of the 2007 CAT.

Ideally, all transportation system management strategies would be implemented as a package in order to get the most reduction in travel times. WSDOT Traffic Operations is already implementing signal synchronization and timing efforts, managed lanes, incident response, traffic management centers and traveler information strategies. Improvements in these areas may produce significant reduction in travel times and can be implemented relatively inexpensively and quickly. Improved multi-modal connections, active traffic management and pricing strategies may also produce significant reductions in travel times, but are more expensive and will take longer to implement.

Cost Assumptions: Low cost represents cost below $10 million; medium cost represents project costs between 10 million and $50 million, high cost is greater than $50 million.

Implementation Cost	GHG Emission Reduction	VMT Reduction
Strategy: *Speed Harmonization / Queue Warning / Lane Control*		
Medium to high due to significant investment in variable message signs, data stations and cameras	High due to ability to manage congestion by reducing queues, delay and idling vehicles	Improved travel time may increase VMT. Benefit comes from reduced congestion and GHG emissions.

Implementation Cost	GHG Emission Reduction	VMT Reduction
Strategy: *Traveler Information and Dynamic Re-Routing*		
High	Medium to high due to ability to reroute or delay trips during peak congestion or poor weather	Improved travel time may increase VMT. Benefit comes from reduced congestion and GHG emissions
Strategy: *Traffic Management Centers*		
Medium to high depending on whether incremental upgrades to existing TMC or capital construction of new facilities are needed	High due to ability to manage congestion by reducing queues, delay and idling vehicles	Improved travel time may increase VMT. Benefit comes from reduced congestion and GHG emissions
Strategy: *Traffic Signal Synchronization*		
Low to Medium	High: optimally timed traffic signals can reduce delay and unnecessary idling	Improved travel time may increase VMT. Benefit comes from reduced congestion and GHG emissions
Strategy: *Arterial Traffic Management and Intelligent Transportation Systems (ITS)*		
High	High due to ability to manage congestion by remote operation of arterials, reducing delay and idling vehicles, rerouting of traffic around high congestion areas	Improved travel time may increase VMT. Benefit comes from reduced congestion and GHG emissions
Strategy: *High Occupancy Vehicle (HOV) Lanes*		
High assuming that any further HOV lane expansion requires a capital project	Medium due to travel time improvement incentives for carpools, vanpools and transit	Medium due to travel time improvement incentives for carpools, vanpools and transit
Strategy: *Reversible Express Lanes*		
High assuming that any further reversible express lane expansion requires a capital project	Low demand due to significant in both directions of travel providing little travel time improvements	Low
Strategy: *Direct Access Ramps*		
High assuming that any direct access ramp expansion requires a capital project	Medium due to travel time improvement incentives for carpools, vanpools and transit	Medium due to travel time improvement incentives for carpools, vanpools and transit
Strategy: *Ramp Bypass Lane*		
Medium to High cost may vary depending on the width of the ramp. If the ramp is wide, enough HOV bypass lane may be created with roadway markings	Medium due to travel time improvement incentives for carpools, vanpools and transit	Medium due to travel time improvement incentives for carpools, vanpools and transit
Strategy: *Transit Only or Truck Only Lanes*		
High assuming that any transit or truck lane only implementation will require a capital project	Low to Medium due to travel time improvement incentives for transit, and trucks. Truck bypass lane may reduce idling of trucks stuck in traffic congestion	High for transit only lanes due to travel time improvement incentives.
Strategy: *Green Lanes*		
Low to High depending on the implementation strategy. Conversion of existing HOV lanes could be done for low cost. Adding green lanes through capital project would be high cost	Low due to additional vehicles in HOV lanes operating at or near capacity may reduce HOV travel time and reliability. Migration of the green vehicles from general purpose lanes may not improve travel in the GP lanes	Low due to improvements from encouraging green vehicle use may not overcome potential additional delay in HOV or general purpose lanes

Implementation Cost	GHG Emission Reduction	VMT Reduction
Strategy: *Limited Access Highways*		
Medium to High due to the cost to purchase access rights on additional routes may be significant	Low to Medium due to reducing access may improve traffic flow, reduce delay and prevent idling vehicles	Low
Strategy: *High Occupancy Toll (HOT) or Tolled Express Lane*		
Medium assuming conversion of existing HOV lanes or general purpose lanes to toll facility.	Medium due to travel time improvement, reduced delay and fewer idling vehicles.	Low due to potential reduction in vehicle trips or shift from peak periods.
Strategy: *Vessel Reservations*		
Low to medium depending on the system needed to process vehicle reservations	Low: may reduce some vehicle waiting and idling	Low: may prevent some trips if travelers are aware of wait times and boarding status
Strategy: *Fixed Toll*		
Medium assuming conversion of existing HOV lanes or general purpose lanes to toll facility	Medium due to travel time improvement, reduced delay and fewer idling vehicles	High due to reduction in vehicle trips or shift from peak periods
Strategy: *Time of Day Schedule Toll*		
Medium assuming conversion of existing HOV lanes or general purpose lanes to toll facility	Medium due to travel time improvement, reduced delay and fewer idling vehicles	High due to reduction in vehicle trips or shift from peak periods
Strategy: *Dynamic or Variable Toll*		
Medium assuming conversion of existing HOV lanes or general purpose lanes to toll facility	Medium due to travel time improvement, reduced delay and fewer idling vehicles	Medium due to reduction in vehicle trips or shift from peak periods
Strategy: *Increase Incident Response Opportunities*		
Low	Medium to high due to rapid removal of blocking incidents, reduction in delay and number of idling vehicles	Improved travel time may increase VMT. Benefit comes from reduced congestion and GHG emissions
Strategy: *Improve Traveler Information*		
Low cost assuming most traveler information improvements are incremental additions to existing systems that can be implemented for less that $10 million	Medium to high due to ability to reroute or delay trips during peak congestion or poor weather	Low to medium: may reduce trips if travelers are aware of congestion and potential travel delay
Strategy: *Increase the number of multi-modal connection points*		
High cost due to the need for capital projects to implement	Medium due to potential to decrees SOV trips because of better multi-modal connections	Medium due to potential to decrease SOV trips because of better multi-modal connections

Discussion Points:

- A Transportation IWG member indicated that, "signal synchronization in dense urban centers such as downtown Seattle may not benefit from signal synchronization optimized for vehicles. Reducing walk times should receive equal prioritization in such locales. An approach similar to that used by Complete Streets design methodology might be appropriate where 'signals should be prioritized to meet the needs of the users of the corridor and not benefit one group to the significant detriment of another.'"
- A Transportation IWG member "does not agree with the implication that travel time improvements lead to either VMT or GHG reductions."

5D: Vehicle Electrification

Plug-In Hybrid Electric Vehicles (PHEVs) and Electric Vehicles (EVs) could displace petroleum with electricity, with significant potential to reduce GHG emissions and expenditures on oil imports.

In order to maximize GHG emission reductions, PHEVs and EVs must be served with electricity from sources other than fossil fuels, which means that incremental electricity demand from vehicles should be matched by increased clean energy generation. Electrifying transportation and greening the grid can be mutually reinforcing initiatives. With two-way connections to the grid, vehicles could provide energy storage and other "ancillary services" back to the grid, enabling it to accommodate more intermittent renewable energy generation.

Impact on Goals

The 2007 CAT strategy, *Acceleration and Integration of Plug-In Hybrid Electric Vehicle Use* identified a goal that by 2020, PHEVs would account for 10 percent of light-duty VMT statewide. Using the Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model (v1.7), a PHEV would have 37 percent lower GHG emissions on a lifecycle basis. The cumulative GHG emission reductions estimated by this earlier analysis was 5.28 $MMTCO_2e$ for the period 2008-2020.

The above stated GHG emission benefits are based on a very aggressive market scenario. The number of PHEVs required to equal 10 percent of registered light duty vehicles by 2020 is on the order of 590,000 vehicles, or 59,000 vehicles per year over the 10 year period. Of the 280,000 new vehicles currently sold per year, approximately 20 percent would have to be PHEVs. By comparison, the total number of hybrid electric light duty vehicles sold in the US during January 2008 was 22,392 units, or approximately 2.14 percent of the more than 1.04 million new vehicles sold in the US for that month.

Additional Benefits

Coupled with "smart charging" and "vehicle to grid" (V2G) capabilities, PHEVs and EVs could provide both back-up power for homeowners, and spinning reserve and load regulation services to the utility-wide grid. This system could also enhance the integration of intermittent renewable energy generation, like wind and solar, by utilizing PHEV batteries to provide system wide storage capability.

A number of Washington companies (Boeing, Paccar, Microsoft, V2Green) are, or have the capability of becoming, major players in creating products or components that support the development of this industry.

Costs

A cost-effectiveness value of $380/$tCO_2$ was calculated for the CAT 2007 *Acceleration and Integration of Plug-In Hybrid Electric Vehicle Use* strategy. This calculation should be revisited as information on PHEV and EV costs mature.

Relationship to other Efforts

ESSHB 1303[67] directed CTED to explore vehicle electrification for Washington. The City of Seattle, King County, Port of Seattle and PSCAA are conducting a year-long demonstration project testing the performance of PHEVs in urban areas. The Chelan School District is demonstrating an Original Equipment Manufacturers (OEM) diesel and electric hybrid school bus. The Advanced Vehicle Initiatives Consortium, which includes an array of public and private partners located in Chelan County, has proposed conversion of 14 Toyota Prius vehicles into PHEVs.

Industry and observer statements on PHEVs have often indicated that the production cost of these vehicles will be high. The National Renewable Energy Laboratory (NREL), in a 2006 report, found that the marginal cost of PHEV technology would be from $12,000 to $18,000. If these high marginal cost projections are accurate, history suggests that manufacturers will need to heavily subsidize PHEVs, at least in the first few years of production. Consequently, they are unlikely to produce more of these loss-producing vehicles than necessary. This, in turn, suggests that manufacturers are most likely to produce PHEVs and EVs only for those states that have opted-in to the Cal ZEV program where they are required (11 states right now, four more expected). Therefore, state incentives for PHEVs and EVs, which do not directly help manufacturers, may not be enough to draw them into Washington if the state does not require them through ZEV provision.

However, some industry comments indicate that at least some manufacturers plan to vie aggressively for leadership in the plug-in hybrid market. This strategy by manufacturers suggests they will be willing to internally subsidize the cost of these vehicles and would market them in Washington and other non-ZEV states. In this case, incentives could be effective on their own and the ZEV regulatory overlay is not necessary to draw them into Washington.

VEHICLE ELECTRIFICATION RECOMMENDATIONS

Even since the 2007 report, electric vehicle technology has made significant strides, with major vehicle manufacturers now making significant investments in commercializing the technology, and commercial models expected to be available from OEMs in 2010. Against this backdrop, the Transportation IWG believes the most important actions for Washington are:

VEHICLE ELECTRIFICATION RECOMMENDATIONS TO ALIGN WASHINGTON PURCHASING INCENTIVES TO ENSURE THAT ECONOMICALLY ATTRACTIVE PHEV AND BATTERY ELECTRIC VEHICLE OPTIONS ARE DELIVERED TO WASHINGTON CONSUMERS FASTER.

- Direct the Department of Licensing and the Department of Revenue to develop options that would decrease the up-front cost of purchasing PHEVs and other high mileage vehicles relative to the cost of purchasing less efficient vehicles. By helping to offset additional consumer costs for purchasing PHEVs, Washington can reduce climate pollution and reap substantial economic rewards by decreasing expenditures on imported petroleum.

- Extend the existing state sales and use tax exemption for PHEVs and EVs beyond the current sunset date of January 1, 2011, and amend the sales and use tax exemption to include heavy-duty vehicles. Beginning January 1, 2009, new passenger cars, light-duty trucks, and medium-duty passenger vehicles that utilize hybrid electric technology and have a U.S. Environmental Protection Agency estimated highway fuel economy of at least 40 miles per gallon are exempt from state sales and use tax. This tax exemption expires January 1, 2011. (Reference Revised Code of Washington 82.08.809 and 82.08.813). It is necessary to extend this tax exemption beyond the current sunset date to coincide with the production and sale of

[67] http://apps.leg.wa.gov/billinfo/Summary.aspx?bill=1303&year=2007

PHEVs by OEMs. In addition, heavy duty vehicles are not included in the current definition of qualifying vehicles. RCW 82.08.813 should be amended to include heavy duty vehicles, as they represent an important market for PHEV sales.

VEHICLE ELECTRIFICATION RECOMMENDATIONS TO ALLOW NEW OPPORTUNITIES FOR PHEV AND BATTERY ELECTRIC VEHICLE APPLICATIONS

Ensure that current Washington laws allow for new opportunities for PHEV and battery electric vehicle applications. King County Metro Transit's VanShare program, for example, provides vans for commuters to drive between ferry, train or transit terminals and their workplaces. The vans carry 7 to 15 passengers. They are parked at the work sites during the workday, and at the transportation terminals on evenings and weekends. The average daily commute distance is 12 miles; the commute may not exceed 20 miles.

The short VanShare commutes are ideal for a battery electric vehicle (BEV) demonstration project. Such a project could speed the development of BEV technology, which is in transition from lead acid to lithium batteries.

Rideshare Operations, which runs the VanShare program, is seeking opportunities to purchase, lease or partner with other organizations to test a van for VanShare use. However, no six-plus passenger BEV vans suitable for a commuter or shuttle program are being produced today. (Some BEVs are available for commercial and recreational use, and small four-passenger sedans are being used for neighborhood commutes).

Two barriers to production of large BEV vans are developments costs and Washington law that limits the gross vehicle weight (GVW) of a medium-speed electrical vehicle to 3,000 pounds. The following recommendations are intended to remove those barriers:

- Title 46 of the Revised Code of Washington currently excludes higher weight battery electric vehicles. The current weight restriction requirement should be reviewed for relevancy and, if practical, amended to include the increase in the GVW of the "medium speed electrical vehicle" from 3,000 lbs. to 4,500 lbs.
- Study possible financial incentives that might be offered to stimulate the production of six-plus-passenger vans for VanShare or shuttle programs.

VEHICLE ELECTRIFICATION RECOMMENDATIONS FOR DEMONSTRATION PROJECTS

Provide financial incentives to demonstrate vehicle electrification applications. To help initiate and accelerate PHEV and battery electric vehicle purchases, PHEV and EV demonstration projects involving both public and private fleets should be supported. Demonstration projects should include all classes of vehicles and must integrate with electric utilities to ensure "smart-charging" capabilities. Heavy-duty vehicle demonstration efforts are of particular interest as displacing petroleum in large diesel vehicles yields not only GHG benefits, but also significant reductions in hazardous local pollutants, and in "black carbon" (soot) which is believed to significantly enhance greenhouse warming. School buses, drayage trucks, and other heavy duty vehicles may be good candidates.

VEHICLE ELECTRIFICATION RECOMMENDATIONS TO INTEGRATE ELECTRIC VEHCILES INTO THE GRID

Integrate electric vehicles into the utility infrastructure in ways that add value to the electric power system and advance progress toward a "smart grid" that can better utilize distributed generation, storage, and demand-side solutions. PHEVs and EVs are one of many technologies that can open the pathway to a more advanced, interactive, resilient, "smart" electric power grid that improves reliability as well as environmental and economic performance. For example, if the grid could call on the storage capability of vehicle batteries, it could successfully integrate more intermittent renewable energy generation, like wind and solar. Northwest research institutions, private firms, and technology innovators are on the cutting edge of opening up this new frontier—integrating the energy capabilities of vehicles and the electric grid. Current utility incentives often discourage innovation. The

region's utilities, technology innovators, and research institutions should be actively encouraged to develop the metering, rate structures, and physical infrastructure to maximize the potential of this opportunity. For example, the Washington Utilities and Transportation Committee (WUTC) should allow rate recovery for prudently incurred expenses associated with advancing and developing new technology and practices that will accelerate deployment of PHEVs and maximize their value to the electric grid.

5E: Evaluate and Implement a Low Carbon Fuel Standard

Background

In its 2007 report, the CAT recommended that Washington implement a Low Carbon fuel Standard (LCFS) that would yield 10 percent less carbon intensive motor fuel by 2020. The LCFS would be based on standards under development in California, British Columbia, and elsewhere.

The CAT recommended LCFS would reduce carbon dioxide equivalent emissions by 10 percent from the full life cycle emissions of the fuel. That means accounting for emissions from extracting, growing, producing, refining, transporting, storing, and using the fuel over its entire life. It means accounting for a high level of detail in the production process. Ethanol distilled with heat from coal would score worse than ethanol distilled with heat from lower carbon fuel such as natural gas or corn stover. In the California approach, life cycle emissions would also include the direct and indirect effects of land conversions; e.g., clearing virgin rainforest to grow palm oil. Any fuel with lower carbon emissions can be used to meet the requirements, so the LCFS creates a level playing field for biofuels, electricity, natural gas, algae derived fuels, etc.

There are alternative ways to lower carbon emissions from transportation fuels. A carbon tax, a renewable fuel standard and a cap and trade program can also accomplish this goal. While these approaches warrant continued consideration, at this time a carefully designed LCFS appears to be the most direct way to achieve reductions in life cycle carbon emissions while at the same time accommodating technology development and a wide range of fuel types. Fuel refiners expressed concern regarding the complexity arising in the California process to develop a low carbon fuel standard and that was acknowledged as a reason to keep alternatives open in the analysis of a low carbon fuel standard for Washington.

In the near term, low carbon gasoline would likely have a large amount of ethanol. Whether ethanol really yields a life-cycle carbon benefit has been hotly debated for many years. Careful review of California, EPA and other analysis on this issue will be needed. Ethanol blends of 10 percent cause higher levels of evaporative emissions of volatile organic carbons. These are a precursor to ozone. The Puget Sound area violated the EPA ozone standards in the Summer of 2008. It may be necessary to ensure that a LCFS does not worsen this ozone situation.

Section 211(c)(4) of the Federal Clean Air Act generally prevents states from setting fuel standards that are more stringent than federal regulations. Since there is no federal LCFS, however, Ecology believes there's no impediment to Washington implementing LCFS requirements by legislation or rule.

Benefits of a Low Carbon Fuel Standard

- A LCFS sets a performance standard and lets fuel providers figure out how to most effectively meet them. It's conducive to lower-cost solutions.
- A LCFS does not favor or promote specific technologies and it automatically handles changing technology well. If a new process can provide lower carbon fuel, there are no rigid barriers to prevent immediate introduction and level competition with existing fuels and processes.

- A LCFS keeps government out of having to forecast technological or economic winners, so there's less risk of mistakenly distorting markets and scientific research.
- A LCFS can address the life-cycle emissions to ensure true GHG benefits. It does not have to rely on only the carbon content of the finished product.
- A LCFS yields rapid benefits, it reduces emissions as soon as the fuel is sold and used.
- A LCFS can allow alternate ways to comply to handle uncertainty. California allows four ways:
  - Provide only fuels that meet the standard.
  - Provide a mix of higher and lower carbon fuels that, on average, meet the standard.
  - Acquire sufficient credits from other parties to meet the standard.
  - Use earned and banked credits sufficient to meet the standard.

Impacts on Goals

The 2007 CAT estimates show that a Washington LCFS could reduce 2020 annual GHG emissions by 3.6 $MMTCO_2e$. That is 60 percent of the reductions estimated for all the technology strategies combined. Technology strategies and VMT reduction strategies each provide about half the reductions needed from transportation.

The California approach would phase in the LCFS slowly, approximately 1 percent per year from 2011 to 2020. California has proposed a draft LCFS rule that is expected to be implemented sometime in 2009.

Additional Benefits

A LCFS is consistent with requirements to achieve use of renewable fuels. Electricity and renewable fuels (cellulosic ethanol, refinery based biofuels, biodiesel, etc.) would provide most of the GHG reductions from lower carbon fuels. The life cycle approach of the LCFS ensures real benefits from renewable fuels.

Costs

See 2007 CAT report.[68]

Relationship to Other Efforts

The Energy Independence and Security Act signed in December 2007, increased national ethanol requirements substantially beyond what existed at the time of the 2007 report. Requirements went from 7.5 billion gallons in 2012 to 36 billion gallons by 2022, with corn ethanol maxed out at 15 billion gallons in 2015 and cellulosic and advanced biofuels providing the remaining 21 billion gallons. The effect of these requirements in Washington State is a bit uncertain because this is a national standard, but EPA projects that by 2013 the national average of ethanol in gasoline will be 10 percent, the level that can be burned in conventional vehicles.

EPA recently estimated that the life cycle GHG reduction from corn ethanol is 16 percent, not enough to meet a 10 percent reduced carbon requirement if ethanol is only 10 percent of the fuel. A LCFS envisions that other fuels would make up the remaining requirements or they would be met by acquiring credits from other sectors. One way or another, carbon would be lowered.

By December 2008, Washington's renewable fuel standard requires that ethanol and biodiesel constitute 2 percent, respectively, of gasoline and diesel fuel. This Summer ethanol accounted for 6 to 8 percent of gasoline. Biodiesel is still quite low at .6 percent. The Washington requirement is largely surpassed by the recent Energy and Independence Security Act requirements.

[68] http://www.ecy.wa.gov/climatechange/CATdocs/020708_InterimCATreport_final.pdf

The Western Climate Initiative (WCI) has decided not to allow trading between transportation and other sectors until 2015. A cap and trade systems and a LCFS can co-exist, although they have to be carefully coordinated.

A carbon tax and a LCFS could also co-exist. British Columbia's carbon tax took effect this summer, at about 9 cents per gallon. British Columbia is also are part of the WCI cap and trade system and expect to be able to coordinate these requirements. WSU has completed a large study of ways to incentivize biofuels. Their draft analysis recommends a carbon tax for that purpose.

LOW CARBON FUEL STANDARD RECOMMENDATIONS TO EVALUATE AND IMPLEMENT LCFS REQUIREMENTS

Request the Department of Ecology, Community Trade and Economic Development, WSDOT, and other affected agencies seek resources from the 2010 legislature to evaluate and implement LCFS requirements appropriate for Washington. The Transportation IWG finds that it's critical to have sufficient resources to do this job well. A 2010 request would come after the implementation of the California LCFS and allow Washington to benefit from California's experience. If resources are provided, Ecology should undertake a two step process to assess and implement the best LCFS program for Washington.

- Step 1 would be a scoping process, coordinated with other agencies and affected parties, to assess whether the California LCFS, a modified LCFS, or alternative ways to lower carbon from motor fuel would best meet the Washington GHG reduction needs.
- Step 2 would be for Ecology, and/or other agencies, to develop rules to implement a LCFS tailored to Washington needs, provided the scoping finds that some version of an LCFS remains the best choice for Washington.

Zero Emission Vehicle Standard

Background

Since California regulated air quality emissions prior to the federal government, it was allowed to continue to regulate emissions after similar federal standards were developed. Other states are allowed to "opt-in" to the California vehicle emissions standards, which are typically more stringent than the federal equivalents, and Washington did so in 2005. The Washington legislature included California's "carbon dioxide equivalent emission standards," however those did not become effective because EPA denied approval to that part of the California standards. When the Washington legislature adopted the California emissions standards with ESHB 1397, it rejected the Zero Emission Vehicle (ZEV) part of requirements. The first vehicle models that must meet California emission standards are 2009 model year cars and light trucks.

Generally speaking, the ZEV requirements mandate that a particular number of vehicles that produce no air emissions are delivered and sold in a state. Though the ZEV mandate has been amended in the past, the current base California requirement is that 12 percent, 14 percent, and finally16 percent of the vehicles sold in California in by major auto manufacturers (in 2012,15 and 18 respectively) must be ZEVs. Because no mass market ZEVs (affordable vehicles with customary range, speed, and refueling capability) are expected to be viable for a number of years, California allows the 12 and 14 percent requirement to be met primarily by substituting large numbers of "partial ZEVs" until 2018. These substitutes can be ultra clean gasoline vehicles, hybrid electric vehicles, and neighborhood electric vehicles (limited speed and range). The "substitutes" allow fewer numbers of "true ZEVs" (full electric or fuel cell vehicles) to be delivered for sale before 2018. California ZEV regulations also give credit to manufacturers for the selling of the required number of "true ZEVs" anywhere in the United States. No extra (expensive) full electric or fuel cell vehicles, beyond what's required directly in California, are needed for the opt-in

states until after 2015. Then, the more limited range full electrics would be required in Washington (and other opt-in states).

The 2020 GHG-reduction calculated for the 2007 CAT from adopting the ZEV standards was relatively small. This result is because only a small number of true ZEVs will have filtered into the fleet by 2020 and while the ZEV substitutes still have low GHG emissions, the ZEV substitutes will largely be replacing other low emission vehicles. The 2007 analysis showed that benefits would triple from the 0.13 $MMTCO_2e$ level by 2035, though this still results in a high cost per metric ton of GHG emissions reduction.

Current Status

California is finalizing amendments to its ZEV requirements to create a new category and credits for "plug-in hybrid" vehicles, which are now expected to become available as early as 2010 from some manufacturers. The earlier 2003 ZEV rules were based on the historic lack of breakthroughs in battery technology and the expectation that fuel cells would become viable. Under revised rules, the 16 percent ZEVs by 2018 requirement remains. The main issue is what will be required between now and 2018 when large scale substitutions of ultra-clean gasoline vehicles and hybrids are still allowed. Between 2012 and 2018, if a manufacturer maximizes their use of substitution credits, 2.2 percent to 3 percent of their sales would be "plug-in hybrids," in addition to regular hybrids and ultra clean gasoline vehicles. Though hybrid production might have difficulty meeting the required production numbers, a maximum use of allowed substitutions for true ZEVs would result in the following distribution of clean vehicles:

Vehicle Types:	2012-14	2012-14 Number of Vehicles	2015-17	2015-17 Number of Vehicles
PZEV (ultra clean gasoline)	6%	16,800	6%	16,800
AT-PZEV (hybrids, natural gas)	3%	8,400	2%	5,600
Enhanced AT-PZEV (plug-in hybrids) and NEV (short-range, low speed electric Vehicles)	2.19%	6,132	3%	8,400
True ZEV (full electric or fuel cell)	.81	[2,268]*	3%	[4,200]*
Total ZEV Obligation:	12%	33,600	14%	35,000
Total WA new vehicle sales (2002-06)		280,000		280,000
* In 2012-14, true ZEVs are not required to be sold in Washington, though some may voluntarily be sold here. After 2014, regulations would require some true ZEVs to be placed in Washington, but numbers depend on how manufacturers comply in California.				

Relationship to Other Efforts

The Vehicle Electrification strategy of accelerating entry of electrified vehicles into the fleet is a different way to achieve a similar result, with the added benefit of including heavy duty vehicles, which are important sources to address. Vehicle Electrification would operate through tax incentives and demonstration programs. This strategy is a regulatory approach. The benefits are more certain, but the approaches are not in conflict and potentially complementary.

Also, see pro and con discussion below on market incentives that debate whether ZEV might actually be needed to enable incentive programs like Vehicle Electrification.

Discussion of Washington Adopting the ZEV Requirements

The Transportation IWG has not made a recommendation on adoption of the ZEV requirements or any alternatives. The Transportation IWG has documented its deliberations and has identified that this is a statutory issue and, if necessary, would have to be resolved by the Legislature.

The potential positive and negative results of Washington adoption of the ZEV mandate were initially debated during the 2005 adoption of California's general emissions standards. The 2008 Transportation IWG also discussed the issue, and opted not to provide a recommendation on the standard. Some members favored this strategy, others opposed it. Some of the arguments for and against Washington adopting the ZEV requirements are presented in what follows. Each major argument is given a heading to help the reader track the discussion.

ARGUMENTS FOR AND AGAINST ADOPTING THE ZEV REQUIREMENTS

Impacts on Goals

Adopting recent ZEV amendments would increase the 2007 benefit estimates (PRO)
The 2007 CAT report indicates an annual benefit of 0.13 $MMTCO_2e$ in 2020 from application of the ZEV requirements. In its ZEV amendments, California calculates that by 2018 GHG reductions are increased by 26 percent relative to the 2003 requirements. In Washington this improvement will be somewhat less than in California, but might be on the order of a 20 percent improvement (0.16 $MMTCO_2e$ instead of 0.13 $MMTCO_2e$).

This improvement results primarily from the large number of plug-in hybrids that are used to comply. In the revised rules, they account for 90 percent of the credits in 2012-14 and 50 percent of the credits in 2015-17. Even though the revised rules result in the same overall goals to be met (equivalent of 12 percent ZEVs in 2012-14 and 14 percent ZEVs in 2015-17), the equivalency is calculated based on ozone precursors, not GHGs. It also uses complicated credit and multiplier formulas. The result is the mix of vehicles that can be used to emit less GHGs than previously. Again, it's the large numbers of plug-in hybrids accounting for this effect.

Adopting recent ZEV amendments would increase the 2007 benefit estimates (CON)
The 2007 CAT report indicates a limited net benefit of 0.13 $MMTCO_2e$ from adoption of the ZEV mandate. Opponents note that a ZEV-qualified vehicle sold in Washington or outside of Washington will have the same potential to reduce GHG emissions, and the actual emission reduction will depend on miles driven and the driving habits of the owner. Therefore, quantifying the specific reduction from the sale of any ZEV-qualified vehicle in a specific state will be very difficult and is unlikely to be easily evaluated for its contribution to the overall 2020 emission reduction goal. Opponents also note that while benefits might increase after 2020 if ZEVs become more generally available, such a change in the mix of the vehicles on the market would produce a benefit even in the absence of a ZEV mandate.

Adopting ZEV now brings early benefits (PRO)
In addition, benefits could start accruing in Washington as early as 2012. These early benefits are important and worth more than their magnitude suggests because of the cumulative nature of global warming. CARB estimates that 60 percent of the 26 percent improvement will occur in 2012-14. The ZEV benefit is also relative to many other strategies that depend on many more uncertainties.

Adopting ZEV now brings early benefits (CON)
Proponents argue that beginning the process now will allow manufacturers to ramp up vehicle availability in Washington State to meet this requirement rather than expecting a manufacturer to comply suddenly at a later date.

Opponents argue that consumer demand and manufacturing capacity are most effective for driving manufacturer response. They point out the current high demand for gas-electric hybrids and other fuel efficient vehicles are causing manufacturers to shift their product mix away from large vehicles to meet this new demand. Even if these vehicles are manufactured and delivered to Washington State, unless there is consumer demand, the ZEV qualified

vehicles will not enter the fleet regardless of a state mandate. However, if there is consumer demand, manufacturers are likely to ship an increased number of vehicles to a state to meet that demand. Sales numbers show Washington residents already register a disproportionately large number of gas-electric hybrids compared to other states, even in the absence of a ZEV mandate, demonstrating manufacturer's willingness to respond to the market before regulatory mandates.

Additional Benefits

Fewer plug-in hybrid electrics will be delivered to Washington without the ZEV requirement (PRO)
The main benefit of opting in to ZEV is that manufacturers would be required to deliver a large number of plug-in hybrids to the state starting in the 2012-14 timeframe. The table shows that as the "Enhanced AT-PZEV" and NEV vehicles.

If Washington does not have the ZEV requirements, plug-in hybrid electrics will first be delivered to states that do have these requirements, where manufacturers need the credits. Since costs for plug-in hybrids will be higher than for conventional vehicles, without the requirement, manufacturers will mostly sell these vehicles where they can get credit for them. It's far less likely that Washington will receive plug-in hybrids, or full electric vehicles, until much later than other "opt-in" states -- even if customers want them.

Fewer plug-in hybrid electrics will be delivered to Washington without the ZEV requirement (CON)
Opponents counter that consumer demand and manufacturing capacity should likely play a greater role than regulation in manufacturer decisions on allocation of ZEV qualified vehicles for sale in a state. They point out that the current high consumer demand has generated waiting lists for new gas-electric hybrids and expected limited production of these vehicles-recognized by the credit system currently offered by many states for the sale of gas-electric hybrids anywhere in the country. In addition, opponents note that a ZEV-qualified vehicle sold in Washington or outside of Washington will have the same potential to reduce GHG emissions, and the actual emission reduction will depend on miles driven and the driving habits of the owner. Therefore quantifying the specific reduction from the sale of any ZEV-qualified vehicle in a specific state will be very difficult and is unlikely to be easily evaluated for its contribution to the overall 2020 emission reduction goal.

Postponing adoption of ZEV delays benefits (PRO)
Adopting ZEV requirements now also allows manufacturers to meet the requirements when the levels are relatively low. If Washington delays entry into ZEV requirements until later phases, manufacturers will not be able to meet the higher requirements. They will need substantial phase-in requirements. That would delay any benefits in Washington much further than might appear when looking at the above table.

Postponing adoption of ZEV delays benefits (CON)
The market has a greater effect than regulations so it will also affect the timing more than regulations, and the benefit is remarkably small compared to the cost to consumers and the burden placed on some of Washington's small businesses.

ZEV will generate recharging infrastructure which will improve chance for sales above minimums (PRO)
While plug-in hybrids are expected to be largely re-charged at home, if they start entering Washington in large numbers, additional recharging infrastructure will be developed at places of work, retail and food outlets, and popular recreation venues. Having this infrastructure in place will greatly improve the possibility that plug-in hybrids and full electric vehicles will be sold in Washington above and beyond the regulatory minimum.

ZEV will generate recharging infrastructure which will improve chance for sales above minimums (CON)
This infrastructure does not exist at present nor have utilities, businesses, or local governments indicated a willingness to build this infrastructure before there is a clear demonstration of demand.

Initial ZEV requirements create a pathway that will speed arrival of true ZEVs (PRO)

In the long run, the base requirement that 16 percent of new sales must be true zero emission vehicles will apply. California's history of providing substitutes and alternative paths simply recognizes the need for development and transitions. The surest way for Washington to benefit from true ZEVs will be to adopt the requirements now, so manufacturers can reasonably phase in supplies to Washington. There is no way manufacturers can get from no ZEVs to 16 percent ZEVs all at once. The ZEV requirement is the transition path.

The short-term benefit is getting the plug-in hybrid electrics as early as possible. The regulations incentivize the more expensive full-electrics being placed in California. Depending on market conditions and how manufacturers comply with California requirements, full electrics are most likely to start arriving in Washington in 2015. If costs allow, some may arrive in the 2012-2014 period.

Initial ZEV requirements create a pathway that will speed arrival of true ZEVs (CON)
Opponents believe that market forces will be more important than the regulations in determining how and when true ZEVs will arrive in Washington.

Market based alternative to ZEV proposed by opponents (PRO)
Proponents believe that T-12 may be needed to make incentive approaches like the opponent proposal (similar to vehicle electrification) work. It's clear that the cost of plug-in hybrids will be much higher than for comparable vehicles. Manufacturers may not produce more than is required. Even if prices appear comparable due to manufacturer cost spreading (internal subsidizing), it seems unlikely that manufacturers will turn-out more of those loss-producing vehicles than necessary. This suggests that manufacturers are most likely to produce plug-in hybrids only for those states that have opted-in to the Cal ZEV program where PHEVs are required (11 states right now, four more expected). Consequently tax incentives alone may not pull electric vehicles into Washington as desired. The T-10, T-12 combination would be beneficial.

Market based alternative to ZEV proposed by opponents (CON)
Opponents of the ZEV mandate also proposed an alternative that harnesses existing consumer behavior to produce GHG emissions reductions. Texas has adopted a vehicle scrapping program, which provides lower income residents with a sales tax credit for scrapping an older vehicle determined to be a high emitter and replacing it with a newer vehicle with a more environmentally conscious profile. Similar efforts are underway in California, which has a $1000 tax credit available and continues to experiment with broadening the impact and coverage of their program

This approach does not force national manufacturers to gamble on particular technologies, does not saddle dealers with vehicles with little consumer demand, and can be tailored to help consumers who are least able to upgrade their vehicles, all while still providing GHG and particulate matter emission reductions. By way of a contemporary GHG example, replacing even a relatively recent 2002 Kia Spectra with a 2007 Kia Spectra would result in a 1.5 ton reduction in CO2 emissions each year.

Encouraging turnover of the fleet more quickly speeds the adoption of all new vehicle technology and takes advantage of the increased fuel efficiency and GHG emission reduction of almost all newer vehicles. Rather than creating a regulatory mandate that, at best, only affects a very miniscule percentage of the vehicle fleet in the state, a broad incentive would produce more substantial emissions reductions and would still allow consumer demand to drive the introduction of advanced technology vehicles promising even more dramatic emissions reductions.

Costs

The revised California requirements are much less costly than 2003 requirements (PRO)
The revised ZEV program is much less expensive than the earlier program which was expected to be met by fuel cell vehicles. California estimates that the costs from 2012 to 2017 of the revised regulations are 53 percent less than current requirements. The 2007 cost estimate for T-12 should be halved. By 2017, costs are estimated at $900

million annually in California. Washington new car sales are about 1/5 of California's, so costs here would reduce more or less accordingly.

The reason costs are lower is that the revised ZEV program drastically cuts the required number of full electric or fuel cell vehicles (90 percent less in 2012, 50 percent less in 2015). The plug-in hybrids and other substitute vehicles are far less expensive, even though batteries needed for plug-in hybrids are likely to remain expensive at least until 2015.

The revised California requirements are much less costly than 2003 requirements (CON)
The costs of ZEV regulations remain very high, especially in light of the small amount of benefits obtained.

Risk of increased costs to auto dealers (PRO)
A concern over ZEV has been that auto dealers, who must buy the vehicles from manufacturers, would be stuck with high priced electric vehicles they could not sell without substantial discounting, i.e. losses. There are several reasons this risk may not be as great as it seems.

The most expensive vehicles will be "true ZEVs" (full electric or fuel cell vehicles). None of those vehicles are required in Washington until 2015. Even then, only the least expensive types (under 100 mile range) would be required in Washington. For those, manufacturers only get one credit for delivering them to a dealer. The other 1.5 or 2.0 credits are based on actual sale. History in California is that manufacturers want those other credits and will subsidize the prices to get them, thus reducing dealer risk.

Regarding the large number of plug-in hybrids that would be required, manufacturer comments in California have implied that some large manufacturers plan to compete very hard to become the leader in plug-in sales. It's believed they will subsidize the high battery cost across all their vehicle sales to achieve this goal. This reduces risk to dealers.

Risk of increased costs to auto dealers (CON)
Regardless of regulatory credit structure or speculations about manufacturer pricing behavior, the bottom line is that ZEV forces dealers to assume considerable financial risk. If consumers do not want these vehicles because of price, performance limits, or any other reason, it's the dealer who gets stuck with the bill.

Other Impacts

Improved likelihood that innovative "system" approaches will be developed in Washington (PRO)
The ZEV requirement will also make it more likely that recent innovative "system approaches," purchased electric vehicles and leases for batteries and electricity, would be introduced in Washington. This leasing approach averages the high battery costs with the low electricity cost to create an affordable lease that could bring tens of thousands of electric vehicles into the area rapidly.

Improved likelihood that innovative "system" approaches will be developed in Washington (CON)
This innovative approach is in its infancy and may or may not prove viable in the long term.

The infrastructure and innovative aspects of this technology will create "green jobs" (PRO)
New technologies create new jobs. The infrastructure development and innovative systems associated with electric vehicles can generate good "green" jobs for Washington.

The infrastructure and innovative aspects of this technology will create "green jobs" (CON)
Creation of these jobs is highly speculative and there is a very limited automotive manufacturing base from which the state can build. Other states with larger vehicle markets and existing automotive manufacturing operations are more likely to see the creation of these jobs.

Appendices

APPENDIX 1: Members and Supporting Staff

APPENDIX 2: Transportation Pricing Research

- Transportation Value Pricing Options and Implementations in the US
- Transportation Value Pricing Projects in the United States

APPENDIX 3: Preliminary Assessment of Washington State's Ability to Measure Vehicle Miles Traveled

APPENDIX 4: VMT Best Practices National and International Synthesis Reports

- DOT Climate Change Policies and VMT Reduction: Synthesis
- International and Municipal VMT Reduction Policies: Synthesis

APPENDIX 5: VMT Best Practices – Current Projects

- King County Metro Transit – Public Transportation Services
- King County Metro Transit – Ridesharing Services
- King County Department of Transportation – Transit Oriented Development
- Puget Sound Clean Air Agency – Climate Protection Program
- Sound Transit – Mass Transit Expansion Proposal
- Sound Transit – Program Summary
- Washington State Department of Transportation – Summary of Urban Programs
- Washington State Department of Transportation – Commute Trip Reduction Program
- Washington State Department of Transportation – Growth and Transportation Efficiency Center Program
- Washington State Department of Transportation – Vanpool Investment Program
- Washington State Department of Transportation – Trip Reduction Performance Program
- Washington State Department of Transportation – Park and Ride Program
- Washington State Department of Transportation – Construction Traffic Management Program
- Washington State Department of Transportation – Regional Mobility Grant Program
- Washington State Department of Transportation – Kitsap Telework Pilot Project (Proposed Program)
- Washington State Department of Transportation – Transportation Demand Management Strategies for Schools Study
- Washington State Department of Transportation – The High Occupancy Vehicle Program
- Washington State Department of Transportation – Tolling and Pricing Program
- Washington State Department of Transportation – Active Community Environments Initiative
- Washington State Department of Transportation – Bicycle and Pedestrian Program
- Washington State Department of Transportation – Context Sensitive Solutions
- Washington State Department of Transportation – Advanced Traffic Operations

APPENDIX 6: Washington Trucking Associations and AAA Washington Minority Report

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- Judy Lorenzo, WA State Department of Transportation
- Jonathan Olds, WA State Department of Transportation
- Leni Oman, WA State Department of Transportation
- Aaron Poor, WA State Department of Transportation
- Paula Reeves, WA State Department of Transportation
- Elizabeth Robbins, WA State Department of Transportation
- Brian Smith, WA State Department of Transportation
- Seth Stark, WA State Department of Transportation
- Elizabeth Stratton, WA State Department of Transportation
- Craig Stone, WA State Department of Transportation
- Ted Trepanier, WA State Department of Transportation
- Megan White, WA State Department of Transportation
- Scott Witt, WA State Department of Transportation

Appendix 2 – Transportation Pricing Research

Transportation Value Pricing Options and Implementations in the US[1]

CONVERTING HIGH-OCCUPANCY VEHICLE (HOV) LANES TO HIGH-OCCUPANCY TOLL (HOT) LANES

"HOT" is the acronym for "High Occupancy/Toll". On HOT lanes, low-occupancy vehicles are charged a toll, while High-Occupancy Vehicles (HOVs) are allowed to use the lanes for free or at a discounted toll rate. HOT lanes create an additional category of eligibility for travelers wanting to use HOV lanes, since drivers can be eligible to use the facility either by meeting its minimum passenger requirement, or by choosing to pay a toll to gain access to the HOV lane.

Under SAFTEA-LU, HOV to HOT conversions were mainstreamed. This project type will now be implemented under 23 U.S.C. 166.

- CALIFORNIA: HOT Lanes on I-15 in San Diego
- CALIFORNIA: I-680 SMART Carpool Lanes in Alameda County
- CALIFORNIA: HOT Lanes on I-880 in Alameda County
- COLORADO: HOT Lanes on I-25/US 36 in Denver
- FLORIDA: HOT Lanes on I-95 in Miami-Dade County
- MINNESOTA: HOT Lanes on I-394 in Minneapolis
- TEXAS: HOT Lanes on I-10 and US 290 in Houston
- WASHINGTON: HOT Lanes on SR 167 in the Puget Sound Region

CORDON TOLLS

Cordon tolls are fees paid by motorists to drive in a particular area, usually a city center. Some cordon tolls only apply during peak periods, such as weekdays. This can be done by simply requiring vehicles driven within the area to display a pass, or by tolling at each entrance to the area.

- CALIFORNIA: Area Road Charging and Parking Pricing in San Francisco
- FLORIDA: Cordon Pricing in Lee County

FAIR LANES

"FAIR" lanes stands for "Fast and Intertwined Regular" lanes. Multiple freeway lanes are separated, typically using plastic pylons and striping, into two sections: "fast" lanes and "regular" lanes. The fast lanes would be electronically tolled express lanes, where tolls could change dynamically to manage demand. In the remaining unpriced lanes, drivers whose vehicles were equipped with transponders would be compensated with credits that would be based on the tolls in effect at the time they traveled, and would be established at a percentage of the toll rate.

- CALIFORNIA: FAIR Lanes with Dynamic Ridesharing in Alameda County

PRICING ON EXISTING LANES

- MINNESOTA: Priced Dynamic Shoulder Lanes

  Converting narrow bus-only shoulder lanes along the Interstate to wider priced dynamic shoulder lanes (PDSLs), and moving these lanes from the right-most to the left-most portion of the roadway to minimize conflict with entering vehicles.

[1] Information culled from the FHWA Value Pricing Project Quarterly Reports – January through March 2008, http://ops.fhwa.dot.gov/tolling_pricing/value_pricing/pubs_reports/quarterlyreport/qrt1rpt08/index.htm

- WASHINGTON: Proposed Variable Priced Tolls on SR 520 in Seattle

Introduce new tolls on SR-520, setting toll rates on the facility based upon demand so as to avoid the build up of congestion and the loss of roadway capacity when it is most needed. Toll rates will be communicated in real-time, and revenues from tolling will be used to help finance the bridge replacement.

PRICED NEW LANES

Priced new express lanes involve tolls on added lanes that vary by time-of-day and are collected at highway speeds using electronic toll collection technology. Tolls may be set "dynamically," i.e., they may be increased or decreased every few minutes to manage demand so as to ensure that the lanes are fully utilized, yet remain uncongested.

- CALIFORNIA: Express Lanes on State Route 91 in Orange County
- CALIFORNIA: I-15 Managed Lanes in San Diego
- CALIFORNIA: Dynamic Pricing on SR 91 in Orange County
- CALIFORNIA: Violation Enforcement System on I-15 Managed Lanes in San Diego
- CALIFORNIA: HOT Lanes on State Route 1 in Santa Cruz County
- COLORADO: Express Toll Lanes on C-470 in Denver
- FLORIDA: Priced Queue Jumps in Lee County
- FLORIDA: I-95 Priced Managed Lanes in Miami-Fort Lauderdale Region
- GEORGIA: Express Toll Lanes on I-75 in Atlanta
- GEORGIA: I-75 South HOT/Truck-Only Toll (TOT) Study in Atlanta
- MARYLAND: Express Toll Lanes on Section 100 of the I-95/JFK Expressway in Baltimore
- MARYLAND: Express Toll Lanes on Section 200 of the I-95/JFK Expressway in Baltimore
- NORTH CAROLINA: HOT Lanes on I-40 in Raleigh/Piedmont Triad
- OREGON: Express Toll Lanes on Highway 217 in Portland
- TEXAS: Value Priced Express Lanes on I-10 in San Antonio
- TEXAS: HOT Lane Enforcement and Operations on Loop 1 in Austin
- TEXAS: Express Toll Lanes on the LBJ Freeway in Dallas
- TEXAS: HOT Lanes on the Katy Freeway in Houston
- TEXAS: Express Toll Lanes on I-30/Tom Landry in Dallas
- TEXAS: Express Toll Lanes on I-35 in San Antonio

PRICING ON TOLL FACILITIES

Pricing on toll facilities involve tolls on congested toll facilities that are varied by time of day with the intention of encouraging some travelers to use the roadway during less congested periods, to shift to another mode of transportation, or to change routes. With less people traveling during congested periods, the remaining peak period travelers will have decreased delays. To be eligible for the variable toll programs, vehicles must be equipped with transponders, which are read by overhead antennas.

- CALIFORNIA: Peak Pricing on the San Joaquin Hills Toll Road in Orange County
- FLORIDA: Pricing on Bridges in Lee County
- FLORIDA: Value Pricing on the Sanibel Bridge and Causeway in Lee County
- FLORIDA: Variable Tolls on the Sawgrass Expressway in Broward County
- FLORIDA: Variable Tolls for Heavy Vehicles in Lee County
- FLORIDA: Pricing Options on the Florida Turnpike in Miami-Dade County
- GEORGIA: Variable Pricing Institutional Study for the GA-400 in Atlanta
- ILLINOIS: Illinois Tollway Value Pricing Pilot Study
- NEW JERSEY: Variable Tolls on the New Jersey Turnpike
- NEW JERSEY: Variable Tolls on Port Authority Interstate Crossings
- NEW JERSEY: Express Bus/HOT Lane Study for the Lincoln Tunnel

- NEW JERSEY: Upgrade of Electronic Toll Collection Technology in New York
- PENNSYLVANIA: Variable Tolls on the Pennsylvania Turnpike
- TEXAS: Truck Traffic Diversion Using Variable Tolls in Austin

USAGE-BASED VEHICLE CHARGES

Usage-based vehicle charges include mileage-based charges for insurance, taxes, or leasing fees; and car sharing; Pay-As-You-Drive (PAYD) Automotive Insurance is a usage-based charge that converts automotive insurance from a fixed to a per mile cost, providing a financial incentive to drive less.

- CALIFORNIA: Car Sharing in the City of San Francisco
- FLORIDA: Dynamically Priced Carsharing in Tampa
- GEORGIA: Simulation of Pricing on Atlanta's Interstate System
- MINNESOTA: Variabilization of Fixed Auto Costs
- MINNESOTA: Mileage-Based User Fee Regional Outreach Statewide
- OREGON: Mileage-Based Road User Fee Evaluation
- WASHINGTON: Global Positioning System (GPS) Based Pricing in the Puget Sound Region. (Study completed by PSRC)
- WASHINGTON: Pay-As-You-Drive (PAYD) Insurance in Seattle, fall 2008

"CASH-OUT" STRATEGIES/PARKING PRICING

Parking Cash-Out is a strategy that involves employers offering their employees the option of receiving taxable cash in lieu of free or subsidized parking provided by the employer. Employees may deny the cash and keep the tax-free parking subsidy or accept tax-free transit or vanpooling benefits in its place-with any balance in taxable cash. Car cash-out involves paying households to use one less car for a certain period of time. It helps people review their transportation choices and see how travel by foot, bicycle, transit, and ridesharing is competitive with the private automobile. The goal is to show people that they can save money and simplify their lives by not owning a second - or even first - car.

- CALIFORNIA: Car Share Innovations in the City of San Francisco
- CALIFORNIA: Smart Parking Initiative in San Diego
- MINNESOTA: Parking Pricing Demonstration in the Twin Cities Area
- WASHINGTON: Parking Cash-Out and Pricing in King County
- WASHINGTON: Cash-Out of Cars in King County

REGIONAL PRICING INITIATIVES

Road pricing strategies that include comprehensive area - or region-wide applications that evaluate pricing's effect on reducing congestion, altering travel behavior, and encouraging the use of other transportation modes. Region-wide pricing applications that use technologies that provide drivers with real-time congestion and pricing information on alternative routes are especially encouraged.

- CALIFORNIA: Investigation of Pricing Strategies in Santa Clara Valley
- FLORIDA: Sharing of Technology on Pricing
- LLINOIS: Comprehensive Pricing in Northeast Illinois
- MARYLAND: Feasibility of Value Pricing
- MINNESOTA: FAST Miles in the Twin Cities
- MINNESOTA: Project Development Outreach and Education
- TEXAS: Regional Value Pricing Feasibility Study in Dallas
- TEXAS: HOT Lane Network Evaluation in Houston
- VIRGINIA: Regional Network of Value Priced Lanes
- VIRGINIA: Value Pricing for the Hampton Roads Region
- WASHINGTON: Tolling Strategies in the Seattle Area

TRUCK ONLY TOLL FACILITIES

Truck only toll (TOT) lanes are highway lanes that are reserved for the use of commercial vehicles, primarily trucks and buses. Commercial vehicles can pay a fee to use the lanes if so desired, or they can continue to use the regular lanes. Further, fees are only charged when necessary to manage the performance of the lanes. TOT lanes can either be newly constructed facilities, or they can be created by reallocating the use of existing lanes. Similar in concept to HOT lanes, the pricing strategy for TOT lanes corresponds to a cost per mile that will keep the TOT lanes performing at a level of service that provides more reliable travel.

- CALIFORNIA: Analysis of Environmental Effects of PierPASS and Dedicated Truck Lanes in Southern California
- GEORGIA: Northwest Truck Tollway

Transportation Value Pricing Projects in the United States[2]

CONVERTING HIGH-OCCUPANCY VEHICLE (HOV) LANES TO HIGH-OCCUPANCY TOLL (HOT) LANES

"HOT" is the acronym for "High Occupancy/Toll". On HOT lanes, low-occupancy vehicles are charged a toll, while High-Occupancy Vehicles (HOVs) are allowed to use the lanes for free or at a discounted toll rate. HOT lanes create an additional category of eligibility for travelers wanting to use HOV lanes, since drivers can be eligible to use the facility either by meeting its minimum passenger requirement, or by choosing to pay a toll to gain access to the HOV lane.

Under SAFTEA-LU, HOV to HOT conversions were mainstreamed. This project type will now be implemented under 23 U.S.C. 166.

CALIFORNIA: HOT Lanes on I-15 in San Diego

What: San Diego's HOT Lanes were originally approved as part of the FHWA'S Congestion Pricing Pilot Program in ISTEA-1991.

Where: In the median between the junction of I-15 and SR 163 south and 1-15 and SR 56 junction north Extension plan calls for 20 miles between SR 163 and SR 78 of 4 lanes in the median, moveable barrier, multiple access points, direct access ramps for buses and an eventual BRT lane.

Method: Initial pricing via collecting tolls via monthly permits with a decal in the window (December 1996); subsequently, the FasTrak® electronic toll collection system in use today was implemented in April 1998. Under this program, customers in single-occupant vehicles (SOVs) pay a toll each time they use the Interstate 15 HOV lanes. The unique feature of this program is that tolls vary dynamically with the level of congestion on the HOV lanes.

Fees: Fees can vary in 25-cent increments as often as every six minutes to help maintain free-flow traffic conditions on the HOV lanes. Motorists are informed of the toll rate changes through variable message signs located in advance of the entry points. The normal toll varies between $0.50 and $4.00. During very congested periods, the toll can be as high as $8.00. Pricing is based on maintaining a LOS "C" for the HOT facility.

Public Support: San Diego Association of Governments (SANDAG) conducts periodic outreach to measure public response to the value pricing concept. These efforts have revealed broad support for managed/HOT lanes through the years. Equity was not perceived to be a major obstacle to implementing pricing on HOT lanes in the San Diego region.

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[2] Information culled from the FHWA Value Pricing Project Quarterly Reports – January through March 2008, http://ops.fhwa.dot.gov/tolling_pricing/value_pricing/pubs_reports/quarterlyreport/qrt1rpt08/index.htm

[*] Projects funded by the FHWA Value Pricing Pilot Program

Web Page: http://www.sandag.org/index.asp?projectid=34&fuseaction=projects.detail

CALIFORNIA: I-680 SMART Carpool Lanes in Alameda County

What: Examined options for the I-680 corridor and the feasibility study is complete. It concluded that the proposal to utilize the planned high-occupancy vehicle (HOV) lanes on Interstate 680 as high-occupancy toll (HOT) lanes is financially, operationally, and physically feasible. Project bid packages were in preparation in May of 2008.

Where: Southbound HOV lane to a combined HOT facility on a 14-mile segment of I-680 in Alameda County, CA. The I-680 corridor connects employees in Southern Alameda County and the Silicon Valley with homes in the Tri-Valley, East Contra Costa County and the San Joaquin Valley.

Who: The Alameda County Congestion Management Agency (CMA) in collaboration with Santa Clara Valley Transportation Authority, Caltrans, and the Metropolitan Transportation Commission

Public Support: Environmental advocacy groups, business and labor organizations, and the metropolitan planning organization, Metropolitan Transportation Commission supports the project.

For More Information Contact: Jean Hart, Deputy Director, Alameda County Congestion Management Agency; Phone (510) 836-2560; Fax (510) 836-2185; E-mail: jhart@accma.ca.gov.

[*]CALIFORNIA: HOT Lanes on I-880 in Alameda County Study

What: A study was done to determine whether excess capacity does exist, whether there is a market among potential users, and how to address the physical and operational issues associated with such a plan. Study results indicated that, while excess capacity exists, it is not sufficiently high to make local officials comfortable that additional priced vehicles could be accommodated. Also, the demand by light duty commercial vehicles was perceived as modest, and the

Where: Interstate 880 is a major congested freeway in Alameda County. Project is located on 17 miles of highway from just south of Oakland to Fremont. It connects the Port of Oakland and Oakland International Airport with high technology companies in Santa Clara and southern Alameda counties and with goods distribution centers to the east. This corridor has the highest volume of truck traffic in the region.

Public Support: California Highway Patrol expressed strong reservations about its ability to conduct effective enforcement.

Web Page: http://www.680smartlane.org/

For More Information Contact: Jean Hart, Deputy Director, Alameda County Congestion Management Agency; Phone (510) 836-2560; Fax (510) 836-2185; E-mail: jhart@accma.ca.gov.

COLORADO: HOT Lanes on I-25/US 36 in Denver

What: The I-25 HOV/tolled Express Lanes opened in June 2006, marking the first time solo drivers could legally access the existing HOV lanes (along I-25 from US 36 into downtown) by paying a toll.

[*] Projects funded by the FHWA Value Pricing Pilot Program

Where: The I-25 Bus/HOV lanes, also known as Downtown Express lanes, consists of a two-lane barrier-separated reversible facility in the median of I-25 between downtown Denver and 70th Avenue, a distance of 6.6 miles.

Purpose: The purpose of the I-25 Express Lanes is not to generate revenue but rather to cover expenses such as maintenance and snow removal that was previously paid for by taxpayers.

Fees: Toll rates for the I-25 Express Lanes vary by time of day to ensure the lanes remain free-flowing. Toll collection is electronic only, with an EXpressToll® transponder. No cash is accepted.

Project Status: The number of vehicles paying a toll to travel in the I-25 Express Lanes during the first quarter of 2008 was 103,257 in January, 103,646 in February, and 98,689 in March. Toll revenues of $215,232 in January, $190,945 in February, and $202,335 in March were collected, exceeding each month's projection of $161,600.

For More Information Contact: Peggy Catlin, Colorado Department of Transportation, 4201 East Arkansas Avenue, Suite 260, Denver, Colorado 80222; Phone (303) 757-9208; E-mail: peggy.catlin@dot.state.co.us.

FLORIDA: HOT Lanes on I-95 in Miami-Dade County

What: The study evaluated adding a new lane in the median of I-95. A moveable zipper barrier would permit multiple lane configurations of between two and three HOT lanes in the peak direction. The additional lanes would use the two existing HOV lanes. The HOT lanes would allow multiple ingress and egress points.

Where: FDOT is planning a Pilot Project to provide Managed Lanes on I-95, from I-395 in Miami-Dade County, to I-595 in Broward County.

Who: The Florida Department of Transportation (FDOT) conducted a preliminary feasibility study

Method: It is anticipated that this pilot will introduce Managed Lanes to commuters on the I-95 corridor while also generating net revenues to help finance the project.

Fees: The 95 Express lanes will have variable congestion pricing, or tolls, that fluctuate with increased congestion so that an operating speed of 50 MPH can be maintained. Transit (buses) and registered high occupancy vehicles with three or more people (HOV-3) could use the 95 Express lanes at no cost. Additionally, all other vehicles will be allowed to enter the 95 Express lanes by paying a toll with the use of SunPass. In addition to toll revenue supporting the cost of the project, FDOT is proposing to allocate a portion of the tolls to support the operation of Bus Rapid Transit on the corridor.

Web Page: http://www.95express.com.

For More Information Contact: Kenneth Jeffries, Office of Planning FDOT, District 6; Phone (305) 470-6736; Fax (305) 470-6737; E-mail: ken.jeffries@dot.state.fl.us.

MINNESOTA: HOT Lanes on I-394 in Minneapolis

What: Converts the existing high occupancy vehicle (HOV) lane on I-395 into the state's first high occupancy toll (HOT) lane, *MnPASS lane*. The first phase of the project opened in May 2005. Two sections, east section - two reversible lanes, barrier separated. West section - one lane in each direction with double-white stripes separating HOT lane from general purpose lane. Policy sets speed on lanes above 55 miles per hour, 95 percent of the time.

Where: I-395 from Highway 101 to I-94 in Minneapolis, MN

Method: Lanes are dynamically priced

Fees: Lanes remain free to HOVs and motorcyclists during peak hours, and are free to all users in off-peak periods

Project Update: Phase II planning for I-394 MnPASS is underway. Planning includes facility design concepts, land use and urban design analysis, transit advantages, telecommuting, and outreach and education.

For More Information Contact: Kenneth R. Buckeye, Program Manager Value Pricing; Phone (651) 366-3737; E-mail: kenneth.buckeye@dot.state.mn.us.

TEXAS: HOT Lanes on I-10 and US 290 in Houston

What: Houston's "QuickRide" pricing program was implemented on existing HOV lanes of I-10, also known as the Katy Freeway in January 1998. It was implemented on US 290 in November 2000.

Where: HOV Lanes on I-10 and US 290 in Houston, TX

Method: The HOV lanes are reversible and restricted to vehicles with three or more persons during the peak hours of the peak periods. The pricing program allows a limited number of two-person carpools to buy into the lanes during the peak hours.

Fees: Participating two-person carpool vehicles pay a $2.00 per trip toll while vehicles with higher occupancies continue to travel free. Single-occupant vehicles are not allowed to use the HOV lanes.

Project Status: The final report has been completed. Reports and findings may be found at http://houstonvaluepricing.tamu.edu/reports.

For More Information Contact: David Fink, Transportation Operations Engineer, Texas Department of Transportation; Phone (713) 881-3063; E-mail: dfink1@houstontranstar.org.

WASHINGTON: HOT Lanes on SR 167 in the Puget Sound Region

What: The State Route (SR) 167 High-Occupancy Toll (HOT) Lanes Pilot Project is a four year pilot project that will convert the existing HOV lanes on SR 167 within King County/Seattle, Washington to HOT lanes without expansion of the existing freeway.

Where: Nine miles on SR 167 from Southwest 15th Street in Auburn, WA to I-405 in Renton, WA

Method: Toll rates increase and decrease with the level of congestion to ensure that traffic in the HOT lane always flows freely and carpools enjoy the same fast and reliable trip they have in HOV lanes.

Fees: The State Transportation Commission established the minimum toll rate at $0.50 and maximum toll rate at $9.00. The Washington State Legislature approved the rates and the Governor signed the bill.

Web Page: http://www.wsdot.wa.gov/Projects/SR167/HOTLanes/.

* Projects funded by the FHWA Value Pricing Pilot Program

For More Information Contact: Patty Rubstello, Project Manager, Washington State DOT; Phone (425) 450-2720; E-mail: rubstep@wsdot.wa.gov.

CORDON TOLLS

Cordon tolls are fees paid by motorists to drive in a particular area, usually a city center. Some cordon tolls only apply during peak periods, such as weekdays. This can be done by simply requiring vehicles driven within the area to display a pass, or by tolling at each entrance to the area.

*CALIFORNIA: *Area Road Charging and Parking Pricing in San Francisco*

What: The goal of this proposal will be to implement the first area-wide parking pricing pilot and lead to the first national implementation of an area road pricing pilot.

The City proposes a two-pronged approach:
1) implement priced parking at the metered spaces (this is already implemented at city-owned garage facilities); and
2) develop a plan to implement area road pricing within 2 years.

Where: San Francisco, CA

Method: Still in study phase

Web Page: www.sfmobility.org

For More Information Contact: Zabe Bent, Senior Transportation Planner, San Francisco County Transportation Authority; E-mail: elizabeth.bent@sfcta.org or.

FLORIDA: Cordon Pricing in Lee County

What: The Town was awarded a grant to study the feasibility of introducing a new variable toll at both approaches to the Town. The Lee County Board of Commissioners approved a one year trial period for implementing One-Way Tolls on the Cape Coral and Midpoint Memorial Bridges. The trial period started November 1, 2007. One-Way Tolling is being studied as a way to make Lee Way more efficient to reduce operating expenses and to facilitate changes to improve traffic flow at the toll plazas.

Where: The island community of Fort Myers Beach in Lee County, Florida. Access to the Town is provided by road at two points of entry

Method: Project in study phase

FAIR LANES

"FAIR" lanes stands for "Fast and Intertwined Regular" lanes. Multiple freeway lanes are separated, typically using plastic pylons and striping, into two sections: "fast" lanes and "regular" lanes. The fast lanes would be electronically tolled express lanes, where tolls could change dynamically to manage demand. In the remaining unpriced lanes, drivers whose vehicles were equipped with transponders would be compensated with credits that would be based on the tolls in effect at the time they traveled, and would be established at a percentage of the toll rate.

CALIFORNIA: FAIR Lanes with Dynamic Ridesharing in Alameda County

What: The study focused on limited eligibility FAIR lanes, which would provide credits for low-income travelers in the corridor. The study was completed in August 2005. The name of the study was changed to HOT/Credit (HOT/C) Lanes to better reflect the focus of the effort to provide credit for low income travelers in the general purpose congested lane to be used for the HOT/C lane.

Where: Interstate 580 and the "Sunol Grade" portion of Interstate 680; connector ramps at the I-580/I-680 interchange near the Dublin-Pleasanton Bay Area Rapid Transit (BART) station.

Method: Dynamic ridesharing enables travelers to respond to pricing in flexible ways that traditional ridesharing and transit options do not. It uses web-based and telephone-based systems to allow users to find carpool partners on a "real-time" basis, close to the time that travel is needed. In addition to cost and time savings (due to free use of express lanes), dynamic ridesharing would be further facilitated with reserved premium parking spaces at participating BART stations, on-demand backup services, and in-station electronic information screens providing necessary details about individual ride matches.

Public Support: Polling indicated that HOT/C was not well supported by the public.

Web Page: The final Evaluation Report is available on the CMA's web site www.accma.ca.gov

For More Information Contact: Elizabeth Walukas, Senior Transportation Planner, Alameda County CMA; Phone (510) 836-2560 extension 26; Fax (510) 836-2185; E-mail: bwalukas@accma.ca.gov.

PRICING ON EXISTING LANES

MINNESOTA: Priced Dynamic Shoulder Lanes

Priced Dynamic Shoulder Lanes – Converting narrow bus-only shoulder lanes along the Interstate to wider priced dynamic shoulder lanes (PDSLs), and moving these lanes from the right-most to the left-most portion of the roadway to minimize conflict with entering vehicles.

What: The Twin Cities Metropolitan Area, encompassing Minneapolis and St. Paul, will be converting narrow bus-only shoulder lanes along the northbound portion of Interstate 35W between 46th Street and downtown Minneapolis to wider priced dynamic shoulder lanes (PDSLs), and will be moving these lanes from the right-most to the left-most portion of the roadway to minimize conflict with entering vehicles.

Where: The plan is for the PDSLs to link up with new, dynamically-priced high-occupancy toll (HOT) lanes on Interstate I-35W, created by converting the existing high-occupancy vehicle (HOV) lanes which extend from approximately I-494 to the Burnsville Parkway, and also to extend these HOT lanes through the Crosstown Commons between I-494 and 46th Street. The end result will then be a new 15-mile, dynamically-priced managed-lane corridor, speeding bus and HOV trips and also providing motorists a new option to experience a fast and reliable trip.

Fees: Buses and high-occupancy vehicles will operate at no charge in the PDSLs with access allowed during peak times to single-occupant vehicles whose drivers are willing to pay the toll, with prices set to ensure free-flow travel.

* Projects funded by the FHWA Value Pricing Pilot Program

For More Information Contact: Nick Thompson, UPA Project Manager, MnDOT, phone (651) 234-7728, email Nick.Thompson@dot.state.mn.us

***WASHINGTON: Variable Priced Tolls on SR 520 in Seattle**

Variable Priced Tolls on SR 520 in Seattle – Introduce new tolls on SR 520, setting toll rates on the facility based upon demand so as to avoid the build up of congestion and the loss of roadway capacity when it is most needed. Toll rates will be communicated in real-time, and revenues from tolling will be used to help finance the bridge replacement.

What: The plan is to introduce new tolls on SR 520 setting toll rates on the facility based upon demand so as to avoid the build up of congestion and the loss of roadway capacity when it is most needed. Toll rates will be communicated in real-time, and revenues from tolling will be used to help finance the bridge replacement.

Where: SR-520 between I-5 in Seattle and I-405 in Bellevue, WA

Method: The project is to deploy "open road" electronic toll collection equipment, allowing tolls to be collected at freeway speeds. Tolls will be collected using in-vehicle transponders, with supplemental automatic cameras to read license plates for vehicles not equipped with transponders.

For More Information Contact: Patty Rubstello, Urban Planning Office, Washington State DOT, (206) 464-1299, rubstep@wsdot.wa.gov

PRICED NEW LANES

Priced new express lanes involve tolls on added lanes that vary by time-of-day and are collected at highway speeds using electronic toll collection technology. Tolls may be set "dynamically," i.e., they may be increased or decreased every few minutes to manage demand so as to ensure that the lanes are fully utilized, yet remain uncongested.

****CALIFORNIA: Express Lanes on State Route 91 in Orange County***

What: The 91 Express Lanes opened in December 1995 as a four-lane toll facility in the median of a 10-mile section of the state route – Riverside / 91 freeway.

Where: 10-mile section of the Riverside / 91 freeway in Orange County.

Method: Toll revenues have been adequate to pay for construction and operating costs. The toll lanes are separated from the general purpose lanes by a painted buffer and plastic channelizers. All vehicles must have a "FasTrak™" transponder to travel on the express lanes

Fees: In the toll schedule effective July 2007, tolls on the express lanes vary between $1.20 and $9.50, with the tolls set by time of day to reflect the level of congestion delay avoided in the adjacent free lanes, and to maintain free-flowing traffic conditions on the toll lanes. Vehicles with three or more occupants travel free except when traveling Eastbound, Monday through Friday between the hours of 4:00 p.m. and 6:00 p.m., when they pay 50 percent of the regular toll. This policy also applies to individuals on a motorcycle. Other toll discount offers are extended to zero-emission vehicles and vehicles with disabled person's license plates.

* Projects funded by the FHWA Value Pricing Pilot Program

* Projects funded by the FHWA Value Pricing Pilot Program

Study Completed: The project was completed in 2000. Study Results can be accessed at http://ceenve.calpoly.edu/sullivan/sr91/sr91.htm.

For More Information Contact: Kirk Avila, Toll Road & Motorist Services; Phone (714) 560-5988; E-mail: kavila@octa.net.

CALIFORNIA: I-15 Managed Lanes in San Diego

What: I-15 HOT Lanes described above in the "Converting HOV Lanes to HOT Lanes" section are being extended to create a 20-mile "Managed Lanes" facility. A four-lane facility in the median with a moveable barrier, multiple access points from the regular highway lanes, and direct access ramps for buses from five transit centers. A high frequency bus rapid transit (BRT) system is under development and will replace the existing express buses that serve the corridor. Project is in three phases. The first stage adds eight miles directly abutting the existing 8-mile reversible HOT lanes and latter stages will be added in 2011 and 2012.

Where: In the median of I-15 between SR 163 and SR 78.

Method: Applying dynamic tolling through a skewed, per-mile rate. The distance-based fares will fluctuate based on the value of travel time saved between the managed lanes and adjacent general purpose lanes, and from the level of congestion in the managed lanes. The toll system will read vehicles upon entry and exit to calculate the toll rate. When complete, the new state-of-the-art system will collect tolls from over 30 locations covering 82 "tolled lanes".

Study Report: The I-15 Managed Lanes Value Pricing Planning Study was completed in 2002 and project deliverables are available at: http://www.sandag.org/index.asp?projectid=34&fuseaction=projects.detail

Web Page: More details on the project are available at www.keepsandiegomoving.com and www.sandag.org/index.asp?rfpid=127&fuseaction=rfps.detail

For More Information Contact: Derek Toups, San Diego Association of Governments; Phone (619) 699-1907; E-mail: dto@sandag.org.

CALIFORNIA: Dynamic Pricing on SR 91 in Orange County

What: Study and implement dynamic pricing on SR 91 in Orange County

Where: SR 91 in Orange County

For More Information Contact: Kirk Avila, Toll Road & Motorist Services; Phone (714) 560-5988; E-mail: kavila@octa.net.

CALIFORNIA: Violation Enforcement System on I-15 Managed Lanes in San Diego

What: San Diego Association of Governments (SANDAG) is studying the feasibility of applying state-of-the-art violation enforcement systems (VES) to improve accuracy in verifying vehicle passenger counts and enforcing HOV and toll provisions of the future I-15 Managed Lanes.

Where: I-15 in San Diego

* Projects funded by the FHWA Value Pricing Pilot Program

Method: Elements of the VES study will be integrated into, the FasTrak® electronic toll collection system for the I-15 Managed Lanes. Other more advanced approaches would require proof-of-concept testing which may be conducted on the existing barrier-separated reversible HOT lanes subsequent to the deployment of the I-15 Managed Lanes toll system in 2008. The VES will utilize a combination of technology and business rules for the effective processing of HOT-lane violators.

Final Report: The I-15 Managed Lanes Violation Enforcement Study Report
http://www.sandag.org/index.asp?projectid=67&fuseaction=projects.detail

Web Page: The I-15 Managed Lanes web page:
http://www.sandag.org/index.asp?projectid=34&fuseaction=projects.detail

For More Information Contact: Derek Toups, San Diego Association of Governments; Phone: (619) 699-1907; E-mail: dto@sandag.org.

CALIFORNIA: HOT Lanes on State Route 1 in Santa Cruz County

What: A five-mile section of State Route 1 is proposed for widening. The facility is currently a four-lane divided freeway. Within the study corridor limits there are seven interchanges. Five HOT lane alternatives were studied in detail, including:

(1) one lane in each direction with barrier separation, no intermediate access;
(2) one lane in each direction, with buffer separation, no intermediate access;
(3) one lane in each direction with striped separation, 1 or 2 intermediate access points;
(4) one lane in each direction with striped separation, continuous access; and
(5) one reversible lane with barrier separation, no intermediate access

Based on the study results, in June 2002, the Regional Transportation Commission voted not to include a HOT lane alternative in further consideration, however it did select a carpool lane alternative with a footprint that would allow conversion to a HOT lane at a future date, should demand warrant it.

Where: Santa Cruz County

Final Report: The Final Report is available on the Santa Cruz County Regional Transportation Commission's web site http://www.sccrtc.org/highway.html.

Study Completed: There are no additional activities expected on this project.

For More Information Contact: Karena Pushnik, Santa Cruz County Regional Transportation Commission; Phone: (831) 460-3210; E-mail: karena.pushnik@co.santa-cruz.ca.us.

COLORADO: Express Toll Lanes on C-470 in Denver

What: A feasibility study was recently completed which evaluated the design, operational and financial feasibility, and expected public acceptance of Express Lanes on the 26-mile C-470 beltway in the southwest part of the Denver metro area.

Where: C-470 is a four-lane beltway between I-70 and I-25 with 18 interchanges.

* Projects funded by the FHWA Value Pricing Pilot Program

Method: The concept studied is a four lane barrier-separated facility in the median of four general purpose lanes would manage volumes in the Express Lanes by charging a variable toll to ensure reliable, free-flowing traffic conditions.

Study Completed: The C-470 Express Lanes Feasibility Study Final Report is available. Go to www.c470.info for updated information.

Project Status: The environmental assessment is on hold due to local government opposition.

For More Information Contact: Ron Buck, Colorado Department of Transportation; Phone: (303) 972-9112; E-mail: ron.buck@dot.state.co.us.

FLORIDA: Priced Queue Jumps in Lee County

What: A feasibility study of Queue Jumps in Lee County, Florida. The feasibility analysis indicated that while queue jumps did not appear to be a good candidate for traditional toll bond financing, they are nonetheless financially feasible. A Queue Jump is a facility that can be used to bypass points on the transportation network where congestion is particularly severe and occurs in a predictable pattern.

Where: Highway and arterial intersections in Lee County, Florida

Method: Tolls would vary by time of day and would be levied electronically, and would be tied in with the County's existing ETC system. A significant characteristic of queue jumps is their ability to generate revenue for needed roadway improvements while simultaneously contributing to travel demand management.

Public Support: The analysis has shown favorable public acceptance

For More Information Contact: Sarah Clarke, Lee County Department of Transportation; Phone: (239) 533-8718; E-mail: sclarke@leegov.com.

FLORIDA: I-95 Priced Managed Lanes in Miami-Fort Lauderdale Region

What: Creating a 21-mile managed-lane facility on I-95 in the Miami-Ft. Lauderdale region. A single HOV lane into two high-occupancy toll (HOT) lanes in each direction by narrowing the travel lanes from 12' to 11' and narrowing the shoulders. Anticipated completion will be June 2009.

The longer-term plan is to convert the flat-rate tolls on the limited-access expressways in South Florida to variable rates based on travel demand. Over half of such expressways are currently tolled.

Where: I-95, between I-395 in Dade County (Miami area) and I-595 Broward County (Fort Lauderdale area)

Method: Variable pricing will be applied based upon demand and the network itself will be used as the back-bone of a bus rapid transit (BRT) system which will be subsidized through the toll revenues. Toll rates will be adjusted as often as every three minutes in order to maintain free-flowing conditions on the managed lanes at least 90 percent of the time.

For More Information Contact: I-95 Managed Lanes Pilot Project

GEORGIA: Express Toll Lanes on I-75 in Atlanta

What: The project evaluated the feasibility of implementing value pricing concepts and Bus Rapid Transit in the I-75 corridor in the Atlanta area.

Where: I-75 south corridor in Atlanta area, that extends from I-285 south to SR 16 near the City of Jacskson in Butts County.

Project Completed: The final report http://srta-valuepricing.net/i75_south/i75_south.htm is available on the State Road Toll Authority web site at www.georgiatolls.com. Managed lanes with pricing will definitely be implemented on I-75 through Atlanta. The project is currently projected to take place in 5-7 years because new lanes must be built to permit the priced lanes.

For More Information Contact: Patrick Vu, Senior Transportation Consultant, State Road and Tollway Authority; Phone: (404) 893-6130; E-mail: patrickvu@georgiatolls.com.

GEORGIA: I-75 South HOT/Truck-Only Toll (TOT) Study in Atlanta

What: The High Occupancy Toll (HOT) Lanes Feasibility Study sought to identify corridors where HOT Lanes Facilities would provide congestion relief and enhance safety and efficiency to justify their installation in the Atlanta Metropolitan Area.

The Truck Only Toll (TOT) Lanes Feasibility Study sought to examine whether the concept of optional truck only facilities would provide congestion relief and enhance safety and efficiency to justify their installation in the Atlanta Metropolitan Area. The proposal included elements to improve the travel demand model to address pricing of truck travel, and to conduct market research and other activities.

Where: I-75 South in the Atlanta area.

Project Completed: Both the HOT and TOT Studies were finalized as of July 2005. The final report is available: TOT Final Report. More information on the HOT/TOT Study can be found at: http://www.hotandtotstudy.com/

Web page: http://srta-valuepricing.net/i75_south/i75_south.htm

For More Information Contact: Patrick Vu, Senior Transportation Consultant, State Road and Tollway Authority; Phone: (404) 893-6130; E-mail: patrickvu@georgiatolls.com.

MARYLAND: Express Toll Lanes on Section 100 of the I-95/JFK Expressway in Baltimore

What: Value Pricing Pilot Program amended to evaluate the possible implementation of variable tolls on selected state highways and toll facilities in the State of Maryland. Study facilities that have the potential to provide a comprehensive approach to making improvements to congested facilities that would allow MDOT to reduce travel delays and offer premium service.

Where: A Value Pricing Pilot program Toll Agreement was executed between the Federal Highway Administration, the Maryland Department of Transportation, and the Maryland Transportation Authority (MdTA) to authorize the collection of tolls on the new Express Toll Lanes (ETLs) on the I-95/JFK Expressway in Baltimore.

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* Projects funded by the FHWA Value Pricing Pilot Program

Project Status: This project did not receive Value Pricing Pilot (VPP) program funds; however the project received FHWA approval to toll the facility through the VPP program. Construction began on the first I-95 ETLs section, the Rossville Boulevard overpass, in November 2005. Mainline construction began in Fall 2006. It is anticipated that the project will be completed in late 2011.

For More Information Contact: Melissa Williams, Planning Manager, Maryland Transportation Authority-Capitol Planning Division; Phone: (410) 537-5651; E-mail: mwilliams9@mdta.state.md.us.

MARYLAND: Express Toll Lanes on Section 200 of the I-95/JFK Expressway in Baltimore

What: The I-95 Section 200 Project Planning Study began in the fall of 2005. Three alternatives are currently being considered; they include the No-Build, General Purposes Lanes and Express Toll Lanes (ETLs) alternatives adding ETLs to approximately a 10-mile stretch of I-95 in Baltimore.

Where: A 10-mile stretch of I-95 / JFK Expressway in Baltimore. The Section 200 ETLs would be immediately north of the Section 100 ETLs, providing a total of nearly 20 miles of ETLs.

Web Page: I-95 Section 200 Project Web page

Project Status: This project is currently in the project planning phase. Approval of the final environmental document is anticipated in Fall 2008.

For More Information Contact: Melissa Williams, Planning Manager, Maryland Transportation Authority-Capitol Planning Division; Phone: (410) 537-5651; E-mail: mwilliams9@mdta.state.md.us.

NORTH CAROLINA: HOT Lanes on I-40 in Raleigh/Piedmont Triad

What: HOT lanes and other potential value pricing options are being explored on I-40 in North Carolina.

Where: HOT lanes and other potential value pricing options are being explored on I-40 in North Carolina's Piedmont (Greensboro, High Point, and Winston-Salem) and Research Triangle (Raleigh and Durham) areas.

Study Completed: The study was completed in October 2005. The report was finalized.

For Additional Information Contact: Mustan Kadibhai, NCDOT; Phone: (919) 508-1819; E-mail: mkadibjai@dot.state.nc.us.

[*]OREGON: Express Toll Lanes on Highway 217 in Portland

What: The Highway 217 Corridor Study in the Portland area developed and evaluated several rush hour toll and ramp meter bypass alternatives in this corridor, including consideration of FAIR lanes among other value pricing approaches at ramp meters. A prior study, the Traffic Relief Options study, evaluated value pricing in the Portland metro area from a regional perspective and recommended that value pricing be considered whenever major new highway capacity is added.

Where: The highway 217 corridor, which connects I-5 to US 26, is the major north-south transportation route in the Washington County portion of the Portland metropolitan area.

[*] Projects funded by the FHWA Value Pricing Pilot Program

Web Page: Highway 217 Corridor Study.

Study Completed 2005: Phase one and two of the studies were completed using Value Pricing funds. Study findings are available at the study web site: Hwy 217 Study Final Recommendations

For More Information Contact: Ms. Bridget Wieghart, Metro Project Manager; Phone: (503) 797-1775; E-mail: wieghartb@metro.dst.or.us.

TEXAS: Value Priced Express Lanes on I-10 in San Antonio

What: Examine the use of value pricing on I-10 in the San Antonio area. The study will consider use of tolling for demand management and public acceptability of tolling; integrate value pricing with financial and mobility goals; and establish baseline travel characteristics for development of future monitoring and evaluation plans

Where: Examine the use of value pricing on I-10 on a 19-mile segment between SH 1604 and SH 46.

For More Information Contact: Judy Friesenhahn, Planning Engineer, Texas Department of Transportation; Phone: (210) 615-5814; E-mail: jfriesenhahn@dot.state.tx.us.

TEXAS: HOT Lane Enforcement and Operations on Loop 1 in Austin

What: Enforcement and Operations study for HOT Lane on the Mopac Expressway (Loop 1) in the Austin area. . The Loop 1 HOT lane is envisioned as a facility that will provide a high level of service and travel time advantages for express bus/BRT, vanpools and carpools while allowing paying Single Occupant Vehicles to use the lane. It is also envisioned that the HOT lane will be actively managed according to an operational plan that triggers changes in price in order to maintain free flow conditions for express bus/BRT. This study would develop an enforcement and operations strategy for this facility.

Where: The Loop 1 corridor in Austin, TX extends from State Highway (SH) 45 in southern Travis County to Farm-to-Market (FM) 734 (Parmer Lane) in Northern Travis County.

Project Status: Work on the project was officially suspended in early February 2008 due to TxDOT budgetary constraints.

Web Page: Project information can be found at www.MoPac1.org.

For More Information Contact: Mark Herber, Texas Department of Transportation, Phone: (512) 832-7077, E-mail: mherber@dot.state.tx.us; Ginger Gooden P.E., Phone: (512) 467-0946, E-mail: G-goodin@tamu.edu.

TEXAS: Express Toll Lanes on the LBJ Freeway in Dallas

What: The Project includes:

- Adding managed HOV lanes to I-635 from Luna Road to the High Five including full reconstruction of I-635 from I-35E to the High Five (the I-635 West Section)
- Adding elevated managed HOV lane connectors along I-35E from Loop 12 to I-635 (the Loop 12/ I-35E Section)
- Adding operational improvements on the I-635 managed HOV lanes within the High Five (the I-635/US 75 interchange)

A key aspect of the approved project is that the two sections of the east-bound and west-bound express lanes will be located below grade in some combination of u-wall, cantilevered, straddle or tunnel segments to

maintain TxDOT's and the region's commitment to "No Higher, No Wider" than what has been previously approved in the public involvement phase.

Where: The LBJ Freeway (I-635) is the major circumferential roadway in the Dallas region. The total length of the corridor is 21 miles. The base initial project is along I-635 from US 75 heading west to I-35E and then southbound along I-35E to the I-35E/LP 12 split.

Method: Currently, the West Section facility consists of eight general-purpose lanes and one HOV lane in each direction. The facility will be upgraded with up to six managed lanes (three in each direction). The proposed lane configuration would vary - the West Section would have six express lanes, the East Section from US-75 to I-30 would vary from having four express lanes (two in each direction) to having two reversible lanes to I-30. The LBJ express lane project design uses variable tolling to provide free-flowing traffic conditions and connections to transit centers to support Bus Rapid Transit (BRT).

Web Page: Additional project information can be found at the project web site: http://www.635project.com.

Project Status: This project received approval for FHWA ***Express Lane Demonstration (ELD)*** program funds in March of 2008.

For More Information Contact: John Hudspeth, P.E. CDA/Tollway Office; Phone: (214) 320-4490; E-mail: jhudsp1@dot.state.tx.us.

TEXAS: HOT Lanes on the Katy Freeway in Houston

What: The I-10 / Katy Freeway in and around Houston, TX is proposed to be expanded to eight general-purpose lanes, four in each direction, with continuous three-lane frontage roads in each direction. In addition, in the center of the facility from I-610 west to State Highway 6, four HOT lanes are proposed, two in each direction. From State Highway 6 to the Grand Parkway, two HOT lanes are proposed, one in each direction.

Where: Katy Freeway (I-10), in the western portion of Houston. The existing freeway is 23 miles long and consists of six general-purpose main lanes (three in each direction), with two-lane continuous one-way frontage roads in each direction for most of its length. Additionally, the freeway has an one-lane reversible high occupancy vehicle (HOV) lane between I-610 and State Highway 6, and one HOV lane in each direction between State Highway 6 and the Grand Parkway (State Highway 99).

Project Status: The Katy Freeway HOT Lanes project did not receive Value Pricing funds, however the project obtained the authority to toll through the Value Pricing Program in 2002. Construction continues and toll operations are slated to begin in the late Summer or early Fall of 2008.

For More Information Contact: David Fink, Texas Department of Transportation; Phone: (713) 881-3063; E-mail: dfink1@houstontranstar.org.

TEXAS: Express Toll Lanes on I-30/Tom Landry in Dallas

What: The project opened in August 2007 as an interim "Managed HOV Lane". The project is initially operating in HOV only mode. It will transition to "Express Lanes" with pricing in later phases as the tolling infrastructure is constructed. The I-30 project features will include; dual declaration lanes, dynamic pricing and extended operating hours. The features proposed for I-30 are also being proposed on other facilities in the Dallas / Ft. Worth region and likely other parts of Texas.

Where: I-30 / Tom Landry freeway in the Dallas / Fort Worth region

Project Status: To find out what the ultimate project looks like go to: (www.keepitmovingdallas.com) click on 2006 Public Hearings for I-30 (Scroll a bit to view the presented and approved schematics).

For More Information Contact: Matthew MacGregor, P.E., Texas Department of Transportation; CDA/Tollway Director Dallas District; Phone: (214) 319-6571; E-mail: mmacgre@dot.state.tx.us.

TEXAS: Express Toll Lanes on I-35 in San Antonio

What: TxDOT evaluated managed lane options for a 15-mile section of I-35 in San Antonio, TX. The project evaluated potential operating strategies, including value pricing, which could be used as tools to manage travel demand on I-35. The team evaluated alternative pricing scenarios that could be utilized to allow certain user groups into the managed lanes at different stages over the facility's life.

Where: A 15-mile section of the Northeast Corridor (I-35) in San Antonio, TX

Public Support: the political climate in the area is unfavorable toward tolling and the project involves a large portion of elevated roadway adding considerable expense

Project Completed: The road will probably be tolled in some form once it is completed and responsibility for the project has been turned over to the Regional Mobility Authority, the local tolling agency. Selection of an alternative is not anticipated for at least 5 years because the political climate in the area is unfavorable toward tolling and the project involves a large portion of elevated roadway adding considerable expense.

For More Information Contact: Judy Friesenhan, Planning Engineer, Texas Department of Transportation; Phone: (210) 615-5814; E-mail: jfriese@dot.state.tx.us.

PRICING ON TOLL FACILITIES

Pricing on toll facilities involve tolls on congested toll facilities that are varied by time of day with the intention of encouraging some travelers to use the roadway during less congested periods, to shift to another mode of transportation, or to change routes. With less people traveling during congested periods, the remaining peak period travelers will have decreased delays. To be eligible for the variable toll programs, vehicles must be equipped with transponders, which are read by overhead antennas.

CALIFORNIA: Peak Pricing on the San Joaquin Hills Toll Road in Orange County

What: Peak pricing was employed on this six-lane toll road facility to reduce congestion. Currently, the toll road is near capacity during peak periods.

Where: The San Joaquin Hills Toll Road (State Route 73) is 15 miles long and extends from Interstate 405 in Costa Mesa near Fairview Avenue through the San Joaquin Hills to its southern terminus of Interstate 5 in San Juan Capistrano.

Fees: A small peak period premium of 25 cents was implemented at the mainline plaza in February 2002. This was increased to 50 cents in July 2005 and to 75 cents in July 2006. The premium was designed to reduce congestion and spread peak demand to shoulder and off-peak periods, while maintaining revenues at levels required to maintain the covenants on the Agency's revenue bonds.

Project Status: It carries in excess of 2.3 million vehicles monthly (2.7 million annual average) on a six-lane facility. Currently the Toll Road is near capacity during peak periods.

Project Completed: The project team submitted their draft final report to FHWA. Despite toll increases of 50 cents at peak and 25 cents off-peak at the mainline plaza implemented on July 3,rd, 2006, traffic volumes continued to grow at about 1-2% each year. In March 2007, fiscal year-to-date toll revenue growth increased over 8.6% from last year while traffic was up 1.2%.

For More Information Contact: David Lowe, San Joaquin Hills Transportation Corridor Agency; Phone: (949) 754-3488; E-mail: lowe@sjhtca.com.

FLORIDA: Pricing on Bridges in Lee County

What: In August 1998, Lee County implemented a value pricing strategy on two toll bridges between the cities of Ft. Myers and Cape Coral.

Where: Lee County, Florida

Method: The project created a peak/off-peak pricing structure offering bridge users a discount toll during times before and after the peak traffic periods.

Fees: Under the pricing plan, a fifty percent toll discount was provided for trips made during the half-hour period before the morning peak of 7:00-9:00 a.m. and in the two-hour period following the morning peak. In the evening, the discount period is during the two hours before the evening peak of 4:00-6:30 p.m. and during the half hour after the peak.

Study Completed: This project was originally funded with Congestion Pricing Pilot Program funds. Information on the project study results along with final reports can be accessed at the following web site www.leewayinfo.com. This successful Value Pricing Pilot Program (VPPP) project is still operating.

For More Information Contact: Kris Cella, Cella & Associates, Inc., Phone: (239) 337-1071, E-mail: kcella@cella.cc or Chris Swenson, P.E., CRSPE, Inc., Phone: (239) 573-7960, E-mail: crs@crspe.com; Scott Gilbertson, Director, Lee County Department of Transportation, Phone: (239) 479-8580, E-mail: gilbersm@leegov.com.

FLORIDA: Value Pricing on the Sanibel Bridge and Causeway in Lee County

What: This project will study lowering tolls prior to the morning peak and just after it, as well as studying a mid-morning toll differential. This project also offers a toll credit component for motorists willing to travel during off-peak hours.

Where: Sanibel Bridge and Causeway in Lee County, Florida

For More Information Contact: Eileen Price, Lee County Department of Transportation; Phone: (239) 533-8507; E-mail: EPrice@leegov.com.

FLORIDA: Variable Tolls on the Sawgrass Expressway in Broward County

What: In May 2003, Florida began a pilot project to combine Open Road Tolling and Value Pricing entitled *Sawgrass Expressway: A Study of New Technologies*. Open Road Tolling (ORT) utilizes electronic toll collection to create a tolled highway system free from toll plazas and delays. The project evaluates the potential for utilizing Value Pricing on the Sawgrass Expressway as a travel demand management strategy. It also documents the evaluation of the traffic impacts associated with the widening of the Sawgrass Expressway

from four to six lanes from Atlantic Boulevard to the Turnpike Mainline and removing the two Mainline Toll Barriers

Where: Sawgrass Expressway, Broward County, Florida

Method: There would be no toll plazas, tollbooths, or lane restrictions. All traffic would operate at highway speeds, yet every vehicle would pay a toll. Toll collection would occur through equipment located on overhead gantries. Eliminating the toll plazas themselves and the merging and weaving that occur while entering and exiting the plazas enhances roadway capacity and safety. Customers with a transponder would already have a pre-paid account with the toll agency. The toll charge would be automatically debited from their accounts. Value Pricing could be utilized during heavily congested peak periods along the corridor.

Study Completed: The final report, Sawgrass Expressway: Study of New Technologies is not available electronically. You can access a copy of the project summary at: PRICING ON TOLL FACILITIES - FLORIDA: New Technologies along the Sawgrass Expressway in Broward Co..

There are no plans to implement the variable toll project at this time on the Sawgrass Expressway. But the agency believes variable tolls will be implemented at a future time. The main issue preventing variable tolling is the lack of collection facilities.

As of June 2007, the first entirely electronic toll plaza in the Turnpike system is set to open in 2016 on Highway 589

For More Information Contact: Randy Fox, AICP - Turnpike Planning Manager; Phone: (407) 264-3041; E-mail: Randy.Fox@dot.state.fl.us.

FLORIDA: Variable Tolls for Heavy Vehicles in Lee County

What: The on-going Variable Pricing Program in Lee County (see "Pricing on Bridges in Lee County") was restricted to light duty vehicles. This project expands the existing program to allow three plus axle vehicles to participate in the program and encourages them to travel during off-peak times.

Where: Lee County, Florida

Study Completed: The project was implemented in December 2003. The monitoring and evaluation study was completed in February 2005. The Final Report Executive Summary and Table of Contents can be accessed on the FHWA Highway Community Exchange Web site at: Expansion of Variable Pricing to Heavy Vehicles -- Final Report

For More Information Contact: Kris Cella, Cella & Associates, Inc., Phone: (239) 337-1071, E-mail: kcella@cella.cc or Chris Swenson, P.E., CRSPE, Inc., Phone: (239) 573-7960; E-mail: crs@crspe.com; Scott Gilbertson, Director, Lee County Department of Transportation, Phone: (239) 479-8580, E-mail: gilbersm@leegov.com.

FLORIDA: Pricing Options on the Florida Turnpike in Miami-Dade County

What: The Florida Turnpike Enterprise recently completed a study of the feasibility of implementing value pricing on an extension of the Florida Turnpike.

Where: A 21-mile section of the Homestead Extension of Florida's Turnpike (HEFT) in Southwest Miami-Dade County. The project was divided into two unique and distinct segments. The southern segment extends from

SR 874 to SR 836. It is approximately eight miles long and includes four interchanges. The northern segment extends from SR 836 to I-75. It is approximately 13 miles long and includes six interchanges.

Study Completed: The study recommended widening the HEFT from six to eight lanes in the short-term. The long-term recommendation (by 2010) was to add two reversible, elevated, value-priced Express Lanes. The recommendation for the northern segment was to widen from four to six lanes in the short-term. The long-term recommendation was to add an additional four value-priced express lanes at ground level by 2015.

There are currently no plans to implement value pricing on the Homestead Extension of the Florida Turnpike (HEFT). Like the Sawgrass Expressway project, the elimination of cash payments for tolls is the largest obstacle being faced. The installation of automated toll collection systems is not currently planned, but may be considered in the future as technology advances

For More Information Contact: Randy Fox, Turnpike Planning Manager; Phone: (407) 264-3041; E-mail: Randy.Fox@dot.state.fl.us.

GEORGIA: Variable Pricing Institutional Study for the GA-400 in Atlanta

What: The State Road and Toll Authority (SRTA) will study the institutional challenges and feasibility of moving from a fixed-priced toll to a variably priced toll system using GA-400 as a case study. The major tasks of the proposal include thorough examination of the Toll Authority's internal processes and procedures; legal, contractual & bond covenants; conceptual traffic & revenue forecasts necessary to meet financial obligations; and development of an implementation plan. The study will produce reports identifying key issues as well as model documents for other toll authorities considering similar conversions. The study will identify issues facing toll authorities considering changing from a fixed toll to a variable toll policy, as well as develop model documents.

Where: Georgia state highway 400 in the Atlanta area.

Project Status: The study team has completed preliminary data analysis for the toll plaza optimization alternative. The next steps for this study are to finalize educational materials and processing of survey results for incorporation into a final study report. This study is scheduled to be complete within the current fiscal year.

For More Information Contact: Patrick Vu, Senior Transportation Consultant, State Road and Tollway Authority; Phone: (404) 893-6130; E-mail: patrickvu@georgiatolls.com.

ILLINOIS: Illinois Tollway Value Pricing Pilot Study

What: A value pricing pilot project is being conducted on the Illinois State Toll Highway Authority (Illinois Tollway) system. Phase 1 was designed as a basic feasibility study and evaluation of possible value pricing options. This included identification of alternative pricing strategies, extensive market research, and traffic and socioeconomic impact analysis.

The new toll rates went into effect and variable pricing was introduced in January 2005. The Tollway is now evaluating the impacts of the new toll rate structure. The original idea of this study was to test a value pricing strategy on a portion of the system on a pilot basis. This possible pilot test has in effect been replaced by a system-wide implementation of a limited value pricing approach.

Where: The eastern portion of the I-88 Ronald Reagan Memorial Tollway (formerly the East-West Tollway) from Illinois 31 to the Tri-State Tollway (I-294) a distance of 23 miles is the section chosen for the

pilot project study. The Illinois Tollway operates 274 miles of interstate tollways in twelve counties in northern Illinois including the Chicago suburban area.

Fees: A summary of the new toll rate structure is as follows: For passenger car users the structure provides a strong incentive for participation in the electronic toll collection program that is called I-PASS on the Illinois Tollway. There was no toll increase for drivers using I-PASS, while tolls were doubled for drivers using cash to pay the toll. Time of day pricing was instituted for commercial vehicles. All commercial vehicles traveling overnight (10 pm to 6 am) receive a discount on tolls. Commercial vehicles using I-PASS traveling off-peak on weekdays and on weekends also receive a discount.

Project Completed: The Illinois Tollway approved a comprehensive ten-year Congestion-Relief Plan on September 30, 2004. This plan includes a toll rate structure that incorporates some of the value pricing concepts included in this study. Results of the analysis were presented in a poster session at the Transportation Research Board Annual Meeting in January 2006. The project is essentially complete. A final report is nearing completion and will be issued shortly.

For More Information Contact: Eugene Ryan, Wilbur Smith Associates, Phone: (630) 434-8111 extension 107, E-mail: eryan@wilbursmith.com; or Dean Mentjes, Mobility Engineer, FHWA, Phone: (217) 492-4631, E-mail: dean.mentjes@fhwa.dot.gov.

NEW JERSEY: Variable Tolls on the New Jersey Turnpike

What: The Turnpike's variable pricing program began in the fall of 2000.

Where: The New Jersey Turnpike Authority operates a 148-mile facility with 28 interchanges

Method: The program provides for tolls that are about twelve percent higher during peak traffic hours than during off-peak periods for users of the electronic toll collection system. The price differential is scheduled to increase in a phased manner over several years.

Study Completed: The final report can be accessed from the FHWA Highway Community Exchange Web site at: PRICING ON TOLL FACILITIES - NEW JERSEY: Variable Tolls on the New Jersey Turnpike.
Study Findings: The average trip delay was reduced by about 3-18 percent from 2000 to 2001 after the concurrent introduction of E-ZPass and the first phase of the time of day pricing program. The major reason for this reduction was, however, observed to be the reduction in toll plaza delays due to the introduction of E-ZPass.

It was also observed that there was no increase in toll plaza delays despite the increase of traffic volumes from 2001 to 2003. This was due to the increase in the percentage of E-ZPass users over the years. Simulation analyses showed that between 2000 and 2001 there was a reduction in vehicle emission levels as high as 10.7 percent. After 2001 a slight increase in emissions was observed due to the increasing demand, which can be interpreted as an expected outcome given the relationship among the demand, delays and emissions.

For More Information Contact: Kaan Ozbay, Ph.D., University Principal Investigator, Rutgers University; Phone: (732) 445-2792; Fax: (732) 445-0577; E-mail: kaan@rci.rutgers.edu.

NEW JERSEY: Variable Tolls on Port Authority Interstate Crossings

What: The Port Authority of New York and New Jersey (PANYNJ) adopted a variable toll strategy for users of the electronic toll collection system (E-ZPass) in March 2001.

Where: PANYNJ's Interstate Crossings

Fees: The Port Authority provides a 20 percent ($1.00) discount for off-peak tolls on its bridges and tunnels crossing the Hudson River between New York and New Jersey. Peak toll rates are effective on weekdays form 6-9 a.m. and 4-7 p.m., as well as on weekends from 12 Noon to 8 p.m.

Study Completed: The final report was completed in March 2005. It can be accessed on the FHWA Highway Community Exchange Web site at: PRICING ON TOLL FACILITIES - NJ/NY: Variable Tolls on Port Authority Interstate Vehicle Crossings.

For More Information Contact: José Holguín-Veras, Ph.D., P.E., Associate Professor, Rensselaer Polytechnic Institute, 110 8th Street Building JEC 4030, Troy NY 12180-3590; E-mail: jhv@rpi.edu or Mark F. Muriello, Assistant Director, Tunnels Bridges and Terminals Department, The Port Authority of New York and New Jersey, One Madison Avenue - 5th Floor, New York, NY 10010; E-mail: mmuriello@panynj.gov.

NEW JERSEY: Express Bus/HOT Lane Study for the Lincoln Tunnel

What: The Port Authority of New York and New Jersey (PANYNJ) is advancing this project to assess the feasibility of pricing a new managed lane intended to connect the New Jersey Turnpike and New Jersey highways to the Lincoln Tunnel and the Port Authority Bus Terminal in Midtown Manhattan.

The project will assess options of pricing the excess capacity of a second Bus Lane in a High-Occupancy Toll (HOT) Lane application. The objective of this project is to determine whether value pricing might be used to allow non-bus traffic to use the excess capacity of a potential second Exclusive Bus Lane on NJ Route 495 leading to the Lincoln Tunnel and Midtown Manhattan.

On weekdays from 6-10 a.m., the PANYNJ currently operates a 2.5-mile eastbound contra-flow Exclusive Bus Lane (XBL) along the westbound Route 495 approach to the Lincoln Tunnel from the New Jersey highway interchanges. Since the XBL has reached its capacity, the PANYNJ is assessing the physical and operational feasibility of adding a second priority bus lane to the corridor.

Where: PANYNJ's Lincoln Tunnel

Project Update: An interim report of these findings is in the final stages of development and will be available during the second Quarter of 2008.

For More Information Contact: Mark Muriello, PANYNJ, Assistant Director; Phone: (212) 435-4836; E-mail: mmuriello@panynj.gov.

NEW JERSEY: Upgrade of Electronic Toll Collection Technology in New York

What: The Port Authority of NY & NJ's (PANYNJ) implemented time-of-day pricing in March 2001 at the six tunnels and bridges that connect New Jersey and New York City. This project will undertake a technology and

* Projects funded by the FHWA Value Pricing Pilot Program

market assessment of equipment and systems that can accommodate cashless toll transactions at a level of accuracy that is currently provided by the existing cash and E-ZPass[sm] system; assess the operational challenges and financial risks of implementing such a system; and possibly determine the potential to deploy such a system in both the New York-bound and New Jersey-bound travel directions in order to facilitate more meaningful congestion charging rates and traffic management incentives in the current non-tolled direction

Where: The Port Authority of NY & NJ's (PANYNJ) six tunnels and bridges that connect New Jersey and New York City.

Project Update: Planning for the overall toll system replacement project was formally authorized by the PANYNJ Board on June 26, 2007.

For More Information Contact: Mark Muriello, PANYNJ, Assistant Director; Phone: (212) 435-4836; E-mail: mmuriello@panynj.gov.

PENNSYLVANIA: Variable Tolls on the Pennsylvania Turnpike

What: The project involved a study of the potential for value pricing strategies to alleviate congestion; to facilitate the timely, efficient, and economical movement of commercial vehicles to industrial and commercial destinations; and to improve the movement of daily commuter vehicles to and from the workplace.

Concurrent with the value pricing study, the Pennsylvania Turnpike Commission (PTC) implemented electronic toll collection (E-ZPass) for travel between the ticket interchanges on its mainline system.

Where: Pennsylvania Turnpike

Study Completed: The final report summary can be accessed from the FHWA Web site at: Pennsylvania Turnpike Value Pricing Study. Despite the prediction of favorable results the turnpike decided not to adopt variable tolls.

For More Information Contact: Robert J. Smith, Director of Finance, PA Turnpike, Phone: (717) 939-9551, extension 2432, E-mail: rsmith@paturnpike.com; or George L. Hannon, Special Assistant, PA Turnpike, Phone: (717) 939-9551, extension 5124, E-mail: ghannon@paturnpike.com.

TEXAS: Truck Traffic Diversion Using Variable Tolls in Austin

What: This project will examine the use of value pricing to encourage truck traffic to divert from I-35 to a newly constructed, parallel toll facility (SH 130) using variable tolls on SH 130.. Additionally, the project will examine methods to encourage route and time-of-travel shifting.

TxDOT has contacted the American Trucking Associations and has developed a plan to involve the trucking community in the study. Additionally, the study will produce market research related to truck tolling from both international and U.S. trucking interests.

Where: I-35 in Austin, TX. When completed in 2007, Phase 1 of SH 130 will stretch from just north of Georgetown, Texas to US 183 near the Austin-Bergstrom International Airport. This 49-mile tolled highway will be a four-lane divided facility with major interchanges at I-35, US 79, SH 45 North, US 290 and SH 71. Subsequent phases of the project will connect the road to I-10 north of San Antonio.

For More Information Contact: David Powell, Texas Department of Transportation; E-mail: dpowell@dot.state.tx.us. Mark Burris, Ph.D., Texas Transportation Institute; Phone: (979) 845-9875; E-mail:

MBurris@tamu.edu. Tina S. Collier, Texas Transportation Institute; Phone: (512) 467-0946; E-mail: t-collier@tamu.edu.

USAGE-BASED VEHICLE CHARGES

Usage-based vehicle charges include mileage-based charges for insurance, taxes, or leasing fees; and car sharing; Pay-As-You-Drive (PAYD) Automotive Insurance is a usage-based charge that converts automotive insurance from a fixed to a per mile cost, providing a financial incentive to drive less.

CALIFORNIA: Car Sharing in the City of San Francisco

What: City CarShare is the nation's only non-profit, fully automated car-sharing program. Its vehicles are located throughout the City of San Francisco, and coverage is expanding rapidly throughout the Bay Area. Project involves automated hourly neighborhood car rentals that substitute for car ownership. Under the Value Pricing Pilot Program, an evaluation of the impacts of car sharing on driving and congestion is underway in San Francisco.

Where: San Francisco Bay Area, California

Study Completed: Existing reports prepared by Prof. Robert Cervero are available on FHWA's Web site at: USAGE-BASED VEHICLE CHARGES - CALIFORNIA: Car Sharing in the City of San Francisco and select the project name. Final report by Dr. Cervero is expected soon.

Findings: Surveys of members and a comparable group of non-members (located in similar neighborhoods, but without convenient car sharing) suggest a decrease in driving from members, reduction in gasoline consumption and emissions, and sizable dollar and travel time savings, suggesting that cars were used to replace some of the least convenient off-peak transit trips. Future surveys will seek to identify how vehicle ownership and residential location choices, when combined with the availability of car sharing, affect travel patterns.

For More Information Contact: Rick Hutchinson, Executive Director; Phone: (415) 995-8588; E-mail: rick@citycarshare.org; www.citycarshare.org.

FLORIDA: Dynamically Priced Carsharing in Tampa

What: This project will test "congestion pricing" for carsharing vehicle usage, with differential pricing based upon both time-of-day/day of week and vehicle demand. Such pricing will be coupled with ridesharing promotions and incentives at the university, providing users more options besides driving a carsharing vehicle alone (e.g., finding a ride from someone who owns their own vehicle, sharing a carsharing vehicle, etc.) when congestion pricing for carsharing begins.

Where: Tampa, Florida area

Project Update: Contracts between FHWA, FDOT District 7 and the University of South Florida were finalized at the end of this quarter. The research team is developing methodology for the dynamic pricing structure and testing procedures for TRAC-IT.

For More Information Contact: Julie Bond, CUTR; Phone: (813) 974-9799; E-mail: bond@cutr.usf.edu.

GEORGIA: Simulation of Pricing on Atlanta's Interstate System

What: This test will assess the effects of converting fixed automotive insurance costs into variable driving costs. The research is monitoring one full year of baseline travel activity for approximately 285 participating households.

In Phase II of the study, the impact of mileage-based insurance incentives will be examined. In Phase III, a simulated freeway congestion pricing scheme will be examined.

Where: Atlanta, Georgia area

Method: Approximately 500 vehicles in these households are equipped with instrumentation that monitors the second-by-second vehicle speed and position for every trip. Travel diaries and employer commute options surveys were also collected from each participating household and employer (as well as from a control group). The research team will monitor the changes in driving patterns and will use statistical analyses of household characteristics, vehicle travel, and relevant employer survey data (parking costs, transit accessibility, etc.) to examine the relationships between the incentives offered and subsequent travel behavior changes. Phases II and III will provide extensive data for the first time on how commuters respond to various types of pricing policies. This will allow evaluation of the impacts of pricing policies on travel behavior, and will provide data from real-world experience to improve the ability of regional travel demand models to estimate the impacts of various types of pricing alternatives.

Project Update: Software problems caused some delay. Pricing should begin in March/April. Online electronic travel diaries are ready to implement and preliminary scheduling of post-study focus groups has been handled.

For More Information Contact: Randall Guensler, Georgia Institute of Technology; Phone: (404) 894-0405; E-mail: randall.guensler@ce.gatech.edu.

[*]MINNESOTA: Variabilization of Fixed Auto Costs

What: The Minnesota Department of Transportation and its consultant team led by Cambridge Systematics have completed a demonstration of how drivers change their travel behavior when some of the fixed costs of owning and operating a vehicle are converted to variable costs. The pilot project simulated conversion of vehicle lease and/or insurance pricing from traditional fixed payments to payments based on actual miles driven. This demonstration may help lease companies consider structuring incentives to reduce miles driven over the life of the lease, thus improving the resale value of vehicles, and may help insurance companies better understand the mileage-based insurance market.

Where: Minnesota

Study Completed: The study was completed in November 2005 and final analysis. In March of 2006, the consultant team submitted its recommendations. Project results will be posted on the research web site at the Minnesota Department of Transportation.

Final Products: The project advisory committee accepted the final reports. Part I is titled "Pay-As-You-Drive Experiment Finding" and Part II is titled "Potential Public Policy Implications of Pay-As-You-Drive Leasing and Insurance Products." In late March 2006, the results from the demonstration were reported to the Transportation Research Forum at New York University.

[*] Projects funded by the FHWA Value Pricing Pilot Program

The complete final reports can be found on the web at:

- http://www.lrrb.org/PDF/200639A.pdf (PDF, 1.6MB)
- http://www.lrrb.org/PDF/200639B.pdf (PDF, 509KB)
- http://www.lrrb.org/PDF/200639C.pdf (PDF, 228KB)

The reports are separated into experiment findings, market research, and policy implications

For More Information Contact: Kenneth R. Buckeye, Mn/DOT, Phone: (651) 296-1606, Fax: (651) 215-0443, E-mail: kenneth.buckeye@dot.state.mn.us; Jeffrey Buxbaum, Cambridge Systematics, Inc., Phone: (617) 354-0167, E-mail: jbuxbaum@camsys.com.

MINNESOTA: Mileage-Based User Fee Regional Outreach Statewide

What: This project is an effort to provide important input and enhance the national projects examining replacement for the motor fuel tax. This project proposes to do an assessment of public understanding of mileage-based road user charges through market research, outreach and education. Subsequently, this project will provide direct input into ongoing work looking at the motor fuel tax replacement and how the need for a new or replacement tax might be communicated.

Where: Minnesota

Project Update: Experts concluded that a mileage based user fee is a solution that will likely not be feasible for at least 10 years. If or when it is tested or implemented, it is imperative to clearly identify the objectives of the fee as a first step for determining structure/design of the concept and how to communicate to consumers. The adequacy of funding is a political issue and dependent on politicians' willingness to increase the fuel tax. Experts proposed that the strategy be used to supplement, rather than replace, the current motor fuel tax.

Focus groups revealed that the majority of the Minnesota public doesn't fully grasp the amount of tax dollars they spend per year on the transportation system, nor do they easily recognize the sources through which these monies come.

Drivers may be more accepting of a change in the funding method, whether simply an increase in the existing tax or a switch to a mileage-based user fee, if the reason for the change is clearly explained. They saw the general idea of a mileage-based user fee as a fair and reasonable way to tax, just as taxes for electricity and water. Mixed feelings existed, however, as to the need for more money for transportation in general, with a small portion convinced that funds were adequate but mismanaged. While varying the fee based on size and weight of the vehicle was seen as logical, some thought it would unfairly penalize those who have chosen to drive fuel efficient or hybrid vehicles. The congestion pricing model was seen as less fair as it negatively impacts those drivers who need to travel for work during standard "rush hours". There is an attitude that raising the motor fuel tax is the best/long term solution for transportation partially due the added costs of administration. The project team is now developing the subsequent phases of this work which will drill down into consumer attitudes through a qualitative research process to be followed with a customer survey.

For More Information Contact: Kenneth R. Buckeye, Program Manager Value Pricing; Phone: (651) 366-3737; E-mail: kenneth.buckeye@dot.state.mn.us.

OREGON: Mileage-Based Road User Fee Evaluation

What: The Road User Fee Task Force (RUFTF) has examined various revenue raising alternatives for replacing the fuels tax as the primary source of revenues for Oregon's roads. The Legislature asked the task force to

* Projects funded by the FHWA Value Pricing Pilot Program

evaluate the potential of alternate strategies to replace the fuels tax, focusing in particular on technical strategies for implementing a mileage-based charge and congestion pricing.

Where: Portland, Oregon

Method: The pilot test is designed to demonstrate the technical and administrative feasibility of implementing an electronic collection system for mileage-based user fees and congestion tolls. The on-board technology was demonstrated in May of 2004. Twenty trial vehicles were equipped with the on-board devices in the Fall of 2005. In the spring 2006, after verifying successful functionality, 260 trial participants in Portland, Oregon, had the on-board equipment added to their vehicles. For a period of one year, participants are paying distance charges rather than the fuels tax (when they fill up at the station, the fuels tax will be deducted from the bill and the mileage charge will be added).

Project Completed: The Oregon Department of Transportation released the final report for the Road User Fee Pilot Program on November 20, 2007. The report can be obtained at Oregon's Mileage Fee Concept and Road User Fee Pilot Program.

For More Information Contact: Mr. James M. Whitty; Phone: (503) 986-4284; E-Mail: jim.whitty@odot.state.us or Betsy Imholt; Phone: (503) 986-4077; E-Mail: betsy.imholt@odot.state.or.us.

WASHINGTON: Global Positioning System (GPS) Based Pricing in the Puget Sound Region

What: GPS based pricing.

Where: Puget Sound region, Washington

Method: Meters were placed in the vehicles of voluntary participants. Different prices per mile were imposed depending upon the location and time of travel. Drivers were made aware of the pricing both though maps and other printed material, as well as a real-time read-out on the in-vehicle meter. At the start of the pilot, participants received a billing account with a positive cash balance. Any cumulative in-vehicle meter charges were debited against this balance. Any funds remaining in the account at the end of the pilot were kept by the participants. This "hold-harmless" study design gave participants the opportunity to participate without committing their own funds, yet also gave them the incentive to adjust their driving behavior so as to enjoy the surplus remaining in the account at the end of the experiment.

Project Completed: The Puget Sound Regional Council released the final report in April 2008. The report can be obtained at Traffic Choices Study. There was also a recent Seattle Times article on the project that can be obtained at http://seattletimes.nwsource.com/html/localnews/2004369904_tolls24m.html

For More Information Contact: Matthew Kitchen, Puget Sound Regional Council; 1011 Western Avenue, Suite 500, Seattle, Washington 98104-1035; Phone: (206) 464-6196; E-mail: mkitchen@psrc.org.

WASHINGTON: Pay-As-You-Drive (PAYD) Insurance in Seattle

What: This study tests the Pay-as-you-drive (PAYD) insurance potential. The company will also recruit new participants to the PAYD pilot. Using the larger data base, they will identify the potential markets for mileage based insurance and, if feasible, implement the product at an earlier stage than originally planned. The PAYD pilot will also develop estimates of emissions reductions.

* Projects funded by the FHWA Value Pricing Pilot Program

Where: King County, Washington

Method: This pilot will install the field-tested Intelligent Mechatronic Systems' iPAID global positioning system (GPS) mileage recording devices on a sample of approximately 5,000 vehicles, collect baseline data needed to model the options for a PAYD premium structure, select the best premium structure, and roll out and test it in the State of Washington. The study has both a pre-implementation and implementation phase.

Insurance company research partner, Unigard Insurance Group, will utilize both vehicle history data that provides odometer information and iPAID technology to verify odometer readings and examine driving behaviors from a data base of current insurance holders. Participants will receive discounts for participating in the PAYD pilot. The PAYD pilot will also examine pricing and billing models.

Anticipated Completion Date: 2010

For More Information Contact: Bob Flor, King County; Phone: (206) 684-1611; E-mail: bob.flor@metrokc.gov.

"CASH-OUT" STRATEGIES/PARKING PRICING

Parking Cash Out is a strategy that involves employers offering their employees the option of receiving taxable cash in lieu of free or subsidized parking provided by the employer. Employees may deny the cash and keep the tax-free parking subsidy or accept tax-free transit or vanpooling benefits in its place-with any balance in taxable cash. Car cash-out involves paying households to use one less car for a certain period of time. It helps people review their transportation choices and see how travel by foot, bicycle, transit, and ridesharing is competitive with the private automobile. The goal is to show people that they can save money and simplify their lives by not owning a second - or even first - car.

CALIFORNIA: Car Share Innovations in the City of San Francisco

What: This project includes two distinct program elements:

1) "Unbundling Housing from Parking," where car-sharing vehicles will be placed in new housing developments allowing such developments to provide less parking and include more housing units, thus reducing housing costs; and

2) a pre-implementation "Integrated Car Sharing/Car Pooling System," where technologies will be explored to facilitate ridesharing among car-sharing participants, enabling them to reduce costs by sharing rides while car-sharing.

Where: San Francisco, California

Anticipated Completion Date: 2010

Project Update: The City Carshare Team hired a contractor to assist with research and developing the' best practices guide'. In addition, the Team has been working with several developers who will offer unbundled parking so they can place vehicles and determine how to monitor data on usage. Finally, City Carshare is also talking with an affordable housing group to see how they can include these types of developments in our efforts.

For More Information Contact: Rick Hutchinson, City Carshare; Phone: (415) 995-8588 Extension 314; E-Mail: rick@citycarshare.org.

CALIFORNIA: Smart Parking Initiative in San Diego

What: This new project will build on the priced smart parking system tested at the Bay Area Rapid Transit (BART) system's Rockridge station. The team will test various parking management strategies, including real-time advanced traveler information about parking availability at stations throughout the system with integrated reservations capabilities, variable pricing based upon time of day and demand, and a unique credit-based pricing system (or transit fare discounts) that will reward station access by transit and carpool.

Where: San Diego area

Method: Park-and-ride carpoolers will, in addition to sharing parking expenses among themselves and receiving additional financial rewards, be able to reserve priority parking spaces nearest the station platforms. Pricing will be used to achieve a targeted parking usage rate (e.g., 95% of capacity) at each station and to encourage station access by carpool and transit modes.

Anticipated Completion Date: 2010

Project Update: The consultant team completed the installation of the parking system technologies and initial research observational assessment. Team will establish an existing conditions related report and will also serve as the platform for developing several parking management strategies composed of several operational suites, including: preferred parking for vanpool/carpool transit riders, limited/long-term operations, and pre-reservations and paid parking strategies.

For More Information Contact: Alex Estrella, San Diego Association of Governments; Phone: (619) 699-1928; E-Mail: aes@sandag.org.

MINNESOTA: Parking Pricing Demonstration in the Twin Cities Area

What: The City of Minneapolis is currently undertaking a major downtown transportation study where parking will be an important consideration. The 18-month outreach program will include efforts tailored specifically to the media, local governments, and community leaders and will create a high level parking pricing task force. Demonstration sites will be selected and parking pricing will be implemented at these sites. A comprehensive evaluation will be performed.

Where: Minneapolis and St. Paul, Minnesota

Method: A variety of pricing innovations will be explored, as will integration with the I-394 MnPASS project and the University of Minnesota Metro Transit smart-card system.

Project Update: Background research was begun to examine the current state of parking in select locations in the Twin Cities. The team is identifying specific parking pricing demonstration projects including local government partners.

For More Information Contact: Kenneth R. Buckeye, Program Manager Value Pricing; Phone: (651) 366-3737; E-mail: kenneth.buckeye@dot.state.mn.us.

WASHINGTON: Parking Cash-Out and Pricing in King County

What: project was designed to implement parking cash out and other parking management strategies in downtown high-rises in cooperation with building owners and employers. The purpose was to provide building owners or managers with incentives to shift existing parking supply to carpool, vanpool, or short-term parking; and to reduce the supply and increase the cost of single-occupant monthly vehicle parking. Unfortunately, a serious downturn in the Seattle economy stalled implementation.

Where: Downtown Seattle, Washington

Study Completed 2004: The final report can be accessed on the FHWA Highway Community Exchange Web site at: CASH OUT" STRATEGIES - WASHINGTON: Parking Cash Out . There is currently a cash-out program marketed to employers in place in King County.

For More Information Contact: Kathy Koss, King County Metro; Phone: (206) 684-1649, Fax: (206) 684-2058, E-mail: Kathy.Koss@metrokc.gov; 400 Yesler Way, M.S. YES-TR-0600, Seattle, Washington 98104.

WASHINGTON: Cash-Out of Cars in King County

What: The *Way to Go, Seattle!* "One-Less-Car Demonstration Study" asked households to use one less car and keep daily records of how they got around.

Where: Seattle, Washington

Method: Households were provided with information on how much their car actually costs to own and operate, as well as information on how to get around by biking, riding transit, and walking. Participant households were provided with a weekly study stipend during the times they were not supposed to use their cars to simulate the financial savings they would realize if they were to actually sell one of their cars (the national average cost of owning/operating a second car is $85 per week). Daily records, odometer readings, and anecdotal stories were analyzed to document costs and to understand whether or not households made significant behavior changes such as consolidating trips, carpooling, taking transit, biking, or walking.

Web Site: A web site describing the program as it is currently available to residents exists at: http://www.seattle.gov/waytogo/onelesscar.htm. The final report and replicability package for the demonstration project are also available at: http://www.seattle.gov/waytogo/waytogo.htm.

Study Completed: The Final Report with stand-alone Executive Summary and Replicability Package is complete. Fifty CD-ROM copies of the Replicability Package disc were made and arrangements were also made to post all of the documents on the project web page (www.seattle.gov/waytogo).

A pilot version of the "One Less Car Challenge" was launched in September 2003. The Challenge was based on the results of the Demonstration Study that showed that many types of households from all over Seattle were able to reduce drive-alone car trips, and the accompanying mileage and emissions, when given information about 1) the availability of multi-modal transportation choices and 2) the actual costs of owning and operating their second (and in some cases their primary) car.

Project Results: The eighty-six participant households reduced total miles driven by 41,463, or an average of 1,974 miles not driven per week. Likewise, participants collectively saved a total of 8,003 fewer car trips, or an

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average of 381 fewer trips per week. Finally, the eighty-six households reduced total CO_2 emissions by 30,198 pounds, or an average of 1,438 pounds per week. Additionally, 20 percent sold their "extra" car after participating in the study or during the selection process

For More Information Contact: Ms. Jemae Hoffman, Mobility Manager for the Policy, Planning, and Major Projects Division of Seattle Department of Transportation; Phone: (206) 684-8674; Fax: (206) 684-5180; E-mail: jemae.hoffman@seattle.gov or visit www.seattle.gov/waytogo.

REGIONAL PRICING INITIATIVES

Road pricing strategies that include comprehensive area, or region-wide applications that evaluate pricing's effect on reducing congestion, altering travel behavior, and encouraging the use of other transportation modes. Region-wide pricing applications that use technologies that provide drivers with real-time congestion and pricing information on alternative routes are especially encouraged.

CALIFORNIA: Investigation of Pricing Strategies in Santa Clara Valley

What: The study will provide an assessment of: (1) institutional, design and operational issues related to replacing general purpose freeway mainline and auxiliary lanes with priced managed lanes, and (2) benefits and costs associated with such replacements. It will also assess the benefits and costs of creating a system that integrates priced, managed lanes, freeway operations, and new transit services. Additionally, it will investigate the implementation of a credit-based congestion pricing approach involving both managed lanes and transit, and determine near-term implementation feasibility. The study will contribute to the development of a comprehensive multi-modal value pricing program that includes alternative transportation options.

Where: Santa Clara Valley, Northern California

Anticipated Completion Date: 2010

Project Update: Valley Transportation Authority staff is in the process of preparing the work scope, project schedule and budget to commence work.

For More Information Contact: Casey Emoto, Senior Transportation Engineer; Phone: (408) 321-5564; E-mail: casey.emoto@vta.org.

FLORIDA: Sharing of Technology on Pricing

What: The Federal Highway Administration, the Organization for Economic Cooperation and Development (OECD), the Transportation Research Board (TRB), and the Florida Department of Transportation collaborated in sponsoring an international symposium to set the stage for consideration of wider implementation of innovative pricing strategies to meet congestion relief, emission reduction, and fiscal objectives. The symposium assembled key pricing experts from across the U.S. and overseas and provided a unique opportunity to synthesize the lessons learned about pricing policies throughout the world. It generated a greater understanding of economic, institutional, and administrative issues and concerns relating to pricing strategies, and is expected to provide invaluable impetus for broader consideration of value pricing strategies throughout the U.S.

It explored U.S. and international applications of road pricing strategies in different governmental and socio-economic settings. Case studies from the United States, Europe, and Asia were the principal focus of the symposium. An international group of participants discussed the rationale and motivations for implementing pricing; factors affecting the political and public acceptance of pricing strategies; the use of pricing revenues; and project outcomes. Drawing on papers, presentations, and symposium discussions, the TRB Steering

committee evaluated the current state of practice, assessed future directions and opportunities, and identified research and information needs.

Where: Key Biscayne, Florida – November 19-22, 2003

Study Complete: The symposium was held in Key Biscayne, Florida on November 19-22, 2003. The final report can be accessed on FHWA's Highway Community Exchange Web site at: INTERNATIONAL SYMPOSIUM ON ROAD PRICING: Conference Proceedings .

ILLINOIS: Comprehensive Pricing in Northeast Illinois

What: The project will evaluate the feasibility of reducing bottlenecks through a system of priced queue jumps and will assess resulting changes in travel times and delays on the region's expressways. The study will also assess the feasibility of better utilizing electronic toll collection and variable pricing mechanisms to reduce traffic congestion and access the potential of implementing pricing to increase the use of alternate travel modes and enhance the capacity on the region's expressway system.

Where: Illinois State

Anticipated Completion Date: 2010

For More Information Contact: Mary Wells, Illinois State Toll Highway Authority; Phone: (630) 241-6800 Extension 3902; E-mail: mwells@getipass.com.

MARYLAND: Feasibility of Value Pricing

What: The feasibility study will evaluate implementing HOT lanes on I-270 from I-495 (Capital Beltway) to I-70 (Frederick County).

Where: on I-270 from I-495 (Capital Beltway) to I-70 (Frederick County).

Anticipated Completion Date: 2007

Project Update: In 2008, the feasibility study continued assessing managed lanes on I-270 from the I-270/I-370 interchange in Gaithersburg to I-495 (Capital Beltway), and along I-495 to just north of the Dulles Toll Road in Virginia. The study limits connect the Intercounty Connector, a planned toll-lane facility between I-95 and I-270, with Virginia's I-495 HOT Lanes project.

For More Information Contact: Michael J. Haley, Chief of Regional & Intermodal Planning, Maryland State Highway Administration; Phone: (410) 545-5675 or 1-888-204-4828; E-mail: mhaley@sha.state.md.us.

MINNESOTA: FAST Miles in the Twin Cities

What: This led to the implementation of I-394 MnPASS HOT lanes in May 2005.

Where: Minneapolis and St. Paul, Minnesota

Method: This project explores the political feasibility of an innovative pricing concept called "FAST Miles". Under the FAST Miles concept, each motorist is provided a number of dollar credits per month, analogous to the "free minutes" given by cell phone providers. The motorist, at his or her discretion, can apply those credits

to use priced lanes. Once credits are exhausted, the motorist is charged the going rate to use the priced lanes, analogous to the process when a cell phone user consumes more than his or her allocated "free" minutes.

FAST Miles is designed to promote carpooling by allowing motorists to "pool" their credits. Should a commuter turn to public transportation, unused toll credits can be rebated through reduced vehicle registration fees or property taxes. In both cases, occupants of multiple occupancy vehicles are rewarded by improved access to free flowing traffic and lower use costs. The project will explore the feasibility of an innovative pricing concept to ease highway congestion on limited access facilities by promoting the use of car pools and public transportation.

For More Information Contact: Kenneth R. Buckeye, Program Manager Value Pricing; Phone: (651) 366-3737, E-mail: kenneth.buckeye@dot.state.mn.us.

MINNESOTA: Project Development Outreach and Education

What: The objective of this project is to develop local champions and educate the citizens of Minnesota to help bring about value pricing implementation projects in Minnesota. A visible group of local leaders will advocate value pricing in Minnesota and succeed in convincing doubters that pricing should be tested and implemented.

Where: Minnesota

Method: The University of Minnesota Humphrey Institute's project team will work with Mn/DOT Metro Division staff, Metropolitan Council transportation staff, and members of the Value Pricing Advisory Task Force to develop support for value pricing alternatives and specific projects. Specific activities will include examining the technical and political feasibility of alternative approaches, giving presentations to elected officials, transportation advocacy and other interest groups, and the formation of a local advocacy group for value pricing

Study Completed: The final report is available at Minnesota Value Pricing Outreach and Education (PDF, 17MB). The Humphrey Institute is now working with Mn/DOT and the Metropolitan Council on the next phase of value pricing outreach and education. This next phase focuses on how to integrate transit improvements into the current I-394 MnPASS project as well as Phase II of the I-394 project and future MnPASS corridors.

The Humphrey Institute continues to manage the Congestion Pricing (CON-PRIC) and Project Partners list serv, maintain the www.valuepricing.org web site, and conduct national outreach and education activities on pricing through TRB annual and mid-summer meetings.

For More Information Contact: Lee Munnich, Sr. Fellow and Director, State and Local Policy; Phone: (612) 625-7357; Fax: (612) 626-9833; E-mail: Lmunnich@umn.edu.

TEXAS: Regional Value Pricing Feasibility Study in Dallas

What: The 2005 Regional Value Pricing Corridor Evaluation and Feasibility Study is now complete. This study discusses the historical and current experiences of value pricing applications around the world. A guide as to how the Dallas-Fort Worth Region plans on evaluating candidate facilities for both short-term and long-term applications is detailed. The criteria developed were then applied to determine the selection of a demonstration project in the Dallas-Fort Worth Region. I-30/The Tom Landry Freeway between the Dallas CBD and Arlington, Texas to the west was selected as the demonstration project.

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* Projects funded by the FHWA Value Pricing Pilot Program

Where: Dallas – Fort Worth Region

Study Completed: The public can view and download this study from NCTCOG's Web site at 2005 Regional Value Pricing Corridor Evaluation and Feasibility Study.

For More Information Contact: Tim Young, North Central Texas Council of Governments; Phone: (817) 695-9288; E-mail: tyoung@nctcog.org.

TEXAS: HOT Lane Network Evaluation in Houston

What: This project will examine Houston's six HOV lane facilities with a goal of developing a detailed implementation plan for a HOT lane network. This will include a plan to expand current HOT activities on the Katy and Northwest Freeways and add tolling to the other four HOV lanes to develop an integrated network of HOT lanes.

Where: Houston, Texas area

Anticipated Completion: August 2008

Project Update: Construction continues and toll operations are slated to begin in the late Summer or early Fall of 2008.

For More Information Contact: David E. Fink, Texas Department of Transportation, 6922 Old Katy Road, Houston, Texas 77024; Phone: (713) 881-3063, E-mail: dfink1@houstontranstar.org or Mark Burris, Texas Transportation Institute, Phone: (979) 845-9875, E-mail: Mburris@tamu.edu.

VIRGINIA: Regional Network of Value Priced Lanes

What: The National Capital Region Transportation Planning Board (TPB) is initiating a study evaluating a regional network of value priced lanes.

Where: Currently, the plan includes four new high-occupancy toll (HOT) lanes along 15 miles of the Capital Beltway in Virginia, and six new variably priced lanes along 18 miles on the Inter-County Connector in Maryland. It also includes a study of the conversion of existing HOV lanes into HOT lanes along 47 miles of the I-95/395 corridor in Virginia.

Anticipated Completion Date: September 2008

Project Update: The project team completed the study analysis and final report. The report was presented to the TPB's Task Force on Value Pricing in February and to the TPB in March. The final report, titled *Evaluating Alternative Scenarios for a Network of Variably Priced Highway Lanes in the Metropolitan Washington Region*, can be obtained by clicking on the following link: Evaluating Alternative Scenarios for a Network of Variably Priced Highway Lanes in the Metropolitan Washington Region

For more information contact: Michael Eichler, National Capital Region Transportation Planning Board; Phone: (202) 962-3763, E-mail: meichler@mwcog.com.

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* Projects funded by the FHWA Value Pricing Pilot Program

VIRGINIA: Value Pricing for the Hampton Roads Region

What: This study will focus a significant amount of effort in educating the public about pricing. The goal of the study is to ultimately lead to recommendations for potential implementation of value pricing concepts across the Northern Virginia metropolitan area and the Hampton Roads region. One of the goals is to assess how public perceptions and the potential level of support before and after conducting outreach and education related to potential tolling strategies.

Where: Hampton Roads Region, Virginia

Anticipated Completion Date: 2007

Project Completed: VDOT is preparing the final report. For public outreach tools you can go to the following websites Downtown Tunnel/Midtown Tunnel/MLK Extension .

The http://www.virginiadot.org/info/congestion_pricing.asp webpage which contains all of the public outreach materials; a press kit; 2 different types of brochures for public distribution; a PowerPoint template for making presentations; a tri-fold display booth; and 2 banner-up displays.

For more information contact: Marsha Fiol, Virginia Department of Transportation; Phone: (804) 786-2985; E-mail: Marsha.Fiol@VDOT.Virginia.gov.

WASHINGTON: Tolling Strategies in the Seattle Area

What: WSDOT received 2006 funding to advance public awareness and acceptance of value pricing and associated operational toll concepts from a "user's perspective," incorporate previous study findings into near and mid term policies and project planning, and improve state and regional coordination. The project will communicate to the public and elected officials the concept of value pricing and how tolling can help manage traffic. The inability of public agencies to effectively communicate these concepts has hindered and delayed acceptance of pricing concepts.

Where: Seattle, Washington

Anticipated Completion Date: September 2009

Project Update: WSDOT and PSRC staff are working to develop of a survey to be fielded in the second quarter of 2008.
The pricing outreach work briefly described above is being coordinated with other pricing activities including conversion of the SR 167 HOV lanes to HOT. WSDOT's pricing work is also being coordinated with the update of Destination 2030, the region's Metropolitan Transportation Plan, currently being prepared by PSRC. That plan will include analysis of several roadway pricing alternatives.

For More Information Contact: Charles Prestrud, Urban Planning Office, Washington State DOT; Phone: (206) 464-1271; E-mail: PrestrC@wsdot.wa.gov.

TRUCK ONLY TOLL FACILITIES

Truck only toll (TOT) lanes are highway lanes that are reserved for the use of commercial vehicles, primarily trucks and buses. Commercial vehicles can pay a fee to use the lanes if so desired, or they can continue to use the regular lanes. Further, fees are only charged when necessary to manage the performance of the lanes. TOT lanes can either be newly constructed facilities, or they can be created by reallocating the use of existing lanes. Similar in

concept to HOT lanes, the pricing strategy for TOT lanes corresponds to a cost per mile that will keep the TOT lanes performing at a level of service that provides more reliable travel.

CALIFORNIA: Analysis of Environmental Effects of PierPASS and Dedicated Truck Lanes in Southern California

What: This project will build off of existing analysis on the congestion reducing benefits of PierPASS by conducting a separate environmental analysis of the program. PierPASS provides off-peak truck discounts from the normal charges for accessing the Ports of Los Angeles and Long Beach.

Where: Ports of Los Angeles and Long Beach, California

Method: This project will look specifically at fleet composition and trucking movements, gather new data, and apply it to advanced emissions models in order to assess environmental effects. Study results will provide a comprehensive understanding of the environmental benefits of this project.

Anticipated Completion Date: 2010

Project Update: The project was awarded funds in April 2007.

For More Information Contact: Matthew Barth, Center for Environmental Research and Technology; Phone: (951) 781-5782; E-mail: barth@ee.ucr.edu.

GEORGIA: Northwest Truck Tollway

What: The study will examine a truck-only toll facility extending on Georgia State and interstate highways near Savannah, GA. The study will initiate a peer-to-peer exchange; conduct market research on the potential for truck-only toll facilities; develop additional data on truck travel; refine the travel model related to truck travel; examine options for selling additional capacity to other modes (single occupant vehicle, high occupant vehicle, transit, etc.); examine use of revenues and other activities.

Where: Georgia State Route 21 near I-95 to I-16 at the intersection of I-516 (Savannah, GA).

Anticipated Completion Date: 2008

Project Update: An initial set of model runs and toll runs at various toll levels under different alignments has been completed. The toll structure has also been decided and will be tested for the development of a template for the model runs for each of the alternatives. The final alignments for the corridor for the portions that extend north to I-95 and I-516 have been determined. These alignments will assist in design cost estimates. Public involvement activities have been initiated to reflect the revised scope, which are to include a stakeholder roundtable and the conception of a strategy to market toll roads in the Savannah newspaper. The peer-to-peer exchange occurred in February and included meetings with SCAG, LAMTA, the Port of Long Beach/Los Angeles, PierPASS, and SR91 staff.

For More Information Contact: Patrick Vu, Senior Transportation Consultant, State Road Tollway Authority; Phone: (404) 893-6130; E-mail: patrickvu@georgiatolls.com.

Value Pricing Projects - International[3]

AUSTRIA: NATIONAL VARIABLE TOLLING MOTORWAY NETWORK

What: Time based system for all vehicles under 12 tons, distance based system for all vehicles over 12 tons.

Where: Austrian highway system.

Method: Charge is paid via on-board units (OBUs) called *Go-Box*. More than 800 tolling gantries have been installed on the network. Enforcement system employs license plate reader by automatic character recognition and when appropriate, sends signals to the enforcement officer.

Start Date: 1997 – a time-based charge system a "Vignette system",
2004 – electronic distance based toll on vehicles over 12 tons,

Web site: Austrian Road Administration (http://www.bmvit.gv.at/en/index.html)

AUSTRALIA, MELBOURNE: MELBOURNE CITYLINK

What: A 22 km privately operated tollway linking major routes between Melbourne Airport to the port and industrial centers in the southeast. Tolls vary by vehicle class: cars, light trucks, and heavy freight. Night discounts for trucks and weekend pass discount for cars and trucks are offered. Toll road is undergoing an upgrage that should open in 2009.

Where: Melbourne, Australia

Method: transponders, account. The advanced freeway management system will include:
- ramp metering;
- reversible flow lanes during peak periods; and
- lane control to manage lane availability, traffic speed and driver information;

Web page: http://www.citylink.com.au/; www.vicroads.vic.gov.au; www.transurban.com.au

AUSTRALIA, SOUTH AUSTRALIA: ADELAIDE CRAFERS HIGHWAY

What: The 10 km highway was one of South Australia's largest road projects and includes two 500m long Heysen tunnels.

Where: South Australia, Australia. Links Adelaide to Crafers in the Adelaide Hills and then continues from Crafers as the South Eastern Freeway.

Method: This project also included implementing an Advanced Traffic Management System (ATMS) in connection with their existing Traffic Management System. The system monitors the Variable Speed Limit Signs (VSLS), Variable Message Signs (VMS), Changeable Message Signs (CMS) and video coverage along the length of the new section of the highway.

The traffic management and surveillance system includes cameras, infrared tall vehicle detectors and signs, lane use signals and tunnel control systems.

The Changeable message signs installed at every 200m along the highway in 2005 can display three different messages (Green for normal traffic conditions – with distance to towns and turnoffs; yellow or red if hazard

[3] Sources listed on page 10

ahead; and red for warnings with appropriate driver information. CMS allow for active traffic management with the ability to change the speed limit of the road from Transport SA headquarters in Adelaide

Completion Date: March 2000

CANADA, ONTARIO: 407 EXPRESS TOLL ROUTE (ETR)

What: The 407 Express Toll Route (ETR), one of the first open access all electronic toll highways, opened its first sections in October 1997. To accommodate future traffic needs, 407 ETR has the capability of expanding from six to ten lanes

Where: Ontario, Canada – The 407 ETR runs east-west just north of Toronto (Canada's largest city), from Brock Road in Pickering in the east to the QEW / 403 interchange in Hamilton in the west.

Method: Electronic toll and automatic vehicle identification system, vehicle detector and classifier

Fees: Charges vary depending on the time of day (peak hours/weekday); vehicle class; and distance traveled. Discounts are given if vehicle has a transponder type device.

Web page: http://www.407etr.com/

CHILE, SANTIAGO: A SERIES OF TOLL ROADS AROUND SANTIAGO

What: A network of urban toll roads with varying charges.

Where: Santiago, Chile

Method: Tolls paid by drivers vary depending on the time of day and the number of kilometers traveled. Tolls are increased when speed drops below 50 km per hour.

Public Opinion: Initial resistance to charging ended after the operation began and time savings increased.

CHINA, BEIJING: Real-Time Traffic Information System

What: Installed a robust traffic information and management system to collect, analyze and manage real-time traffic in preparation and use during the 2008 Summer Olympics.

Where: Beijing, China.

Method: The traffic information system is intended to collect, process, analyze, display and store real-time traffic information from systems in and around the city, with the result of controlling and efficiently managing the road infrastructure to increase traffic volumes.

Project Start: 2005

Project Complete: 2008.

ENGLAND, DURHAM: Road user charge scheme

What: This cordon-based pricing system charges drivers to enter a fixed zone.

Where: Durham, England – historic city center, cathedral and castle area.

Method: Access is via a single road. Charge is applied Monday through Saturday from 10:00 am to 4:00 pm. No fee during off hours. Drivers pay while exiting the area at a pay station. Closed-circuit television surveillance.

Results:

- 85 percent reduction in vehicle traffic (2000 to 2000 vehicles per day);
- 10 percent increase in pedestrian activity; and
- increase in bus usage.

Public Opinion: Significant improvement – 70 percent now believe the charge is a good idea (versus 21 percent prior to implementation). 78 percent now believe Durham City is a safe place to visit (versus 68 percent prior to implementation).

Project Start: October 2002

Web page:
www.durham.gov.uk/durhamcc/usp.nsf/web/pages+with+sections/Transport+and+Streets+-+Parking-Durham+Road+User+Charge+Zone

ENGLAND, LONDON: CORDON PRICING

What: Cordon pricing in the central zone of London. Single daily charge to enter the zone.

Where: London, England – central zone

Method: Uses an automatic number plate recognition (ANPR) system; License plates are scanned when entering the central zone. Those without a permit are charged a fee via the mail. Charge is applied to vehicles entering zone Monday through Friday between 7:00 am and 6:30 pm.

Fees: 90 percent discount for zone residents. Revenues generate 100 million pounds (80 percent is spent on improving bus service within London). Projected net revenue for 2007/2008 is about 140 million pounds, reflecting an increase in the charge.

Results:

- traffic entering zone decreased 18 percent,
- congestion in zone decreased 30 percent,
- buses and taxis increased 20 percent,
- bus reliability and travel times improved,
- congestion charging has had neutral impact on central London economy

Project Start: 2003

Web page: London Congestion Charging: www.tfl.gov.uk/roadusers/congestioncharging/

ENGLAND, LONDON: HEATHROW T5 MULTI-STORY CAR PARK

What: The T5 Multi-Story Car Park is an automated parking system is located at Heathrow Airport.

Where: Heathrow Airport's Terminal 5 parking structure.

Method: The automated system employs a plate recognition system and prints the plate number on the ticket. Each driver is directed to an empty parking space. This information is updated in real time. The sensors are all networked to a central system, which checks every few seconds for an update on the parking space status.

Return space location system – when returning to the vehicle, the driver may insert his or her ticket into the locator terminal and a 3D map of the structure will light up the region where the car is parked.

Directing vehicles to open spaces eliminates some circling and GHG emissions.

ENGLAND, LONDON: M6 MOTORWAY TOLL ROAD (M6T)

What: Opened in December of 2003, this privately financed and operated three-lane toll road provides a link around Birmingham. The motorway is 27 miles in length, has eight entry and/or exit junctions, and six toll stations.

Where: Bypass of M6 north of Birmingham to the M42 east of Birmingham.

Method: Variable tolls based on vehicle type, time of day, day of travel and day versus evening travel.

Web page: http://www.m6toll.co.uk/pricing/

FRANCE: TOLL MODULATION

What: Extensive toll road network

Where: France

Method: In 1992 instituted a Sunday afternoon toll. Tolls have evolved to today where variable speed tolling is applied. Shifted toll control from national level to a county level in early 2000s.Over 4,500 miles operated by 6 mainly publicly owned companies (ASF, SAPRR, SANEF, ESCOTA, AREA, and SAPN).

Different variable tolls applied: time variable based on time of day; itinerary variable based on route traveled; environmental variable based on vehicle emissions.

Start Date: 1955
1998 – implementation of time variable toll

Web page: http://www.sanef.com/en/index.jsp

FRANCE, PARIS: A86 WEST TUNNEL

What: The final link of the 80 km A86 ringroad around Greater Paris. Two toll tunnels – one double-deck tunnel for light vehicles.

Where: Paris, France. Ringroad around Greater Paris, from Malmaison to Versailles.

Method: Advanced Traffic Management System (ATMS), techniques. An information system automatically collects traffic data such and speed and density of traffic. This information is relayed to a safety and control office to allow quick and effective control of vehicles entering, using and exiting the tunnel. The tunnels also feature 350 DIVA cameras for the instantaneous detection of non-moving vehicles to supplement the fire alarms, air quality detectors and other traffic management systems that usually determine incidents and intervention response.

Completion Date: 2010

GERMANY: NATIONAL MOTORWAY CHARGING SCHEME FOR HGVS

What: National motorway charging scheme for heavy goods vehicles (HGVs). System was instituted to address the high volume of trucking on German highways. Thirty-five percent of all truck kilometers on Germany's highways are made by foreign trucks.

Where: Germany highway system.

Method: All trucks weighing over 12 tons pay a charge based on distance traveled, emissions by vehicle class, and number of axles. Charge is paid via on-board units (OBUs), manually, or via internet. Long term method will mostly be OBUs.

Start Date: January 2005

Results: - Six percent shift to rail from road freight.
- One negative impact – some trucks are diverting off the highways onto other roads to avoid paying the charge.

Web sites: - Toll Collect (www.toll-collect.de);
- German Federal Transport Ministry (www.bmvbs.de/en)

GREECE, ATHENS: ATHENS TRAFFIC MANAGEMENT SYSTEM

What: The Athens Traffic Management System (TMS) was planned in 2002 and opened in time for the 2004 Summer Olympics.

Where:

Method: The TMS is controlled from two control centers in case one becomes inoperable. Data come from multiple sources: close circuit television, traffic signals, ground loop detectors, speed radar devices, security personnel, and traffic police. The TMS system uses algorithms to determine the best fix and automatically acts via message signs on the highway by adjusting the traffic signal phasing and alerting the traffic police.

Completion Date: Summer 2004

GREECE, ATHENS: ATTIKI ODOS MOTORWAY

What: A tolled highway that is actually three main highways with an outer ring under construction.

Where: The three separate highways are: Stavros Spata A/P Motorway (52.4 km); Attiki Odos (47 km); and Markopoulo to Eleftherios Venizelos (12.9 km). The outer ring highway is the Aigaleo Ring (8 km).

Method: The Integrated Toll and Traffic Management System (ITTMS) allows for smart cards and electronic toll collection (ETC).

HUNGARY: SPEEDWAY NETWORK

What: Time based system for all vehicles for about 640 km of current highway system.

Where: Hungary highway system.

Method: System charges are based on time dependent access. There are no toll gates or check point. A mileage based tolling system is recommended beginning in 2008 to ensure all users pay according to their actual use of the roads.

Start Date: 1996

ITALY, GENOA: CORDON PRICING

What: Cordon pricing system created to protect a 2.5 square kilometer area of the historical downtown area.

Where: Genoa, Italy – historical downtown area

Method: Cordon pricing. Fees are collected per trip with fares varying according to day of the week, time of day, and environmental conditions. Uses a license plate video recognition system.

Web page: http://www.progress-project.org/Progress/genoa.html

ITALY, ROME: HISTORICAL CENTER

What: Since 2001, controlling access to historical center of city by combined Access Control System and Road Pricing Scheme.

Where: Rome, Italy

Method: Gates and cards. Restriction period (6:30 am to 4:00 pm) controlled through access gates and permits (transponders/on-board units and smart cards).

Results: - decrease in overall traffic throughout the day.
- decrease in the morning peak hour (8:30 am to 9:30 am)
- increase in public transit use

Future plans: potential future applications discussed: charging two wheel vehicles, and extending application to evening hours from 4:00 pm to 11:00 pm

JAPAN: NATIONAL TOLLING MOTORWAY NETWORK

What: Tolling covering 8,800 km of total highway system. Tolling replaced vehicle and fuel taxes for financing roads program.

Where: Japan highway system.

Method: Current tolls are distance based, with a double charge for large vehicles. System uses electronic tolling collection with on-board units.

Start Date: 1952

Web site: Japanese Road Bureau, Ministry of Land, Infrastructure and Transport (www.mlit.go.jp/road/road_e/index_e.html)

KOREA, SEOUL: NAMSAN TUNNELS #1 AND #3

What: Congestion toll pricing in two tunnels

Where: Seoul, Korea

Method: Day toll, nights and Sundays free.

Web page: - *Four-Year-Old Namsan Tunnel Congestion Pricing Scheme in Seoul* (http://www.iatss.or.jp/english/research/26-1/pdf/26-1-03.pdf)

- Seoul Metropolitan Government (http://english.seoul.go.kr/today/news/traffic/1240291_3327.html)

MALTA, VALLETTA: CONTROLLED VEHICULAR ACCESS (CVA)

What: Cordon pricing or as it is referred to in this city, Controlled Vehicular Access is a city wide charge based on time traveled into the center city area.

Where: Valletta, Malta

Method: Fees are assessed using Automatic Number Plate Reading (ANPR) technology and dedicated camera systems to monitor and photograph vehicles entering and exiting the CVA boundary. A charge is based on time traveled (amount and time of day) in the city.

Start: *May 2007*

Web page: Controlled Vehicular Access (http://www.cva.gov.mt/)

NORWAY, BERGEN: CORDON PRICING

What: Cordon pricing – a toll is placed on vehicle traffic entering the city. This application was initially developed to help pay for infrastructure but evolved into congestion management tool. On average, 30 percent of state's budget for road construction comes from toll revenue. Revenue for public transit and roads is split 50/50.

Where: Bergen, Norway – First city in Europe to introduce cordon pricing system

Method: Toll Ring. Only incoming traffic is charged. Facility is a fully electronic toll collection system, which debits accounts as drivers pass through unmanned toll booths around the cordon.

Fees: Fee is charged Monday through Friday, 6:00 am to 10:00 pm. Buses are exempt.

Results: - 6 to 7 percent decrease in traffic

Started: 1986

Web page: Norwegian Public Roads Administration: www.vegvesen.no

NORWAY, OSLO: TOLL RING

What: Cordon pricing – a toll is placed on vehicle traffic entering the city. This application was initially developed to help pay for infrastructure but evolved into congestion management tool.

Where: Oslo, Norway

Method: Toll Ring. Only incoming traffic is charged. Vehicle transponders with photo identification and charging through mail for non-permitted vehicles. 19 toll booths around the city center.

Fees: Fee is charged at all times of day, seven days a week.

Results: - raised revenue for infrastructure investment
- slower traffic growth than national average
- two thirds of the population is in favor of a new toll ring where income is dedicated to public transit
- Chamber of Commerce reported no significant impact on trade
- first year of operation's initial investment of 250 million NKr was covered by revenue of 750 million NKr.

Started: 1990

Public Support: Initial support was limited. In 1989 before opening of toll ring 70 percent of population in Oslo region was against the charge. By 1996, support increased to 45 percent of the population in favor of the toll ring.

Web page: Norwegian Public Roads Administration: www.vegvesen.no

POLAND, GDAŃSK: A1 GDAŃSK to TORUŃ MOTORWAY

What: Tolled public-private highway. The motorway will be a dual carriageway with two lanes in each direction and an emergency lane as well as a median barrier. Bridges and overpasses will be constructed as necessary to cross rail lines and rivers. There will be one toll plaza on phase one of the road and toll arrangements on the slip road junctions as well.

Where: Gdańsk, Poland – link between the north and south of Poland from the Baltic ports of Gdańsk and Gdynia across the country to its ultimate end in Austria (Vienna) and then go through Slovenia to meet the Mediterranean and the Adriatic seas.

The Polish section of the A1 will be constructed in two phases. The first section of 90 km is currently underway and runs from Gdańsk to Nowe Marzy in the north of Poland. The Polish section of the A1 will run for 568 km from Gdańsk through Toruń, Łódź, Częstochowa and Katowice to Gorzyczki on the border. Phase two will be a 60 km section which will extend the southern end of the A1 to Toruń.

Completion Date: Phase One - 2008.

POLAND, GDAŃSK: A2 TOLL MOTORWAY

What: Tolled public-private highway. Phase I construction - 150km dual-lane road, 78 new bridges, 31 renovated bridges, 7 interchanges, 3 toll plazas, and 3 maintenance centers.

Where: The A2 motorway (610 km) will run through Warsaw to connect with Germany (German A12 autobahn) in the East and Belarus in the West as a part of the planned East-West Trans European motorway (2,500 km) Berlin to Moscow route (part of the E30).

SCOTLAND, EDINBURGH: RESIDENTIAL PARKING PERMIT LINKED TO ENVIROMENT

What: Proposed parking permits based on carbon dioxide emissions or engine size of vehicle.

Where: Edinburgh, Scotland

Proposed: July 2008

SINGAPORE: CORDON PRICING SYSTEM

What: Cordon variable pricing system where drivers pay to enter the central business and some arterial highways.

Where: City of Singapore – Central business districts and outer ring roads

Method: The current system is electronic road pricing (ERP) and based on a pay-as-you-use principle. Charges are applied in the central business districts from 7:30 am to 7:30 pm; and on the expressways and outer ring roads in the mornings from 7:30 am to 9:30 am. Rates charged are variable priced based on congestion level at time of entry and class of vehicle.

Results:
- 13 percent reduction in traffic in charging zones during periods
- 20 percent increase in average traffic speed
- Increase in carpooling
- shift in vehicle trips from peak to non-peak times

Start Date: 1975 –

Web site: Singapore Government, Land Transport Authority (www.lta.gov.sg)

SPAIN, AUTOPISTA DEL SOL: AUTOPISTA MALAGA TO ESTEPONA

What: Toll Motorway

Where: Toll Motorway between Malaga, Spain and Estepona, Spain

Method: Toll facility uses an electronic toll collection system with on board electronic devices to charge each vehicle.

Fees: The basic fare is assessed based on vehicle type to all users from October to May.

Start Date: Operations began in June 1999

Web page: (http://www.autopistadelsol.com/ausol1/index.htm)

SPAIN, BILBAO AREA: ARTXANDA TUNNELS

What: Three tunnels create a triangular access corridor referred to as the Artxanda Tunnels, 1) Ugasko-Txorierri tunnel; 2) La Salve – Txorierri tunnel; and 3) La Salve – Ugasko tunnel.

Where: Three tunnels make up the Artxanda Tunnels, which are located between the Getxo coastline to the A-8 motorway in Erletxe, Spain. The tunnels allow for easier access to Bilbao's city center, the international airport and a new corridor in the Asua Valley.

Fees: Fees are reported to be applied during the day peak and off peak, with some holiday rates and nights are free.

Method: The fifteen lane facility uses an electronic toll electronic windshield card system

Web page: (http://www.tunelesdeartxanda.com/ingles/intro.htm)

SWEDEN, STOCKHOLM: CONGESTION TAX

What: Full scale congestion tax. In September 2006 the municipality of Stockholm voted in favor of permanent application of the congestion tax.

Where: Stockholm, Sweden – cordon ring covering 29.5 km of central Stockholm

Method: Cordon around city center with 19 control points, traffic cameras with Automatic Number Plate Recognition (ANPR) and transponders. Variable pricing by direction and time of day. Applied Monday through Friday, between 6:30 am and 4:29 pm.

Results:
- Freight users switched to untolled roads;
- Freight users passed costs onto consumers;
- Traffic levels went down 22 percent;
- Public transit use went up 6 percent.

Web site: Swedish Road Administration (http://www.vv.se/templates/page3____21106.aspx)

SWITZERLAND: SWISS HEAVY VEHICLE FEE

What: Nationwide distance-based, variable tolling for Heavy Goods Vehicles. Switzerland's geographically central position in Europe created higher amount of transit traffic particularly HGV traffic, than in other more peripheral countries.

Where: Switzerland

Method: Fee is calculated according to the distance traveled, highest authorized weight, and emissions tariff. Information is collected via on board units (OBUs).

Start Date: January 2001

SOURCES:

; accessed 08/06/2008.

University of Minnesota, Hubert H. Humphrey Institute of Public Affairs: Congestion Pricing. Value Pricing web page. http://www.hhh.umn.edu/centers/slp/vp/vp_org/projects.html; accessed 08/01/2008.

CURACAO - Coordination of Urban Road-user Charging Organizational issues web site. http://www.curacaoproject.eu/; accessed 08/06/2008.

DESigns for Interurban Road pricing schemes in Europe web site. http://www.tis.pt/proj/desire.htm; accessed 08/06/2008.

Commission on Integrated Transport; http://www.cfit.gov.uk/

Tollroad News, http://www.tollroadsnews.com/

Appendix 3 – Preliminary Assessment of Washington State's Ability to Measure Vehicles Mile Traveled

Purpose of Briefing Paper

This paper provides a preliminary assessment of Washington State's current practices to measure vehicle miles traveled (VMT). Sec 8 of ESSHB 2815 directs the Washington State Department of Transportation (WSDOT) to work with partners to

- Develop measurement tools to accurately measure annual progress towards the VMT benchmarks at the state, regional, and local levels.
- Develop measurement tools to measure the effects of strategies implemented to reduce VMT and distinguish between common travel purposes.
- Measure per capita VMT on a five-year basis.
- Establishing a process to periodically evaluate progress towards VMT benchmarks.
- Establishing a process to measure achieved and projected emissions reductions.
- Establishing a process to recommend whether the benchmarks should be adjusted to meet the state's overall GHG emissions reductions goals.

As the State adopts strategies to reduce per capita VMT, WSDOT will continue to work with appropriate technical staff in partner agencies and organizations to develop tools and best practices to measure the progress of the respective strategies in meeting the VMT reduction benchmarks.

How VMT is measured in Washington State

The statewide VMT total is calculated from traffic counts taken on state, county, and city roadways. This information is used to meet Federal Highway Administration (FHWA) reporting requirements as part of the Highway Performance Monitoring System (HPMS). HPMS divides roadways into 12 functional[4] classes and traffic into four vehicle classes. Traffic counts performed as part of the planning and design processes to identify a baseline for future projects are also incorporated into the state VMT calculation. Federal guidelines dictate how this information is collected and reported. These guidelines are necessary because VMT and total lane miles are two factors FHWA uses to determine the distribution of funding among the states.

Traffic is continuously counted and classified at nearly 160 permanent data collection sites in the state. WSDOT rotates about 2,000 temporary sampling sites on a three-year cycle. Each site is sampled for three days continuously. Short-duration hand counts taken during the three days are used to verify mechanical counts. The sampling sites represent a cross-section of functional class and traffic volume categories. About 30 of the permanent sites have the ability to weigh the vehicle as part of the classification process. The other permanent sites and the temporary sites use the distance between axles to determine vehicle size and type. Thirteen vehicle classes are counted, such as passenger vehicles, light duty trucks, semi-trucks with one trailer, and semi-trucks with two trailers. These classes are grouped into four categories for reporting to FHWA. Counters can easily distinguish between sedans and large trucks; however, accurately distinguishing between similarly sized vehicles is

[4] Function class explanation is available at: http://www.wsdot.wa.gov/mapsdata/tdo/functionalclass.htm, Highway Performance Monitoring System Field Manual, Item 17 http://www.fhwa.dot.gov/ohim/hpmsmanl/chapt4.htm, WSDOT Design Manual http://www.wsdot.wa.gov/Publications/Manuals/M22-01.htm,

more difficult, e.g., large pickup trucks and utility/delivery trucks may get misclassified due to their similar characteristics.

In addition to state measurement, 132 cities and 36 counties collect traffic counts on their roads and annually report this information to WSDOT. Not all local governments provide the data each year. For example, last year the response rate was about 94 percent. Three counties do not report traffic counts at all because their principle arterials are state highways. Some cities do not have the resources to count traffic on their roadways every year. These jurisdictions provide best estimates where direct counts are not available.

The equipment needed to count vehicles varies depending on the traffic conditions. Stop and go traffic conditions require more sophisticated equipment than free flow conditions. Radar, sensors in the road, and cameras are three types of technology that are used to count and classify vehicles. Price ranges from several hundred to tens of thousands of dollars. Many vendors offer a wide variety of equipment.

WSDOT uses the counts collected and roadway miles to calculate the statewide VMT. The formula for calculating statewide VMT takes into account lane miles of the different roadway classifications (both functional class and volume category) and traffic volumes on these types of roads. VMT is reported on a calendar year basis. Differences from one year to the next are not clear indicators of changes in driving behavior. Consistent with this, ESSHB 2815 requires WSDOT to report trends based on five-year periods.

At the state level, VMT is a good indicator of the actual miles traveled. Below the county level it is very difficult to accurately assess VMT. Data is not accurate below the county level due to insufficient sample sizes. In addition, because VMT reflects activity across the roadway network, it is not a useful measure for isolated areas, such as the project level.

WSDOT also measures VMT to Commute Trip Reduction (CTR) worksites and within Growth Transportation Efficiency Centers (GTEC) via population and sample surveys. This current practice provides relatively good data on origins and destinations at the zip code level and the commuter VMT between them.

Available approaches for measuring VMT

VMT measurement practices rely on determining the distance traveled by each vehicle. Individual vehicle travel data can be captured through odometer readings or transponders. Surveys can be effective when gathering all the data would be impractical or impossible.

Approach	Agency	Advantage	Disadvantage
Require odometer readings as part of vehicle registration process	Department of Licensing	-Most accurate -Could evaluate effect of localized or sector specific strategies -Good way to measure a statewide aggregate	-Require new reporting system -Accuracy of readings reported -May not be to see trends at less than 5 years -Unable to differentiate between in state and out of state travel. Does not capture out of state vehicles in WA.
Survey sample of vehicle owners for annual odometer	WSDOT	-Select vehicles in areas to match need for information to evaluate localized strategies	-Requires new system to capture data -May not work for all strategies

readings		-Likely more accurate than odometer readings from all drivers.	-Unable to differentiate between in state and out of state travel. Does not capture out of state vehicles in WA. -ROUGH cost estimate $50-100K annually, based on estimate received from WSU survey center 12/07.
Use current vehicle count system	WSDOT	-System in place and recognized -Good way to measure statewide aggregate -Consistent, national approach -Can measure 5-years trends -No new costs	-Difficult to evaluate localized strategies -Not accurate below the county level
Transponders, such as those used in Oregon study for fee based driving.		-Can precisely track where the vehicle travels, and when	-Costly -Privacy issues -Would take time to implement -Is technology ready?

Appendix 4 – VMT Best Practices National and International Synthesis Reports

DOT Climate Change Policies and VMT Reduction: Synthesis

prepared for
Katy Taylor, Director, Public Transportation Division, WSDOT
Anne Criss, Program Lead, Climate Change Team, WSDOT

prepared by
Aaron Poor, TRAC Synthesis Editor
Kathy Lindquist, WSDOT Research Office
Michel Wendt, WSDOT Library

Updated
July 9, 2008

Transportation Synthesis Reports (TSRs) are brief summaries of currently available information on topics of interest to WSDOT staff. Online and print sources may include newspaper and periodical articles, NCHRP and other TRB programs, AASHTO, the research and practices of other state DOTs and related academic and industry research. Internet hyperlinks in the TSRs are active at the time of publication, but host server changes can make them obsolete.

Request for Synthesis:

Katy Taylor, Director, Public Transportation Division, WSDOT, and Anne Criss, Program Lead, Climate Change Team, WSDOT, requested information on state-DOT policies, targets, and measures for climate change, specifically those involving VMT reduction.

Background:

A search of state DOT and agency Web sites has revealed three state DOTs, Connecticut, Maine, and Massachusetts, actively pursuing a set of climate change initiatives. Many states, often their agencies for environment or energy, are in the process of developing or implementing climate action plans, which may recommend policies for DOTs. Several DOTs publicize programs that lead to emissions reduction, such as transit or multimodal programs, although these programs are not obviously guided by an overarching climate-change policy. Legislation to reduce emissions is on the increase, as well as land-use planning strategies to promote transportation efficiency.

Databases Searched:

- Transport, available through WSDOT Library
- TRIS Online
- Research in Progress
- Google
- Wisconsin DOT Transportation Synthesis Reports

Synthesis Summary:

Categories of publications and resources are as follows:

- State Policies
- National Resources
- WSDOT Research on Climate Change
- Literature Search on VMT Reduction and Greenhouse Gas
- Literature Search on Road Pricing

STATE POLICIES:

California:

Climate Action Program: Moving Forward

The Climate Action Program at the California Department of Transportation (Department) is an interdisciplinary effort intended to promote and facilitate greenhouse gas (GHG) emission reduction measures and greening within the Department. The overall objective is to encourage innovative ways to balance progressive program delivery and responsible environmental stewardship in a way that: 1) transportation strategies, plans, and projects as a whole contribute to the State's GHG emission reduction targets, and 2) proper guidelines, procedures, and a quantifiable set of reporting protocols are in place to monitor GHG footprints and provide feedback for program development and implementation. The Climate Action Program serves as a resource for technical assistance, training, information exchange, and partnership-building opportunities.

http://www.dot.ca.gov/climateaction.htm

Climate Change Draft Scoping Plan: a Framework for Change (June 2008 Discussion Draft Pursuant to AB 32, the California Global Warming Solutions Act of 2006)
California Air Resources Board

Excerpt (p. 7 of PDF): ARB must develop a Scoping Plan to lower the state's greenhouse gas emissions to meet the 2020 limit. This Draft Scoping Plan, developed by ARB with input from the Climate Action Team, proposes a comprehensive set of actions designed to reduce overall carbon emissions in California, improve our environment, reduce our dependence on oil, diversify our energy sources, save energy, and enhance public health while creating new jobs and enhancing the growth in California's economy. ARB will revise this Draft Plan based on continuing analysis and public input, and will take the Proposed Scoping Plan, which will be released in early October, to the Board for consideration at its meeting in November, 2008. The measures in the Scoping Plan adopted by the Board will be developed over the next three years and be in place by 2012.

Primary recommended emissions-reduction measures, including several related to transportation, begin on page 29 of the PDF. Secondary measures for the transportation sector begin on page 53 of the PDF. Forthcoming appendices will detail and add measures.

http://www.arb.ca.gov/cc/scopingplan/document/draftscopingplan.pdf

Assessment of Local Models and Tools for Analyzing Smart-Growth Strategies, Final Report
DKS Associates, et al, July 2007, California Department of Transportation

Provides case studies of travel models for six California studies (p. 101 of PDF).

http://www.dot.ca.gov/newtech/researchreports/reports/2007/local_models_tools.pdf

California Transit-Oriented Development (TOD) Database, Caltrans

Caltrans provides travel outcome data for each of its TODs, comparing station area vehicles per household and auto mileage per household with that of the surrounding area. The supporting methodology can be found at http://www.sierraclub.org/sprawl/transportation/holtzclaw-awma.pdf.

The Mountain View station travel outcomes are provided for example: http://transitorienteddevelopment.dot.ca.gov/station/stateViewStationOutcomes.jsp?stationId=1.

Connecticut:

Connecticut Climate Change Action Plan 2005, Transportation and Land Use Sector

This chapter of the Climate Change Action Plan lists three DOT-related recommended actions:

- RA5, Public Education Initiative on Transportation: Raise the awareness of low GHG emitting vehicles (p. 19 of PDF),
- RA7, **Transit, Smart Growth, and VMT Reduction Package**: Implement a package of transit improvements and land-use policies and incentives to achieve a 3 percent reduction in VMT below the 2020 baseline (p. 23 of PDF), and
- RA8, Multistate Intermodal Freight Initiative (p. 31 of PDF).

http://ctclimatechange.com/documents/TransportationSector_CCCAP_2005.pdf

For progress on the above initiatives, including a detailed description of **VMT reduction measures**, see pages 4 and 6 of the following PDF: http://ctclimatechange.com/documents/RAupdatetransportationNov07.pdf.

Public Act 08-98, Section 5, Item 2, 2008

The Department of Transportation shall, within available appropriations, continue to investigate the potential for improvements to the state's transportation system that will reduce greenhouse gas emissions and coordinate with the northeastern states on regional strategies to incorporate greenhouse gas emission reductions into regional transportation planning, including, but not limited to, high speed rail, light-rail passenger service and freight rail service within the northeast region.

http://www.cga.ct.gov/2008/ACT/PA/2008PA-00098-R00HB-05600-PA.htm

2005 Connecticut Climate Change Action Plan

This is the main Web page of the Action Plan with links to report sections and related materials. DOT-related policies are described in the "Executive Summary" and the "Transportation and Land Use" section summarized below.

http://ctclimatechange.com/StateActionPlan.html

Florida:

House Bill 7135, 2008

The bill calls for MPOs to minimize greenhouse gas emissions in accord with state transportation plans (p. 71-73 of PDF).

http://www.flsenate.gov/data/session/2008/House/bills/billtext/pdf/h713503er.pdf

Maine:

Second Biennial Report on Progress toward Greenhouse Gas Reduction Goals
Maine Department of Environmental Quality, January 2008

Page 10 of PDF: LD 1180, "An Act to Promote Transportation Planning, Increase Efficiency and Reduce Sprawl," (enacted as P.L. 2007, ch. 208) will assist in the implementation of Option 17, **"Lowering the Growth of VMT."** It establishes a program within the Department of Transportation, funded on a pilot project basis, to provide technical assistance and incentive grants to municipalities to prevent new development along state highways.

Page 12 of PDF: Workgroup on Option 17, **"Lowering the Growth of Vehicle Miles Travelled."** Composed of some members of the original Transportation Working Group, plus new members, this group is staffed by DEP, Maine Department of Transportation, and the Maine State Planning Office. It has agreed to focus on ways to promote healthy transit-oriented development in some of Maine's key geographical transportation corridors, and is working with the Center for Clean Air Policy, supported by foundation grants, to gather and analyze Maine-specific data in order to assure that any recommendations will meet the desired level of GHG reductions. In 2007, DOT secured funding for a research project, "Transportation Impacts of Transit-Oriented Development in Maine" that will produce additional policy recommendations to move this option forward.

http://www.maine.gov/dep/air/greenhouse/Report%20to%20NRC%201-18-08_FINAL.pdf

Public Law 2007, Chapter 208, An Act to Promote Transportation Planning, Increase Efficiency and Reduce Sprawl

http://www.mainelegislature.org/legis/bills/chapters/PUBLIC208.asp

Maine Climate Action Plan 2004, Volume 1
Department of Environmental Protection, December 2004

GHG mitigation option 17, **"Slowing VMT Growth,"** is presented on page 67 of the PDF.

http://www.maine.gov/dep/air/greenhouse/MaineClimateActionPlan2004Volume%201.pdf

Massachusetts:

The Green Communities Act, Senate Bill 2768, 2008

The act calls for state transportation agencies to make alternative fuels available on the Massachusetts Turnpike and to advance hybrid and alternative-fuel vehicles (p. 89 of PDF).

http://www.mass.gov/legis/bills/senate/185/st02pdf/st02768.pdf

Massachusetts Climate Protection Plan 2004
Office for Commonwealth Development

The following climate change mitigation actions for the Executive Office of Transportation are detailed beginning on page 36:

- Favor Transit-Oriented Development around MBTA Stations,
- Include Energy Use and GHG Emissions Data as Criteria in Transportation Decisions,
- Maintain and Update Public Transit Services,
- Increase Parking at Train Stations to Encourage Use of Public Transit,
- Improve the Efficiency of Transit Vehicle Movement,
- Develop New Bicycle and Pedestrian Policies, Programs, and Facilities,
- Expand Programs to Promote Efficient Travel,
- Seek Opportunities to Reduce Emissions at Logan Airport,

- Improve Aircraft Movement Efficiency,
- Evaluate the Benefits of Expanded Rail and Water Opportunities,
- Promote the Use of Cleaner Vehicles and Fuels in Our Public Transit Fleets,
- Clean Up the Existing Transit Fleet with Less Polluting Fuels,
- Continue to Promote the Use of Clean Diesel Equipment on State-Funded Construction Projects,
- Eliminate Unnecessary Idling of Buses, and
- Use Cleaner Train Engine Technology to Reduce Diesel Soot.

http://masstech.org/renewableenergy/public_policy/DG/resources/2004_MA_Climate_Protection_Plan.pdf

Minnesota:

Transportation and Land Use Technical Work Group: Draft Priority Policy Options for Analysis
Minnesota Climate Change Advisory Group, January 2008

This report describes several climate change policies for the transportation sector. Most call for DOT involvement and some are VMT reduction measures. All options are summarized on page 1. According to a policy briefing (http://www.dot.state.mn.us/traffic/data/mtdmcc/CLIMATE%20CHANGE%20ENERGY%20POLICY.ppt) the measures most related to the DOT are:

- 2, Expand Transit, Bicycle, and Pedestrian Infrastructure (p. 15 of PDF),
- 4, Infrastructure Management (p. 27 of PDF),
- 5, Climate-Friendly Transportation Pricing (p. 30 of PDF),
- 7, "Fix-it-First" Transportation Investment Policy and Practice (p. 36 of PDF),
- 11, Heavy-Duty Idle Reduction (p. 42 of PDF),
- 13, Reduce Maximum Speed Limits (p. 52 of PDF), and
- 14, Freight Mode Shifts: Intermodal and Rail (p. 56 of PDF).

http://www.mnclimatechange.us/ewebeditpro/items/O3F14766.pdf

Minnesota Climate Change Advisory Group: Home
http://www.mnclimatechange.us/index.cfm

New Jersey:

New Jersey FIT: Future In Transportation

Welcome to the future of transportation in New Jersey. The NJFIT initiative represents a change in direction for the New Jersey Department of Transportation. With NJFIT, we are integrating road building and community building. We are forming partnerships to coordinate development and redevelopment in our towns and cities with transportation needs and investments.

This web site presents case studies of current initiatives, and the goals, toolbox, and partnership opportunities of NJFIT.

http://www.state.nj.us/transportation/works/njfit/

New York:

New York State: A Leader in Alternative Fueled Vehicles
New York Office of General Services, January 2008

This is a bulletin on the state's alternative fueled vehicles program. An item under "Developing the State's Alternative Fuel Infrastructure" notes, "The Thruway Authority is planning a project to install E-85 [85 percent ethanol, 15 percent gasoline] pumps at Thruway Travel Plazas" (p. 2).

http://www.ogs.state.ny.us/supportservices/vehicles/cleanfuel/epactInfrastructureUpdate.pdf

Oregon:

Efforts on Climate Change: Fact Sheet—March 2008

Oregon Department of Transportation

The Oregon Department of Transportation recognizes that the transportation sector in Oregon generates significant greenhouse gases. In fact, transportation sources are responsible for over a third of emissions in the state—roughly the same share as the electric power sector. The department understands that in order to meet the greenhouse gas reduction goals laid out by

Governor Kulongoski and the legislature, the state will need to make major changes in the transportation sector.

http://www.oregon.gov/ODOT/SUS/docs/EffortsOnClimateChange2008.pdf

Pennsylvania:

Rail Freight Funding Programs

Rail Freight Assistance Program

The Rail Freight Assistance Program (RFAP) provides financial assistance for investment in rail freight infrastructure. The intent of the Program is to (1) preserve essential rail freight service where economically feasible, and (2) preserve or stimulate economic development through the generation of new or expanded rail freight service.

http://www.dot.state.pa.us/Internet/Bureaus/pdBRF.nsf/infoGrantProgram?OpenForm

South Carolina:

Reducing Emissions thru Congestion Mitigation, SCDOT

Bicycles, Pedestrians Accomodations and Intermodal Planning

SCDOT was the first DOT in the southeast to adopt a policy affirming that bicycle and pedestrian accommodations be a routine part of planning, design, construction and operating activities and be included in the everyday operations of our transportation system. Highways are being viewed as more than simply a place for cars and trucks, they are also facilities that will allow for alternative modes of transportation and easier commutes. A prime example of this is the bicycle/pedestrian lane on the new Cooper River Bridge. This lane is separated from traffic and is used by hundreds of people each day.

SCDOT is also identifying and protecting abandoned rail corridors across the state to promote the future use of passenger rail and shared bicycle and pedestrian paths. These modes of transportation have the potential of reducing carbon emissions -promoting good health for the citizens of our state, as well as reducing the green house effect on our environment.

To further reduce emissions, SCDOT has encouraged Mass Transit providers to install bike racks on buses. This increases mobility for customers and encourages the use of alternative transportation. The Central Midlands Regional Transit Authority (CMRTA) has installed bike racks on all of the CMRTA busses and providers throughout the state are beginning to follow their lead. Bike racks have also been installed at the SCDOT Headquarters building in Columbia, encouraging visitors and employees to use two-wheeled transportation- an environmentally friendly free form of transportation.

Intermodal connectivity is another tool we use to enhance transportation, giving travelers more options and improved convenience. SCDOT is developing a 20-year Intermodal Plan that will improve connectivity between highways, airports, bus terminals, seaports, rail, public transit, bicycle and pedestrian facilities. By working together with our partners in each of these areas, the state will benefit by having a well thought-out transportation system.

Twenty to twenty-five percent (20-25%) of morning rush hour traffic is attributed to adults driving their children to school. (*U.S. Department of Transportation, National Highway Traffic Safety Administration, "Safe Routes to*

Schools," DOT HS 809-497: Sept. 2002, 73.) The South Carolina Safe Routes to School Program provides guidance and funding to make walking and cycling more appealing transportation alternatives for students in kindergarten through eighth grades. By enabling and encouraging children to walk and bicycle to school, we reduce traffic congestion and improve air quality. The Safe Routes to School Program also explores reducing the number of children that must be bused within a reasonable walking distance, encourages carpooling, and proposes no idling policies in school pick-up lines.

http://www.scdot.org/environmentalstewardship/bikes.shtml

SMARTRIDE

SCDOT partners with DHEC, and the SC Energy Office to help improve air quality and reduce imports of foreign oil by using the SmartRide commuter service. Currently, SmartRide offers two bus routes that provide service between Camden and downtown Columbia, and between Newberry and downtown Columbia. The SC Department of Transportation offered free fares on the SmartRide commuter service between July 1 and September 30, 2007 on days DHEC forecasted Ground-Level Ozone Action Days. SmartRide has proven to be popular with many people who live in outlying areas and commute to downtown Columbia on a daily basis.

http://www.scdot.org/environmentalstewardship/smartride.shtml

Traffic Signal Coordination

Several tools used in the reduction of congestion and improving traffic flow are computer generated traffic signal coordination and improved intersection design standards. These efforts reduce stop-and-go traffic and vehicle idle times, saving fuel and shortening commuting times.

SCDOT Traffic Engineers monitor traffic signal systems to ensure optimum performance. Properly managed traffic signal systems can improve highway capacity up to 20%*. (*footnote: based on national studies and can deliver up to a 40:1 benefit to cost ratio) In the past year, our Traffic Engineers have retimed 23 signal systems. There are currently 208 signal systems in South Carolina. Several large "retiming" projects managed by SCDOT are currently in progress in Columbia, Rock Hill, Spartanburg and Charleston- major urban areas. There are currently plans to retime 20 signal systems in Richland, Lexington, Florence, Bluffton and the Myrtle Beach area. New signal systems are also planned in Georgetown and Spartanburg County in the near future.

http://www.scdot.org/environmentalstewardship/trafficsignals.shtml

Tennessee:

TDOT Biofuel Program

TDOT Plays Key Role in Governor's Alternative Fuel Initiative

Tennessee Governor Phil Bredesen is dedicated to the protection of our natural resources, our environment, our economy and the health of Tennessee's citizens. That commitment includes a focus on promoting the efficient use of natural resources, including renewable alternative fuels, such as biodiesel and ethanol ("biofuels"), made from agricultural products.

http://www.tdot.state.tn.us/biofuel/default.htm

Virginia:

Senate Bill 233, 2008

Revises code regarding the Statewide Transportation Plan such that the plan will include quantifiable measures and achievable goals relating to greenhouse gas emissions.

http://leg1.state.va.us/cgi-bin/legp524.exe?081+ful+SB233E

Transportation and Land Use

The planning and construction of new highways and transportation improvements affects existing land uses and plans for future development. Types and pattern of development influence and impact travel patterns and demand for transportation facilities.

In Virginia, land use is the prerogative of local governments, while transportation planning and funding decisions are generally made at the state level.

Improving the coordination between transportation and land-use planning is essential for ensuring mobility throughout the commonwealth.

The Virginia Department of Transportation (VDOT) is working with various stakeholders to develop regulations to improve the coordination between transportation and land-use planning in Virginia.

Through these regulations and requirements, VDOT strives to provide a balanced and efficient transportation system for citizens of the commonwealth.

http://www.virginiadot.org/projects/landuse.asp

NATIONAL RESOURCES:

Pew Center on Global Climate Change: U.S. States and Regions

States and regions across the country are adopting climate policies, including the development of regional greenhouse gas reduction markets, the creation of state and local climate action and adaptation plans, and increasing renewable energy generation.

Read More . . .

http://www.pewclimate.org/states-regions

Center for Clean Air Policy Transportation Emissions Guidebook

This interactive website provides an index to two categories of mitigation policies: (1) land use, transit, and travel demand management, and (2) vehicle technology and fuels. The site provides briefs for each policy, which include an overview, emissions-reduction potential, implementation strategies, case studies, and links to resources. There is also an emissions-reduction calculator and a policy comparison matrix.

http://www.ccap.org/safe/guidebook/guide_complete.html

Updated List of Select State Global Warming Policies and 2008 Bills
National Caucus of Environmental Legislators, February 2008

http://www.ncel.net/newsmanager/news_article.cgi?news_id=184

Primer on Transportation and Climate Change
AASHTO, May 2008

This report identifies and summarizes five national data sources from the FHWA, EPA, and DOE that underlie most of the independent research on transportation-related GHG emissions (excerpts, p. 23):

- *FHWA, Highway Statistics:* The report includes detailed break-downs of VMT as well as total fuel consumption, but does not include data on GHG emissions.
- *FHWA, Conditions and Performance Report:* Important information in this report includes vehicle miles of travel (VMT) growth rates from 1984 through 2004, as well as projected VMT growth trends through 2024. Notably, the FHWA forecast of VMT growth is somewhat higher than the forecast in DOE's *Annual Energy Outlook*.
- *U.S. DOE, Annual Energy Outlook:* The report provides a 25-year forecast of various measures of energy usage for all sectors of the economy. The report includes forecasts for VMT, fuel economy (miles per

gallon), and energy usage (measured in BTUs), all of which are broken down by vehicle type. The report also provides CO2 emissions for the transportation sector as a whole.

- *U.S. EPA, Inventory of Greenhouse Gas Emissions and Sinks:* The report includes historical data, not future projections. It includes data on VMT, fuel economy, and GHG emissions for various classifications of transportation vehicles. It also includes historical data on trends in use of ethanol and other biofuels.
- *U.S. DOE, Transportation and Energy Data Book:* [This report] is a compendium of primarily historical data regarding energy usage, transportation vehicle characteristics (e.g., fuel economy), alternative fuel usage, GHG emissions, economic conditions, and other factors. It includes some projections of future fuel usage, but does not include projections specifically for VMT growth or GHG emissions.

Additional sources can be found in the Reference Materials section (p. 49). Noted resources include TRB's Appendix B to Special Report 290 (2008), which provides an in-depth review and explanation of the transportation sector's contribution to GHG emissions and a discussion of potential strategies for reducing those emissions, and USDOT's online list of publications, http://climate.dot.gov/ publications/index.html.

Available from the WSDOT Research Library and at http://downloads.transportation.org/ClimateChange.pdf

Securing a Clean Energy Future—Greener Fuels, Greener Vehicles: a State Resource Guide
National Governors Association, February 2008

Excerpt from Page 24:
Overcoming Barriers: State Examples: Governors across the country are applying one or more types of policy tools to build sustainable alternative fuel sources, infrastructure, and advanced vehicle markets. Some of these state policy actions are described below.

http://www.nga.org/Files/pdf/0802GREENERFUELS.PDF

Backgrounder: State and Regional Greenhouse Gas Initiatives (Energy Sector)
National Governors Association, October 2006

Summary of regional GHG initiative programs.

http://www.nga.org/Files/pdf/0610GREENHOUSE.PDF

Transportation and Global Warming: Defining the Connection and the Solution
CTC & Associates LLC and WisDOT Research & Library Unit, July 2007

This transportation synthesis report provides background on transportation's contribution to global warming and a state-by-state list of DOT and local government initiatives. Research articles on CO_2 emission reduction strategies are cited or included for the following subjects:

- reducing GHG emissions through land-use development (The Kyoto Protocol and Sustainable Cities: Potential Use of Clean-Development Mechanism in Structuring Cities for Carbon-Efficient Transportation, *Transportation Research Record No. 1983*, 2006);
- using byproducts such as fly and bottom ash for embankment construction (p. 15 of the pdf);
- developing policies to target behavioral differences of diesel and hybrid car buyers (p. 35 of the pdf);
- implementing an emission permit trading program (p. 50 of the pdf); and
- measuring emissions reductions of roundabouts (p. 66 of the pdf).

http://www.dot.wisconsin.gov/library/research/docs/tsrs/tsrglobalwarming.pdf

Transit-Oriented Development: Developing a Strategy to Measure Success
John Renne and Jan Wells, February 2005, *NCHRP Research Results Digest 294*

From Summary: This digest offers a strategy to systematically evaluate the potential success of transit-oriented development. The digest identifies and evaluates various indicators of the impacts of transit-oriented

development, provides the results of a survey of transit-oriented development indicators, and identifies ten indicators that can be used to systematically monitor and measure impacts.

http://trb.org/publications/nchrp/nchrp_rrd_294.pdf

WSDOT RESEARCH ON CLIMATE CHANGE:

Transportation-Efficient Land Use Mapping (TELUMI): Phase 3 of Integrating Land Use and Transportation Investment Decision-Making
Anne Vernez Moudon, UW, June 2005, Publication No. WA-RD 620.1

The objective of this project was to devise a conceptually simple tool that operationalized the complex relationship between land use and travel behavior. The TELUMI is a set of maps that depicts how the region's urban form affects overall transportation system efficiency.

http://www.wsdot.wa.gov/Research/Reports/600/620.1.htm

Options for Making Concurrency More Multimodal
Mark Hallenbeck, Dan Carlson, Keith Ganey, Anne Vernez Moudon, Luc de Montigny, and Ruth Steiner, December 2006

This study's purpose, by legislative intent, is to examine and propose multimodal improvements to concurrency. These include both alternative ways to measure the availability and effectiveness of multimodal transportation systems, and ways to use those measurements to implement more effective multimodal transportation systems that support the intent of the Growth Management Act.

http://depts.washington.edu/trac/bulkdisk/pdf/ConcurrencyOptions.pdf

Travel Behavior, Emissions and Land Use Correlation Analysis in the Central Puget Sound
Lawrence Frank and Company, Inc., Mark Bradley, Keith Lawton Associates, July 2005, Publication No. WA-RD 625.1

A growing body of research documents that land use relates with travel mode choice, distances and time spent traveling, and household level vehicle emissions. However, to date little work has been done at a sufficiently disaggregate scale to gain an understanding of how local governments should alter their land use policies and plans to reduce vehicle use and encourage transit and non-motorized forms of travel. This study of the four county Central Puget Sound region links parcel level land use data with travel data collected from the Puget Sound Household Travel Survey (PSHTS).

The primary aim of the study is to describe how measures of land use mix, density, and street connectivity where people live and work influences their trip making patterns including trip chaining and mode choice for home based work trips, home based non-work trips, and mid day trips from work. Land use measures are developed within one kilometer of the household and employment trip ends in the survey. Tour based models are developed to estimate the relative utility of travel across available modes when controlling for level of service, regional accessibility to employment, and sociodemographic factors.

A secondary aim of the project is to estimate the linkages between land use and household generation of Oxides of Nitrogen and Volatile Organic Compounds that are precursors to the formation of harmful ozone.

http://www.wsdot.wa.gov/Research/Reports/600/625.1.htm

Travel Indicators and Trends in Washington State
Anne Vernez Moudon, Gwen Rousseau, and D.W. Sohn, April 2005, Publication No. WA-RD 615.1

This review of travel indicators in Washington State aims to understand similarities and differences between the state and the nation and to detect changes or special conditions that need to be considered in the future. The work is intended to support general transportation policies and future state-level transportation plans.

None of the travel indicators reviewed strongly suggests that travel conditions in the state stand out in the national context. Two factors are prime in their association with travel demand: household income and development density. Stagnant income explains why the demand for car travel has slowed over the recent past, yet future demand for car travel may increase if the economy improves. On the other hand, demand could remain stable if development density continues to increase.

Residential and population densities are positively associated with demand for modes other than single-occupancy vehicle (SOV) travel. Living in more compact residential areas and in alternative housing types, and renting versus owning a home, also relate to lower demand for SOV travel.

Even at the aggregate level of national data, the Puget Sound region's transportation context differs from that of rural or other urbanized regions in the state. State policies need to recognize at least three different markets for transportation, which are found in rural, small town, and metropolitan areas.

Overall, Washington State needs to stay tuned to national projections about the likely impacts on travel demand and transportation of general economic trends, the slow down in household formation, growth in car ownership among new immigrants, an aging population with changing driving patterns, and population growth in densely populated areas --where transportation systems investments and land-use policies can affect future travel behavior.

http://www.wsdot.wa.gov/Research/Reports/600/615.2.htm

An Analysis of Relationships Between Urban Form (Density, Mix, and Jobs: Housing Balance) and Travel Behavior (Mode Choice, Trip Generation, Trip Length, and Travel Time)
Lawrence Frank, July 1994, Publication No. WA-RD 351.2

This project is part of a research agenda to discover ways to plan and implement urban forms that reduce dependence on the single occupancy vehicle (SOV). The purpose of this project was to empirically test the relationship between land use density, mix, jobs-housing balance, and travel behavior at the census tract level for two trip purposes: work and shopping. This project provides input into policies at the national, state, and local level targeted at the reduction of SOV travel and for urban form policies.

http://www.wsdot.wa.gov/Research/Reports/300/351.2.htm

Relationships Between Land Use and Travel Behavior in the Puget Sound Region
Lawrence Frank and Gary Pivo, September 1994, Publication No. WA-RD 351.1

http://www.wsdot.wa.gov/Research/Reports/300/351.1.htm

LITERATURE SEARCH ON VMT REDUCTION AND GREENHOUSE GAS:

Modeling Land Use, Bus Ridership, and Air Quality: Case Study of North River Industrial Corridor in Chicago
Jie Lin and Santosh Mishra, 2006, Conference Title: Transportation Research Board 85th Annual Meeting, Washington, Held: 20060122-20060126

Abstract: Public transportation is a means to reduce vehicle miles of travel and vehicle emissions from automobile travel. This paper presents a demonstrative study of predicting potential automobile VMT and emissions reductions due to transit service improvement by using a simple GIS-aid computer tool. The prediction procedure involves a bus ridership model that incorporates transit policy and land use indicators, prediction of transit demand of new or modified existing service by applying the ridership model in GIS spatial analysis, and finally estimation of VMT and emissions reductions. We applied this approach to a proposed new Chicago Transit Authority (CTA) bus service in the North River Industrial Corridor in City of Chicago. Bus ridership was found to be strongly correlated with bus service measures such as bus headways, run miles and service frequency; residential and commercial land area and value within a quarter mile buffer zone of a bus route, and other competing transit services available in the same area. We further demonstrated that the ridership models combined with GIS tools and MOBILE6 models could be a useful screening tool for VMT and emissions reduction estimation for CMAQ type of projects. Model limitations are also discussed in the paper.

Heuristic policy analysis of regional land use, transit, and travel pricing scenarios using two urban models
C.J. Rodier, R.A. Johnston, and J.E. Abraham, July 2002, *Transportation Research Part D* 7(4): 243-54, ISSN: 1361-9209

Abstract: To address some of the uncertainties inherent in large-scale models, two very different urban models, an advanced travel demand model and an integrated land use and transportation model, are applied to evaluate and use, transit, and auto pricing policies in the Sacramento, CA (US), region. The empirical and modeling literature is reviewed to identify effective land use, transit, and pricing policies and optimal combinations of those policies and to provide a comparative context for the results of the simulation. The study illustrates several advantages of this approach for addressing uncertainty in large-scale models. First, as Alonso [Predicting the best with imperfect data, AIP Journal (1968)] asserts, the intersection of two uncertain models produces more robust results than one grand model. Second, the process of operationalizing policy sets exemplifies the theoretical and structural differences in the models. Third, a comparison of the results from multiple models illustrates the implications of the respective models' strengths and weaknesses and may provide some insights into heuristic policy strategies. Some of the key findings in this study are (1) land use and transit policies may reduce vehicle miles traveled (VMT) and emissions by about 5-7%, and the addition of modest auto pricing policies may increase the reduction by about 4-6% compared to a future Base Case scenario for a 20-year time horizon; (2) development taxes and land subsidy policies may not be sufficient to generate effective transit-oriented land uses without strict growth controls elsewhere in the region; and (3) parking pricing should not be imposed in areas served by light rail lines and in areas in which increased densities are promoted with land subsidy policies.

Index of Transportation Measurement Quantification Efforts: Methodology Matrix
D.R. Luscher, D.A. Coleman, D.K. Popek, and F. Kamakate, September 1998, ARCADIS Geraghty & Miller, Inc., and Environmental Protection Agency—Regional and State Programs Division, Report No.'s SJ007262 and EPA420-98-018

Abstract: The purpose of this work assignment was to develop a comprehensive index of methodologies used in assessing transportation measures and other non-mandatory programs. Quantification refers to any effort to numerically evaluate transportation measures, or other related measures, in terms of developing air quality benefits, program costs, VMT reductions, trip reductions, and/or cost effectiveness. This extensive matrix was produced for planners and policy makers to use when they need to evaluate the travel and emissions impact of their own existing or planned transportation measures.

<u>LITERATURE SEARCH ON ROAD PRICING:</u>

Data Requirements to Support Road Pricing Analyses.
Johanna Zmud, April 2006, Volpe National Transportation Systems Center and Department of Transportation—Office of the Secretary of Transportation, Conference Title: Expert Forum on Road Pricing and Travel Demand Modeling, Alexandria, Held: 20051114-20051115, Report No. DOT-OST/P-001-06

Abstract: This paper discusses data requirements to support pricing analyses. It focuses on road pricing analyses as they relate to infrastructure financing and congestion management. Infrastructure financing can be defined as either revenue generation via toll roads or capacity enhancement via more efficient use of existing roadway lanes. Congestion management under the rubric of travel demand management (TDM) may include strategies to reduce peak-period vehicle traffic or shift travel to alternative modes or times of the day. The paper has four parts. In the first part, an overview of road pricing is presented, along with associated background information including pricing history, its impetus, and pricing options. This information is followed by areas of intersection between road pricing and travel demand modeling. Given the complexity of road pricing analyses, the paper then presents recommended data requirements at three levels: policy, strategic, and tactical. The paper concludes with ideas for future research, as well as recommended criteria for selecting data items.

Congestion and Traffic Management
R.W. Poole, Jr., 2001, *Contributions in Economics and Economic History* (224): 59-77, ISSN: 0084-9235

Abstract: Transportation economists view urban traffic congestion as an imbalance of supply and demand, caused by the lack of market pricing of roadway use. Road pricing, in which higher prices are charged at peak times and lower prices are charged during off-peak hours could help alleviate this imbalance. There is strong political opposition to road pricing, but recent congestion pricing pilot programs suggest that technically and operationally successful forms of road pricing can be developed. The most successful programs thus far have high-occupancy/toll (HOT) lanes allowing vehicles not meeting the car-pooling requirement to purchase excess capacity in those lanes. The article suggests that a reform of highway finance is necessary to make road pricing feasible since the current financing and ownership of U.S. roadways is too convoluted. New technologies, such as electronic toll collection systems, vehicle-miles-traveled technologies, and a global positioning system-based virtual tolling system, could also help make road pricing a reality. This article suggests a new approach in which the road system becomes a public utility, run either as government utility or franchised to private firms on a long-term basis. The article concludes by suggesting the following policy changes: defederalize the highway system; convert high occupancy vehicle lanes to HOT lanes; use annual registration fees for local streets and roads; end "double taxation" of paying both tolls and fuel taxes; enact public-private partnership laws; and develop national standards for electronic tolling.

Where Are We Going? Transportation Demand Management in the Next Millennium

P.L. Winters, 2000, Association for Commuter Transportation, Conference Title: ACT 2000 International Conference: Imagine the Possibilities, Orlando, Florida, Held: 20000917-20000920

Abstract: This paper will discuss how technology, policies, and procedures fit together to help alter travel behavior in our mobile society. Together these factors can influence travelers' choice of mode, departure time, route, or willingness to pay. These modified travel behaviors will help achieve goals such as reductions in traffic congestion and air pollution. Transportation demand management (TDM) is the all-inclusive term given to this variety of measures used to improve the efficiency of the existing transportation system. TDM products and services include encouragement to use alternatives to the single-occupant vehicle such as carpools, vanpools, transit, bikes, and walking. Alternative work-hour programs such as the compressed workweek, flextime, and telecommuting are also TDM strategies, as are parking management tactics such as preferential parking for carpools and parking pricing. The need to influence travel behavior becomes clearer as recent trends are examined. During the past several decades, commuting behavior could be described as more people in even more vehicles traveling to more places. Although the population increased nearly 22 percent from 1976 to 1996, licensed drivers increased 34 percent. The suburb-to-suburb commute became the dominant commuting pattern. Not only were there more drivers, there were 77 percent more vehicle miles of travel (VMT). Nevertheless, supply has increased at a much slower rate than demand. When adjusted for inflation, highway capital outlay in constant dollars increased by 56 percent from 1976 to 1996, but road mileage only increased 2 percent. In fact, highway expenditures by all units of government, with inflation removed, were about 56 percent of what they were for each vehicle mile of travel in 1976. The result of these growth and demographic trends is more traffic congestion. If present trends continue, increases in the total number of vehicles on the road and in the amount they are driven will continue to cause significant traffic delays and overwhelm the benefits gained from improved emissions controls on vehicles. Therefore, viable alternatives to single-occupant driving need to be available and used in order to ensure the healthy air quality needed and to maintain the personal mobility we all depend on. As we look to the future, TDM professionals face the uncertainty with optimism and renewed vigor.

Proposal for a National Mileage Based Tax

Adeel Z. Lari and Kenneth Buckeye, 1999, ITS America, Meeting (9th: Washington, D.C.), New thinking in transportation: conference proceedings, Publisher: Minnesota Dept. of Transportation—Office of Alternative Transportation Financing

Abstract: In Minnesota, as with virtually all other states, the motor fuel tax is the primary method for collecting road user charges. In addition, a significant portion of revenue is collected through motor vehicle registration fees which vary with the sale price and age of the vehicle. Although registration fees have grown in recent years, the rate of increase in motor-fuel consumption has fallen short of the increase in vehicle miles traveled due to increasingly efficient vehicles. This problem will likely be exacerbated in the future with demands for increased efficiency and as more vehicles are developed which use alternative sources of energy. One proposal to create a

more optimal user fee system is a concept called the Mileage Based Tax (MBT). A primary motivation for a MBT is to close the widening gap between fuel consumption and vehicle miles of travel. Under such a concept revenue would increase in direct proportion to increased travel. The MBT, like other taxes, could be indexed to inflation thereby helping to assure that revenues keep pace with costs. Coupled with advanced electronics now becoming commonplace in motor vehicles the MBT may also be utilized to vary charges by type of vehicle, time of day, and route of travel. Primary challenges for the MBT concept are in the area of public acceptance and technical aspects of implementation.

Transportation Financing: Vehicle Miles Traveled (VMT) Assessment and Measurement: A Critical Review and Evaluation of Alternative Revenue Sources

Reza Nevai, July 2007, California Department of Transportation, Source Notes: This document consists of two reports: Transportation Pricing: Vehicle Miles Traveled (VMT) Assessment and Measurement: Executive Summary, and 2) Transportation Financing: Vehicle Miles Traveled (VMT) Assessment and Measurement: A Critical Review and Evaluation of Alternative Revenue Sources: White Paper

Abstract: This study provides a framework for the analysis and evaluation of transportation pricing, and in particular, vehicle miles traveled (VMT). It presents a critical analysis of transportation pricing issues and develops a realistic notion of market-based measures. The study evaluates transportation revenues and financing reform using different transportation sensitive criteria and strategic scenarios, along with the application of the VMT method. A framework is used to evaluate alternative revenue sources and provide an assessment in terms of adequacy and stability. Options are given that are available for reforming the existing financing system. Recommendations are presented underlining the packaging of potential new revenue sources and improvement measures.

Transportation Pricing Strategies for California: An Assessment of Congestion, Emissions, Energy, and Equity Impacts, Final Report

E. Deakin, G. Harvey, R. Pozdena, and G. Yarema, November 1996, Deakin Harvey Skabardonis, Source Notes: This report was prepared for the California Air Resources Board (CARB) of the California Environmental Protection Agency and the Federal Highway Administration (FHWA); This report was funded and co-sponsored by FHWA, CARB, Caltrans, the Los Angeles County Metropolitan Transportation Authority, Southern California Association of Governments, and the San Diego Association of Governments; Contract/Grant No. 92-316 (CARB)

Abstract: This study investigated five categories of transportation pricing measures - congestion pricing, parking charges, fuel tax increases, vehicle miles traveled (VMT) fees, and emissions fees. Advanced travel demand models were used to analyze these measures for the Los Angeles, Bay Area, San Diego, and Sacramento metropolitan areas. The analyses indicate that transportation pricing measures could effectively relieve congestion, lower pollutant emissions, reduce energy use, and raise revenues. For example, a combination of congestion pricing, employee parking charges, a 50 cent gas tax increase, and mileage and emissions fees would reduce VMT and trips by 5-7% and cut fuel use and emissions by 12-20%, varying by region. Because auto use and its impacts are quite inelastic to price, sizable increases in revenue can be obtained with relatively little effect on travel; conversely price increases must be large to obtain sizable reductions in travel and its externalities. Citizen reactions to prototype transportation pricing measures were explored in focus groups, and feedback from public officials and private organizations was obtained through meetings and interviews. First reactions were skeptical, but many were more favorably inclined after considering alternatives to pricing. Public acceptance would be increased by earmarking revenues for transportation improvements and providing independent oversight of revenue collection and expenditure. Federal and state laws govern and in some cases restrict the implementation of pricing strategies, and these and other institutional and administrative issues would have to be resolved before proceeding with specific measures.

Transport, Land-Use and the Environment, Chapter 10: Short-Term Impact Analysis of Pricing Strategies on VMT (Vehicle Miles Travelled) Reduction

Y. Hayashi, J.R. Roy, T.J. Kim, and P. Hanley, 1996, Transport, Land-Use and the Environment 1996: 191-212, Report No. 0-7923-3728-X

Abstract: In order to comply with standards imposed by the US Environmental Protection Agency a number of strategies are being implemented across the United States. This paper assesses the impact of some of these transportation control measures, in particular pricing strategies, on the reduction of mobile sources of emissions and vehicle miles travelled. The case of Chicago is examined. Using data from the Chicago Area Transportation Study, a number of scenarios are tested which affect the cost of driving. These include various combinations of increases in fuel costs and parking charges. The most effective transportation control measures are identified.

Congestion Pricing and Motor Vehicle Emissions: An Initial Review

R. Guensler and D. Sperling, 1994, Transportation Research Board Special Report (242): 356-379, ISSN: 0360-859X, Report No. 0309055059

Abstract: This paper examines the air quality impacts likely to result from congestion pricing. Key questions addressed are: What effect will congestion pricing have on trip making and VMT? How will traffic volumes change on priced and unpriced routes? How will the change in traffic volume affect the operating environment of vehicles (examined as a change in average vehicle speed under the current modeling regime) and the resulting emission rates per unit of vehicle activity? What changes in vehicle emissions are expected to result from overall changes in vehicle activity and emission rates? In this paper, the focus is on the effects of postulated changes in average vehicle operating speeds on emission rates. The existing emission modeling regime for average speed changes is examined, and a range of emission rate changes based on the projected changes in average vehicle operating speeds is provided. Using projected changes in average vehicle speeds provided by Harvey (in this volume, pp 89-114), percentage changes in emission rates associated with the implementation of four congestion pricing scenarios are examined.

Feasibility of Employee Trip Reduction as a Regional Transportation Control Measure

M.R. Lupa, 1994, Transportation Research Record (1459): 46-52, Source Notes: This paper appears in Transportation Research Record No. 1459, Parking and Transportation Demand Management, ISSN: 0361-1981, Report No. 0309060664

Abstract: The passage of the Clean Air Act Amendments of 1990 resulted in the introduction of a number of transportation control measures (TCMs) that are designed to reduce the number of vehicle kilometers traveled in ozone nonattainment regions. Employee trip reduction (ETR) is one of those strategies. A policy analysis of ETR and a preliminary cost comparison of ETR among TCMs are presented. ETR is an evolving TCM and, as such, provides an arena for strategic planning using many tools, including direct political action, classical economics, technological implementation, pricing, and regional consensus building. Thus far ETR has not affected regional vehicle miles traveled, and yet it is premature to say that it has no effect on regional clean air goals. ETR strategies cannot successfully be separated from related mode split component strategies such as transit expansion, transit user subsidy, and parking fees; this synergistic quality complicates freestanding analysis of ETR. Finally, the positive and negative results of ETR indicate that pricing of some sort is the most direct means of securing behavioral change.

An Assessment of Travel Pricing Strategies

Regional Transportation Authority, September 1994

Abstract: A number of economists who have looked at our transportation problems have concluded that one of the key reasons we drive so much is because driving and the use of roads is underpriced. When prices are low, or the price is not perceived for what it is, i.e. the market signal is weak, then demand will not be tempered by market signals. There are a number of strategies by which market signals for travel demand can be strengthened. This report describes four major pricing strategies that recently have been discussed, analyzed and reviewed (and in a few cases implemented) by transportation planners, analysts and economists. The travel pricing strategies discussed in this report are: congestion pricing, parking pricing, fuel taxes and vehicle miles traveled/emission fees.

Urban Transportation: Reducing Vehicle Emissions with Transportation Control Measures

General Accounting Office, August 1993, Source Notes: Report to Congressional Requesters, Report No. GAO/RCED-93-169

Abstract: In this report, the General Accounting Office (GAO) (1) reviews evidence on the effectiveness of transportation control measures (TCMs) in reducing pollution and (2) assesses the prospects for implementing TCMs in areas that have not attained federal air quality standards for ozone and carbon monoxide (CO). To meet these objectives, among other things, GAO conducted a nationwide survey of 119 metropolitan planning organizations (MPOs) in ozone and CO nonattainment areas. Briefly, GAO found the following: The traditional TCMs listed in the Clean Air Act Amendments of 1990 (CAAA) are projected to reduce regionwide hydrocarbon and CO emissions from 0 to 5% of total emissions. A strong consensus was found among transportation planners that TCMs are complementary programs that will supplement improvements in emissions technology, cleaner fuel, and vehicle inspection and maintenance programs. TCMs will play a growing role in transportation planning. The Intermodal Surface Transportation Efficiency Act (ISTEA) and CAAA contain funding and enforcement provisions that will encourage states to emphasize TCMs in the future. 56% of the surveyed MPOs stated that TCMs would receive strong emphasis in their transportation programs in the next 5 years (1993-98). Only 8% reported that TCMs had received strong emphasis in their programs during the last 5 years (1987-92). GAO found a strong consensus that market-based TCMs--financial disincentives that change travel behavior, such as gasoline taxes or emissions fees--may be more effective than traditional TCMs in reducing automobile use. Department of Transportation and Environmental Protection Agency officials are encouraging states to implement market-based TCMs. However, since these measures add to the cost of driving, they are economically and politically painful; 80% of the MPOs surveyed agreed that public resistance to these measures made their implementation highly unlikely. Localities that find market-based TCMs unfeasible may obtain maximum benefits from traditional TCMs through several approaches, including focusing on specific congested corridors and implementing TCMs that reduce the number of trips as well as the number of vehicle miles traveled.

Commuting, Congestion, and Pollution: The Employer-Paid Parking Connection
D.C. Shoup and R.W. Willson, September 1992, Reason Foundation, Report No. Policy Insight No. 147

Abstract: Urban areas increasingly face problems associated with traffic congestion and vehicle air emissions. Employer-paid parking--a form of matching grant whereby an employer offers to pay the cost of parking if employees are willing to pay all other costs of driving to work--contributes to the tendency of employees to drive alone to work. In Los Angeles, the average employer-paid parking subsidy is equivalent to 11 cents per mile traveled to and from work. Thus, imposing a congestion toll of 11 cents per vehicle mile traveled would raise the cost of driving to the Los Angeles CBD by only as much as employer-paid parking already lowers it. A survey of 5,060 commuters to downtown Los Angeles was used to estimate how employer-paid parking affects transportation system performance. The results show that employer-paid parking: increases the number of solo drivers by 44%; increases parking demand by 34%; increases automobile vehicle miles traveled to work by 33%; increases gasoline consumed for driving to work by 33%; increases the cost of automobile travel to work by 33%; and increases the total cost of parking at work and driving to work by 33%. Although employers spend an average of $750 per employee per year for parking subsidies ($563 in replaced employee spending, and $187 in stimulated spending), the employees' own average spending for parking and driving declines by only $183 per year. The net effect is that the employer must spend $4.10 on parking subsidies for every $1 the employee saves on the cost of parking and driving. This disproportion between the large amount employers pay and the small amount employees save is explained by employer-paid parking's strong stimulus to spending on both parking and driving: the stimulus to parking demand inflates what employers have to pay, and the stimulus to driving diminishes what the employees save. In offering to pay for their employees' parking at work, employers are responding to the Internal Revenue Code's so-called "special rule for parking", which defines employer-paid parking subsidies as a "working condition fringe" that is exempt from income taxation. Given the political difficulty of taxing employer-paid parking subsidies, an alternative policy would be to amend the special rule for parking in Paragraph (4) of Section 132(h) as follows: The term "working condition fringe" includes parking provided to an employee on or near the business premises of the employer if the employer offers the employee the option to receive in lieu of the parking, the fair market value of the parking subsidy, either as a taxable cash commute allowance or as a mass transit or ridesharing subsidy. Offering the cash option to employees who now receive employer-paid parking would reduce their solo driving share by an estimated 20%, and the number of vehicle miles traveled (VMT) per employee by 17%. This VMT reduction would reduce the total cost of automobile commuting to downtown Los Angeles by $40 million per year, and would save 3.5 million gallons of gasoline per year.

Managing Transportation Demand: Markets Versus Mandates
G. Giuliano and M. Wachs, September 1992, Reason Foundation, Report No. Policy Insight No. 148

Abstract: The increasing concern over congestion and air quality problems in Southern California, as well as recent federal legislation, has focused new attention on transportation demand management (TDM). The purpose of TDM is to reduce the demand for trips in order to cope with pollution problems and other difficulties associated with growth. There are two general approaches to TDM: a regulatory approach and a market-based approach. The regulatory approach, such as mandatory trip-reduction programs, involves requiring a class of individuals to achieve a specific performance target established by fiat, e.g. a particular average vehicle ridership. In contrast, a market-based policy creates incentives for socially desirable action but allows for discretionary market choices on the part of individuals. For example, the congestion pricing of expressways provides incentives for individuals to shift travel to non-peak times or to carpool, but it also allows individuals to pay premium fees if they so choose. This study compares the regulatory approach with the market-based approach, by focusing on a paradigm example of each. The South Coast Air Quality Management District's Regulation XV (a mandated employer-based trip-reduction program) is contrasted with the potential for congestion pricing on Southern California's freeways. The reduction in vehicle miles traveled (VMT) from congestion pricing is projected to be at least 12 times as great as that produced by Regulation XV. Even though regulatory techniques like Regulation XV are considered more politically acceptable, market-based strategies such as congestion pricing are more effective and more efficient, and should be considered the TDM policy tool of choice.

International and Municipal VMT Reduction Policies: Synthesis

prepared for
Anne Criss, Program Lead, Climate Change Team, WSDOT

prepared by
Aaron Poor, TRAC Synthesis Editor
Kathy Lindquist, WSDOT Research Office
Michel Wendt, WSDOT Library

July 16, 2008

Transportation Synthesis Reports (TSRs) are brief summaries of currently available information on topics of interest to WSDOT staff. Online and print sources may include newspaper and periodical articles, NCHRP and other TRB programs, AASHTO, the research and practices of other state DOTs and related academic and industry research. Internet hyperlinks in the TSRs are active at the time of publication, but host server changes can make them obsolete.

Request for Synthesis:

Anne Criss, Program Lead, Climate Change Team, WSDOT, requested a synthesis of VMT reduction policies, targets, and measures by cities in the US and cities and countries internationally.

Background:

Municipal and national programs to curb vehicle miles traveled (VMT) work variously. Alternative modes of travel are improved through increased pedestrian access or investing in transit infrastructure. Incentives function financially by taxing road use or offering cash in lieu of unused parking fees, or they may simply be advisory, educating the public on travel behavior. Urban growth and planning strategies encourage development near transit, seek public involvement, and generally build transportation-efficient cities.

Databases Searched:

- Transport, available through WSDOT Library
- TRIS Online
- Research in Progress
- Google
- Wisconsin DOT Transportation Synthesis Reports

Synthesis Summary:

Categories of publications and resources are as follows:

- Multimodal Programs
- Financial Mechanisms
- Growth and Planning
- Transit
- Ad Campaigns
- Resources

MULTIMODAL PROGRAMS:

Pedestrian Design Guidelines
Portland, Oregon, Office of Transportation, 1998

Seven design principles enhance the pedestrian environment by providing safety, accessibility, efficient transportation, and a pleasant atmosphere (p. 3 of Introduction):

- The pedestrian environment should be safe,
- The pedestrian network should be accessible to all,
- The pedestrian network should connect to places people want to go,
- The pedestrian environment should be easy to use,
- The pedestrian environment should provide good places,
- The pedestrian environment should be used for many things, and
- Pedestrian improvements should be economical.

http://www.portlandonline.com/transportation/index.cfm?c=34955

Employer Resources, Bike and Walk Benefits, Parking Cash Out
Downtown Minneapolis Transportation Management Organization

Employers that subsidize employee parking, transit pass, or vanpool costs, can extend this benefit to employees who bike or walk to work by allowing employees to take a "healthy choice" award in cash in lieu of the subsidy.

The value of the award will be subject to taxes. There is no real cost to employers. The amount is treated as additional compensation and employees incur payroll and income taxes. The employer will have to pay payroll taxes on the cash out benefit provided. To offset that cost, employers can simply lower the cash out amount by their share of the payroll taxes.

This "healthy choice" award allows employees to cover the costs of walking shoes, rollerblade and bicycle equipment and repair, bicycle locker rental, or shower privileges at a nearby gym.

http://www.mplstmo.org/pages/employer_bikewalk.html

Safe Routes to Schools
NYDOT

Transportation Commissioner Janette Sadik-Khan announced that 97% of the short term safety improvements at the 135 priority schools in the Safe Routes to Schools Initiative are complete. This work includes new traffic and pedestrian signals, the addition of exclusive pedestrian crossing time, speed bumps, speed boards, high visibility crosswalks and new parking regulations. DOT also announced that capital construction on long term improvements has begun. The next 135 public, private and parochial elementary and middle schools will be identified this winter as well as 40 high schools for similar safety enhancements.

http://www.nyc.gov/html/dot/html/safety/saferoutes.shtml

FINANCIAL MECHANISMS:

B.C.'s Revenue-Neutral Carbon Tax

Excerpt: On July 1, 2008, subject to approval by the legislature, British Columbia will begin to phase in a fully revenue-neutral carbon tax with built-in protection for lower income British Columbians.

The purpose of the carbon tax is to encourage individuals and businesses to make more environmentally responsible choices, reducing their use of fossil fuels and related emissions. The tax has the advantage of providing an incentive without favouring one way to reduce emissions over another. Business and individuals can choose to

avoid it by reducing usage, increasing efficiency, changing fuels, adopting new technology or any combination of these approaches.

http://www.bcbudget.gov.bc.ca/2008/backgrounders/backgrounder_carbon_tax.htm

Road Pricing: Different payment for mobility
Dutch Ministry of Transport and Water Management

At the end of November 2007, the Dutch cabinet decided to introduce a road payment system based on a kilometre charge. The first road users will be confronted with the kilometre charge in 2011, with the entire system being operational by 2016. This site contains background information on the introduction of the kilometre charge.

Paying per kilometer:
In the near future you will pay for the use rather than the possession of a car. The road tax (MRB) and the vehicle purchase tax (BPM) will be phased out and road users will pay per kilometre driven. Motorists who use the car infrequently will pay less, whereas those who drive regularly will pay more. In addition, cars that cause more pollution will be more expensive than cleaner cars and driving in off-peak periods and on quiet roads will be cheaper than driving on busy roads in the rush hour. The revenue from the kilometre charge system will be paid directly into the infrastructure fund. This will be used to finance the construction, management and maintenance of roads, bridges and viaducts . . .

http://www.verkeerenwaterstaat.nl/english/topics/mobility_and_accessibility/roadpricing/index.aspx

Road Pricing Project Descriptions
FHWA Office of Policy and Governmental Affairs

This Web site provides case studies under the following headings:

- Converting HOV Lanes to HOT Lanes (Category A-1),
- Cordon Tolls (Category A-2),
- FAIR Lanes (Category A-3),
- New Priced Lanes (Category B),
- Pricing on Toll Facilities (Category C),
- Usage-Based Vehicle Charges (Category D-1),
- "Cash Out" Strategies (Category D-2), and
- Regional Pricing Initiatives.

http://www.fhwa.dot.gov/policy/otps/projdesc.htm

Congestion and variable user charging as an effective travel demand management instrument
D. Hensher and S.M. Puckett, August 2007, *Transportation Research Part A 41*(7): 615-626, ISSN: 0965-8564

Abstract: Interest at the political level in congestion charging is gaining pace as cities struggle with ways to reduce the effects of growing traffic congestion on the liveability of cities. Despite a long history of promotion of a wide array of travel demand management (TDM) initiatives, very few have had a noticeable impact on the levels of traffic on the road networks of metropolitan areas. TDM success in this context has almost become a band-aid in the absence of a pricing strategy that not only promotes efficient use of the system but also hypothecates revenues to support essential complementary infrastructure and services such as public transport. This paper takes a look at the stream of pricing consciousness that is surfacing around the world. Although very few jurisdictions have implemented congestion charging, or any form of efficient variable car and truck user charging, the winds of change are well in place. The adage "it is not a matter of if but of when" seems to be the prevailing view. Our overview of global trends in positioning the debate and hopefully follow-through commitment to implementation provides a backdrop to papers submitted for this special issue on travel demand management. The predominance of papers on pricing is indicative of the priority that must be given to efficient charging and revenue disbursement.

The road pricing proposal for Tokyo—its development and major issues
K. Ohta, 2001, *World Congress on Intelligent Transport Systems, 8th*, Sydney, New South Wales, Australia

Abstract: Road Pricing is a measure of traffic access restraint with economic incentive. Facing deteriorating traffic congestion and air pollution, TMG (Tokyo Metropolitan Government) has introduced several TDM (Transportation Demand Management) measures to reduce traffic volumes especially in the central area of Tokyo. Pollution by nitrogen oxides and particulates is of increasing concern and control of traffic and especially older diesel lorries is considered important. An outline of proposed road pricing schemes is outlined. It is planned to charge both cars and lorries. Charges are set to reduce traffic and improve air quality, but the lorry charge is reduced for economic reasons. A cordon pricing system is proposed from 0700 to 1900h on weekdays. A camera identification system is proposed. The effects and impacts of the road pricing scheme are simulated and the implementation of the scheme is discussed.

GROWTH AND PLANNING:

Portland Program Offers Incentives to People Who Buy Homes Near Transit
Smart Growth Online

Similar to other such measures across the nation, the new Portland Regional Smart Commute Initiative will let buyers of homes near transit obtain higher mortgage loans, or increase their purchase power by the prospective transportation savings -- $200 per month for one-wage-earner households and $250 for two-wage-earner households . . .

The initiative brought together Fannie Mae, Countrywide Home Loans, Portland Metro, TriMet, the Portland Development Commission, the city's Transportation Office, Flexcar, and the Portland Metropolitan Association of Realtors.

According to *The Business Journal of Portland,* the Smart Commute Initiative will provide home buyers with free one-month passes on TriMet buses and light-rail trains, while Flexcar will offer those who join its car-use program $100 in initial credit . . .

http://www.smartgrowth.org/news/article.asp?art=4342&State=38&res=1024

Regional Funding Programs
Sacramento Area Council of Governments

SACOG has three federally funding programs that help local government agencies promote the goals of SACOG's Metropolitan Transportation Plan and Blueprint Project. SACOG solicits project applications from public agencies and their partners, proposing projects located in Sacramento, Sutter, Yolo, and Yuba counties. There are three transportation-related programs: Bicycle/Pedestrian, Air Quality and Community Design. All three programs have awarded projects in early 2006.

http://www.sacog.org/regionalfunding/fundingprograms.cfm

Introduction to Envision Utah

In January 1997, the Envision Utah Public/Private Partnership was formed to guide the development of a broadly and publicly supported Quality Growth Strategy - a vision to protect Utah's environment, economic strength, and quality of life for generations to come. Five years of scenarios analysis, research and public involvement have helped Envision Utah bring the topic of planning and preparing for growth to the forefront of the public mind. With the help of thousands of Utah residents, Envision Utah has developed a Quality Growth Strategy that will help preserve critical lands, promote water conservation and clean air, improve our region-wide transportation systems, and provide housing options for all residents.

http://www.envisionutah.org/introduction.phtml

Singapore's motorization policies 1960–2000

C. Willoughby, April 2001, *Transport Policy 8*(2): 125-139

Abstract: Because of the rapid economic growth it sustained over the last 40 years and the small physical space at its disposal, Singapore has had to give special attention to managing the process of motorization—the spread of private motor vehicle ownership and use. Despite the inevitable imperfections of the policies adopted—and, more seriously, of related land-use and resettlement policies—the motorization restraints had no major negative side-effect on economic growth and generated substantial funds for the improvement of social welfare.

TRANSIT:

Renaissance of Public Transport in the United States?
John Pucher, Winter 2002, *Transportation Quarterly 56*(1): 33–49

The article details New York's public transportation boom from 1995 to 2005, crediting improved fare policy, service, and security (p. 11 of PDF).

http://www.vtpi.org/tqtransi.pdf

Curitiba, Brazil: BRT Case Study

Curitiba's bus system was developed as an integral part of an overall master plan whose basic objectives included radial expansion of the city along five corridors (structural axes), integrating land use and transport, and protecting the traditional city center. The median busways in each corridor are in the center of a "trinary" road system (busway, local street, one-way arterial). Development densities are greatest within this system as compared with other parts of the city.

Curitiba's busways are viewed as a model bus rapid transit (BRT) system. They are widely recognized for their many innovative features. Trunk and feeder bus lines routed through terminals allow convenient fare-free transfer. Bi-articulated five-door buses and tube stations with off-vehicle fare collection and floor-level boarding facilitate passenger access. Finally, direct express service and tube stations are provided along parallel, one-way arterial streets.

The overall system is the result of many incremental decisions aimed at improving service quickly, pragmatically, and affordably.

http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp90v1_cs/Curitiba.pdf

The relationship between car ownership and public transport provision: as case study of Hong Kong
S. Cullinane, January 2002, *Transport Policy 9*(1): 29-39

Abstract: It is often suggested that traffic demand management measures designed to make public transport more attractive have little impact on car ownership and use. Much of the work on this subject, however, relates to piecemeal changes in public transport provision. Results of an attitudinal survey of 389 university students in Hong Kong, where public transport is both plentiful and cheap and car ownership and use is extremely low, indicate that good public transport can deter car ownership, with 65% of respondents stating that they are unlikely to buy a car in the next 5 years.

AD CAMPAIGNS:

Travel Feedback Programs: Communicative Mobility Management Measures for Changing Travel Behavior
Satoshi Fujii and Ayako Taniguchi, 2005, *Proceedings of the Eastern Asia Society for Transportation Studies 5:* 2320-2329

Abstract: This paper reviews the literature on travel feedback programs (TFPs). These constitute soft measures, involving psychological and behavioral strategies, designed to change travel behavior, mainly, from automobile to a non-automobile travel, in Mobility Management (MM). We classified TFPs according to place, technique, procedure, and communication media. Then, we reviewed the effectiveness of ten TFPs implemented in Japan. We found that the TFPs in Japan reduced CO2 emissions by about 19%, and car use by about 12%, while increasing the

use of public transport by about 50%. The size of these effects did not differ much from those observed in Western countries including European countries and Australia. In addition, we found that TFP's effectiveness increased when participants were asked to make behavioral plans to change their travel behavior.

Travelling smarter down under: policies for voluntary travel behaviour change in Australia
Michael A.P. Taylor and Elizabeth S. Ampt, July 2003, *Transport Policy 10*(3): 165-177

Abstract: This paper reviews the voluntary travel behaviour change programs adopted across Australia in recent times. These programs facilitate individuals and households in changing their travel behaviour through personal choice and individual action. The paper examines the issues relating to the various programs and discusses the techniques used and the results and evaluations. The behaviour change programs reported to date show consistent evidence that participating households make substantial reductions in their usage of private motor vehicles. Further, a range of non-transport benefits have been found, albeit at the local level. These benefits include changes in land use, social interaction, economic development, and health indicators. One consequence is that other government agencies, responsible for areas such as community development, health, environment, energy, public safety, planning and even education, have begun to form interests in the programs. Two key challenges have emerged: (1) the actual measurement tools are hard to implement or the changes are on a scale smaller than that at which measurement is usually made, and (2) the clients for travel behaviour change programs have to date been transport organisations for who the only relevant outcome is travel change. Given that these projects may be of value to other interested organisations, it may be that ultimately travel behaviour change may be intimately linked with all aspects of community life, which could lead to greater change, and certainly to greater sustainability.

Designing a procedure to undertake long term evaluation of the effects of TravelSmart interventions
P. Stopher, S. Greaves, M. Xu, and N. Lauer, 2005, *Australasian Transport Research Forum (ATRF) 28*, Report No. 1877040428

Abstract: As part of the program of strategies to reduce the emission of greenhouse gases in Australia, the ACT, Queensland, South Australia, and Victoria have joined together to undertake a program of voluntary travel behaviour change (VTBC) strategies. Based on implementation of such strategies in a few locations around Australia, estimates have been made of the potential reductions in greenhouse gases that might be achievable. The intent of the project undertaken by the Institute of Transport and Logistics Studies (ITLS) was to develop a method for long-term monitoring that would indicate the probable extent of reductions of greenhouse gas emissions through measuring the reduction in vehicle kilometres of travel (VKT).

RESOURCES:

Climate Change 2007: Mitigation, Transport and its infrastructure
S. Kahn Ribeiro, S. Kobayashi, M. Beuthe, J. Gasca, D. Greene, D.S. Lee, Y. Muromachi, P.J. Newton, S. Plotkin, D. Sperling, R. Wit, and P.J. Zhou, 2007, Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change

Discussion of VMT reduction policy begins on page 26 of the PDF with attention to modal shifts from personal vehicles to public and non-motorized transportation. Detailed discussion of mitigation policies and measures for surface transportation begins on page 44 of the PDF, covering:

- Land use and transport planning,
- Taxation and pricing,
- Regulatory and operational measures,
- Fuel economy standards, and
- Transport Demand Management.

http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter5.pdf

Policies in Key Countries

Pew Center on Global Climate Change

http://www.pewclimate.org/policy_center/international_policy

Trends in vehicle kilometres of travel in world cities, 1960–1990: underlying drivers and policy responses
I. Cameron, T.J. Lyons, and J.R. Kenworthy, July 2004, *Transport Policy 11*(3): 287-298

Abstract: Increases in private motorised urban vehicle kilometres of travel are shown to arise from population growth, urban sprawl, increased car ownership and decreases in vehicle occupancy. In particular, the worldwide increase in urban mobility since 1960 has been the direct result of increased affluence and the consequent greater accessibility of private motor vehicles, as well as population growth. Urban sprawl has significantly less influence, although it has been significant in USA, Canadian and Australian cities. Despite this, a number of cities have shown that clear policy initiatives can contain the growth of urban private motorised mobility.

Greenhouse Policy Options for Transport
Bureau of Transport and Regional Economics, 2002, ISSN: 1446-9790, Report No.'s 1877081094 and Report 105

Abstract: This report explores the actions involving the transportation industry that have the potential to decrease greenhouse gas emissions in Australia. The report includes the economic, fiscal, and environmental impacts. Since road transportation accounts for about 14% of Australia's total greenhouse emissions, it is the main focus of the report. (Australia generates less than 2% of the greenhouse gas emissions in the world). The table of contents lists the following chapter and subject headings. Chapter 1 Greenhouse Gas Emissions And The Australian Transport Sector—Kyoto origins and outcomes, The transport sector and greenhouse emissions; Chapter 2 Reducing Vehicle Kilometres Traveled (VKT)—Induced travel, Public transport, Personalized journey planning techniques, Ridesharing, High occupancy vehicle (HOV) lanes, Parking, Park and ride, Non-motorized transport, Carsharing, Car-free days, Flexible work arrangements, Increased urban density, Shifting freight from road to rail; Chapter 3 Reducing Emissions per VKT—Mandated fuel efficiency standards, Feebates, Promoting technological improvements, Inspection and maintenance programs, Voluntary agreements with manufacturers, Education and provision of information, Encouraging the use of alternative fuels, Modernizing the vehicle fleet: accelerated scrapping of older cars, Intelligent transport systems; Chapter 4 Road-Use Charges—The case for road-use charges, Environmental impact of road-use charges, Efficiency impact of road-use charges, Fiscal impact of road-use charges; Chapter 5 Economy-Wide Measures—Carbon taxes, Tradable permits; Chapter 6—Choosing the Best Policies - Win-win measures, Economy-wide measures, Targeted measures, Integrated strategies.

Appendix 5 – VMT Best Practices – Current Projects

- King County Metro Transit – Public Transportation Services
- King County Metro Transit – Ridesharing Services
- King County Department of Transportation – Transit Oriented Development
- Puget Sound Clean Air Agency – Climate Protection Program
- Sound Transit – Mass Transit Expansion Proposal
- Sound Transit – Program Summary
- Washington State Department of Transportation – Summary of Urban Programs
- Washington State Department of Transportation – Commute Trip Reduction Program
- Washington State Department of Transportation – Growth and Transportation Efficiency Center Program
- Washington State Department of Transportation – Vanpool Investment Program
- Washington State Department of Transportation – Trip Reduction Performance Program
- Washington State Department of Transportation – Park and Ride Program
- Washington State Department of Transportation – Construction Traffic Management Program
- Washington State Department of Transportation – Regional Mobility Grant Program
- Washington State Department of Transportation – Kitsap Telework Pilot Project (Proposed Program)
- Washington State Department of Transportation – Transportation Demand Management Strategies for Schools Study
- Washington State Department of Transportation – The High Occupancy Vehicle Program
- Washington State Department of Transportation – Tolling and Pricing Program
- Washington State Department of Transportation – Active Community Environments Initiative
- Washington State Department of Transportation – Bicycle and Pedestrian Program
- Washington State Department of Transportation – Context Sensitive Solutions
- Washington State Department of Transportation – Advanced Traffic Operations

King County Metro Transit
Public Transportation Services

What is the program?
Other Programs to Reduce SOV and VMT
King County Metro implements a wide array of programs to make our public transportation and ridesharing services, as well as non-motorized travel, more attractive to travelers. The programs address both the commute and non-commute markets.

What are we doing now?
Commuter Market
Metro's programs have focused primarily on the employers affected by the state Commute Trip Reduction (CTR) program. The ability to reach non-CTR affected employers via the Growth and Transportation Efficiency Center program is a step in the right direction to engage more employers. Metro has over 2000 employer customers for the following programs:

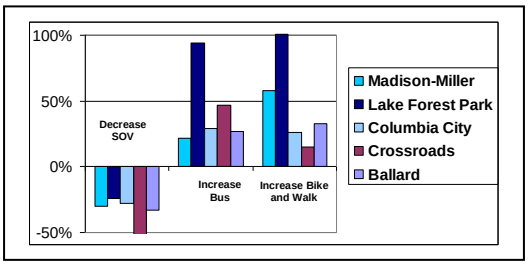
- Transit Passes (PugetPass, FlexPass, Soon ORCA smart card)
- Home Free Guarantee (emergency ride home)
- Commuter Bonus (Vouchers for transit and vanpool fares on many transit agencies)
- Commuter Bonus Plus (Vouchers to provide subsidies to employees who carpool, bike, walk or telework)
- Carsharing (in partnership with Zipcar, reduced the need for commuters to have a car at work for mid day trips)
- Promotions to employers and commuters
- Numerous partnerships with cities, business groups, and employers

Non-Commute Market
King County Metro has created several programs to reduce SOV travel for non-work trips. Several cities, counties, and transit agencies have done the same. All have been pretty successful. Since non-commute trips represent such a huge proportion of all trips, any state program to implement 2815 must direct resources to this market segment. A critical place to start in this would be to better understand what non-commute trips are taken by individuals and why. Recent PSRC survey data suggests that this is the right place to start.

In Motion
The In Motion program was designed to help individuals leave their cars at home — some of the time. It was built using the foundations of community-based social marketing: speaking to the motivations of local communities by providing information, getting action commitments, and offering prompts and incentives to encourage new, healthier travel behavior.
Average results for In Motion programs:

- participation rates between 8% and 10% of the households contacted
- reported changes of 20% fewer drive-alone trips
- corresponding increases in busing, biking, ridesharing and walking
- increased openness to using alternative modes more often.

Community-Based Marketing Reduces SOV



[1]

Figure 1. Change in travel behavior in *In-Motion* neighborhoods

Partners In Transit

The Partners in Transit program is a new way for Metro to work with organizations that share our commitment to sustainable living. Partners in Transit brings a membership organization's customers the information they need to explore how they can get around their community while leaving their car behind. The program is geared to helping individuals think about every trip they make, and finding the ones that are easy to change from driving to taking the bus, walking, biking or sharing a ride.

Partners in Transit promotes healthy transportation through communications with partner members, shoppers, and/or affiliates. The Partners provide information and incentives to encourage the use of sustainable transportation as well as touching individuals through more traditional advertising and promotion.

Mileage Based Insurance

Over the next five years, King County and Unigard Insurance Company of Bellevue will be enrolling participants in a mileage-based insurance pilot. In a mileage-based program, drivers who reduce their miles driven qualify for lower insurance premiums. As people drive fewer miles to save on insurance, they will utilize more efficient travel options, reduce emissions and save energy. The pilot will aid in the creation of an insurance program that saves consumers money and it will also contribute to the nation's goal of establishing energy independence and reducing the production of greenhouse gasses. The demonstration will hopefully lead to acceptance of the pricing model by the Washington State Insurance Commissioner's Office for application statewide.

How does the program help reduce VMT?

For both the commuter and non-commute markets these programs, and others, influence the individual's decision about how to meet their mobility needs. They increase the attractiveness of riding the bus, ridesharing, biking, and walking.

[1] In Motion Program Data, survey of participants

What can we be doing with existing resources?
Transit agencies need to focus on promoting existing services and engaging local partners to help commuters and residents understand how to use their systems.

The level of effort in Washington State for the areas of public transportation, ridesharing and TDM stand head and shoulders above other states. Through statewide and national associations (WSTA, WSRO, APTA, and ACT), transit agencies and others should use that experience to affect state and national transportation policy.

What could we be doing with additional resources?
A significant expansion of programs to support both the commuter and non-commute travel markets is needed. Agencies and local jurisdictions need resources for promoting the availability and viability of alternatives, taking the CTR and GTEC programs to a much broader scale, and engaging a very large number of residents statewide in exploring and using travel modes that reduce VMT while enjoying the ability to meet their daily needs.

King County Metro Transit
Ridesharing Services

What is the program?
King County Metro operates three lines of business to support ridesharing: Vanpool, Vanshare, and the statewide ridematching service, RideshareOnline.com.

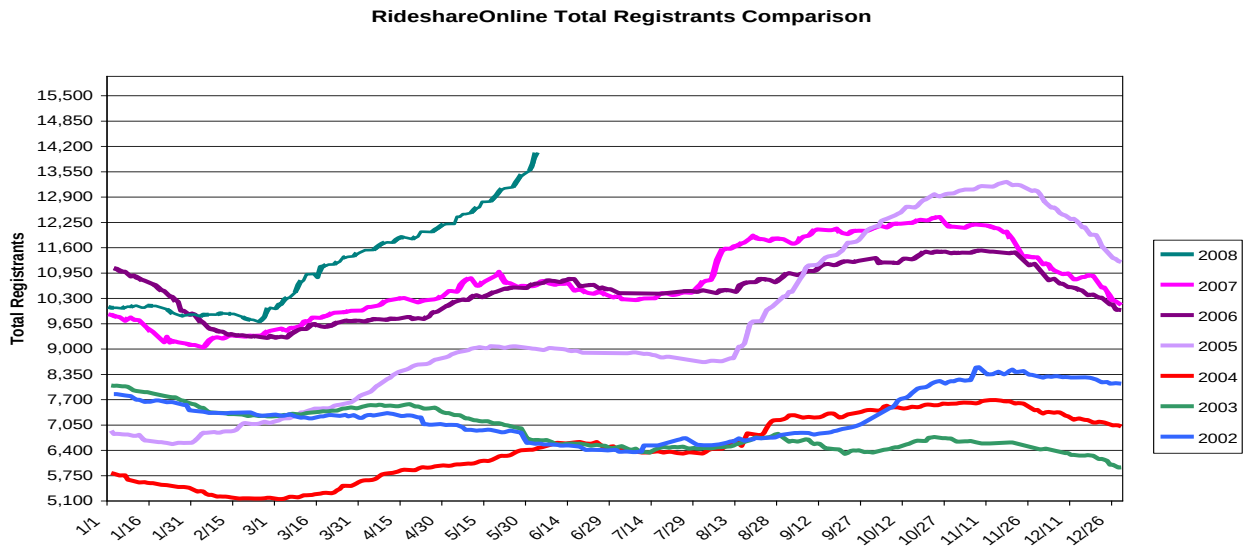
Vanpool
Metro operates the oldest and largest public commuter van program in the nation. VanPool has been a guiding resource for other vanpool programs around the country. VanPool provides the van and everything else for successful ridesharing: rider support services, maintenance, insurance, fuel, tires and training. Groups of five to fifteen people all over the Puget Sound region are choosing to vanpool. Metro currently has over 980 vans on the road and several dozen in formation.

Vanshare
Vanshare is an innovative program that uses vanpool vehicles due for retirement from the fleet and puts them back into service to help commuters solve the "last mile" problem. Vanshare serves many Sounder commuter rail stations, connecting Sound Transit riders to their workplace where no similar connection existed before. Likewise, many Washington State Ferries customers complete their commute in a Vanshare vehicle. There are currently over 180 Vanshares on the road.

RideshareOnline.com
Thousands of people all over the state use RideshareOnline.com to find their carpool, Vanpool, or Vanshare partners. See below for more information.

How does the program help reduce VMT?
Ridesharing increases average vehicle occupancy (AVO). As AVO rises, a single vehicle accomplished the travel need for more people, taking cars off the road. This leads to reductions in VMT. Furthermore, ridesharing meet travelers' mobility needs in many context where public transportation cannot due to high costs.

What's happening now?
As with transit use statewide, ridematching is increasing due to rising fuel costs. The chart below track RideshareOnline.com registrations over time.



Over eighty percent of RideshareOnline registrants live and work in the Central Puget Sound region.

In terms of GHG emissions reductions, the Vanpool program has been very successful. While not expressed in terms of VMT, consider the impacts of the Vanpool program:

- Saved 21,000 Tons of GHG from being produced.
- Saved 2,150,000 of equivalent gallons of fossil fuel from being consumed.
- Experienced a 70% reduction in all regulated emission categories.
- Saved our citizens $7,800,000 in vehicle fuel and maintenance costs.

What can we be doing with existing resources?
Demand for vanpools is way up. Rideshare Operations is receiving a record number of driver applications. There has been a 16% increase over the same period in 2007. Metro has added an extra Saturday orientation class in June to accommodate 30+ volunteer vanpool drivers and adding two additional Saturday classes next quarter. Presently Metro has 15 new vanpool groups scheduled to start with another 16 new vanpool groups in formation, for a total of 31 new vanpool starts scheduled for June already. The VanShare program has four groups starting from King Street station now that additional parking has been arranged and one vanshare being formed.

The IWG should prioritize promotion of carpooling and vanpooling as the motorized modes that can do the most to reduce VMT in the short term at the lowest cost.

What could we be doing with additional resources?
The Washington State Ridesharing Organization (WSRO) developed the following list of priority investments for 2007-2008. This list is being updated in collaboration with the state Commute Trip Reduction Board and the Washington State Transit Association. The priority projects are:

- Purchase additional expansion vans to meet customer demand based on priority criteria. $10 - $12 million.
- Establish a statewide customer loyalty program with an "incentive registration" and "calendar tracking system." linked to RideshareOnline.com while maintaining individual program branding. $1.25 million.
- Identify and install roadside signage for RideshareOnline statewide. $500,000.
- Incentive tracking and calendar registration established on one central database connected to RideshareOnline. $250,000.

This list will change as the 2009 legislative strategy is developed, but indicates where new resources can lead to success in reducing VMT.

King County Department of Transportation
Transit Oriented Development

What is the program?
The King County Council funded the Transit Oriented Development (TOD) program in 1998 to support its Urban Center vision. The program was directed to work with Urban Center jurisdictions to develop transit supportive land uses and activities. TOD staff operates within the DOT Director's office to facilitate transit supportive housing and retail joint-development at selected Transit Division properties.

One major goal of the program is to increase transit ridership through co-locating housing, jobs, and shopping with close proximity for walking or transit. A related goal is to identify opportunities to introduce an element of affordability into the development of housing near the transit centers.

How does the program help reduce VMT?
Increasing density of housing, jobs, and shopping uses in close proximity to transit and pedestrian opportunities reduces the need to use single occupancy vehicles. Also, fewer parking stalls are necessary for multi-family housing constructed close to transit. At the Overlake TOD, car ownership is .6 per unit; much lower than comparable projects. At the Renton TOD, 38% of the residents are using the bus an average of 7 times per week.

What's happening now?
Demand for multi family, affordable housing remains strong, especially rental, in the current economic climate. Population growth remains strong in the region despite the current credit restricted downturn. Developers continue to search for properties to construct lower to middle income rental units with convenient pedestrian or transit availability.

The TOD program has consistently emphasized higher density housing with minimum parking availability and maximum transit and pedestrian access. This emphasis makes the Transit properties being evaluated for TOD development even more valuable since the recent upswing in fuel prices.

What can we be doing with existing resources?
The TOD program currently receives grants and annual council appropriations to conduct feasibility studies and other pre-development work on selected Transit Division properties suitable for joint-development.

Since there is no additional funding for developable Transit properties whose land values cannot support the cost of structuring the existing parking, TOD is limited to properties with higher land values or where more affordable housing can be incorporated. For example, low income housing tax credits can reduce the cost of borrowing for a developer able to build at the lower end of the affordable housing spectrum.

What could we be doing with additional resources?
Capital improvements could be made at existing park and ride lots on highly travelled corridors to increase and reorient surface capacity into structured parking while also providing a podium upon which to build multi-family housing. The resulting increased housing and park and ride density would increase the utility of existing Transit properties and advance Urban Center goals to reduce VMT and green house gas emissions.

AGENCY/ORGANIZATION NAME: Puget Sound Clean Air Agency

Program Title: Climate Protection Program

What is the program? This program includes several projects aimed at reducing VMT. These include:

1. *Land Use and Air Quality Analysis:* The goal of this project is to identify key land use characteristics that result in lower VMT. We are working with academic researcher Dr. Larry Frank to identify land use characteristics (referred to as urban form) that would help reduce GHG emissions and meet the Governor's and the Legislatures greenhouse gas reduction goals. This work builds on the existing research demonstrating that local amenities, increased density, street connections, and access to transit.

   Preliminary results show that we can explain about 30 to 35% of the variation in VMT with changes in density, retail space, land use mix (civic, education uses, entertainment, retail, office etc.), number of intersections, and auto ownership.

2. *Assessing GHGs from SR-520 Improvement Project*: This project calculates the GHGs associated with the proposed SR-520 Bridge Improvement project, focusing on the three options (bridge, tunnel, and changing on-ramps). We are evaluating how different levels of transit service and other amenities affect bridge traffic and air emissions. This project is part of the Health Impacts Assessment as required under ESSB 6099.[1]

3. *GHG Emissions Inventory Assistance to Local Jurisdictions:* We are working with ICLEI, an international non-profit that has developed emissions inventory software for local jurisdictions to calculate their GHG emissions. We are developing a regional guidance document for Puget Sound local jurisdictions to use the software. In addition, we're gathering data necessary to run the software, including VMT estimates from PSRC, and will post them in a data repository on our website. This will allow small jurisdictions with limited resources to easily calculate their GHG emissions.

How does the program help reduce VMT?

1. The land use and air quality project will provide land use characteristics that could used as community development goals. For example, if we find that certain intersection densities and number of retail or amenities are associated with reduced VMT, we could offer these up as goals for developing communities or include them as development requirements for state or regional funding, particularly since they will be based on the Governor's and State Legislature's

[1] An act relating to the state route number 520 bridge replacement and HOV project, signed May 2007.

goals. We can also ask our researcher to identify land use characteristic goals that will meet the VMT goals stated in ESHB 2815.

2. The GHG emission estimates from the SR-520 project will be shared with the stakeholder advisory committee that is evaluating the three options. We have included a number of assumptions about transit levels and land use in an effort to demonstrate the impact of these services on GHG emissions.

3. The local guidance document and data repository will assist jurisdictions in estimating their GHG emissions. More specifically, we are working with PSRC to generate the VMT estimates that locals would use in their inventories. Key assumptions about how these numbers are generated have a dramatic effect on the VMT estimates and how jurisdictions view their responsibilities in implementing strategies aimed at reducing VMT.

What is happening now (current status/activities)? We expect a draft final guidance document from ICLEI and a final report from Dr. Frank at the end of June. We expect to obtain VMT estimates for our local jurisdictions by early fall and to create the repository by early 2009. We expect to finalize our GHG estimates for the SR-520 replacement project by August 2008.

What can we be doing with existing resources to enhance the program's ability to reduce VMT? We expect local jurisdictions to need assistance in developing strategies to reduce their VMT. This includes increased transit service and advanced community development.

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement)? As our jurisdictions become more aware of their impact on VMT, we will need to provide services and assistance to help reduce their overall emissions, particularly as they pertain to transportation.

Program Contact: Leslie Stanton
Program Manager: Leslie Stanton
Program Manager Title: Team Lead, Climate Protection and Transportation Planning Unit
Agency number: 206-689-4022
Program manager email: leslies@pscleanair.org
Program web page: www.pscleanair.org

JULY 2008

Mass transit expansion proposal

On November 4, 2008, residents will decide whether to expand mass transit in the Central Puget Sound region. The Sound Transit 2 Plan responds to immediate demand for transit expansions by delivering a 17 percent increase in express bus service in 2009. It achieves a 53-mile regional light rail system, five years sooner than earlier proposed. The plan responds to the more than 15,000 public comments Sound Transit received this year and gets ready for the region's projected population increase of 1.2 million by 2030.

LINK LIGHT RAIL

Adds 34 miles of light rail to the Link system that opens for service between downtown Seattle and the airport in 2009 and to the University of Washington in 2016:

- North from the University of Washington to Northgate, Shoreline and Lynnwood
- East from downtown Seattle across Interstate 90 to Mercer Island, Bellevue, Overlake Hospital and Redmond's Overlake Transit Center
- South from Sea-Tac Airport to Highline Community College and Federal Way at South 272nd Street
- Link connector service serving Seattle's International District, First Hill and Capitol Hill.

Expands light rail with a partnership to extend Tacoma Link beyond the downtown area.

SOUNDER COMMUTER RAIL

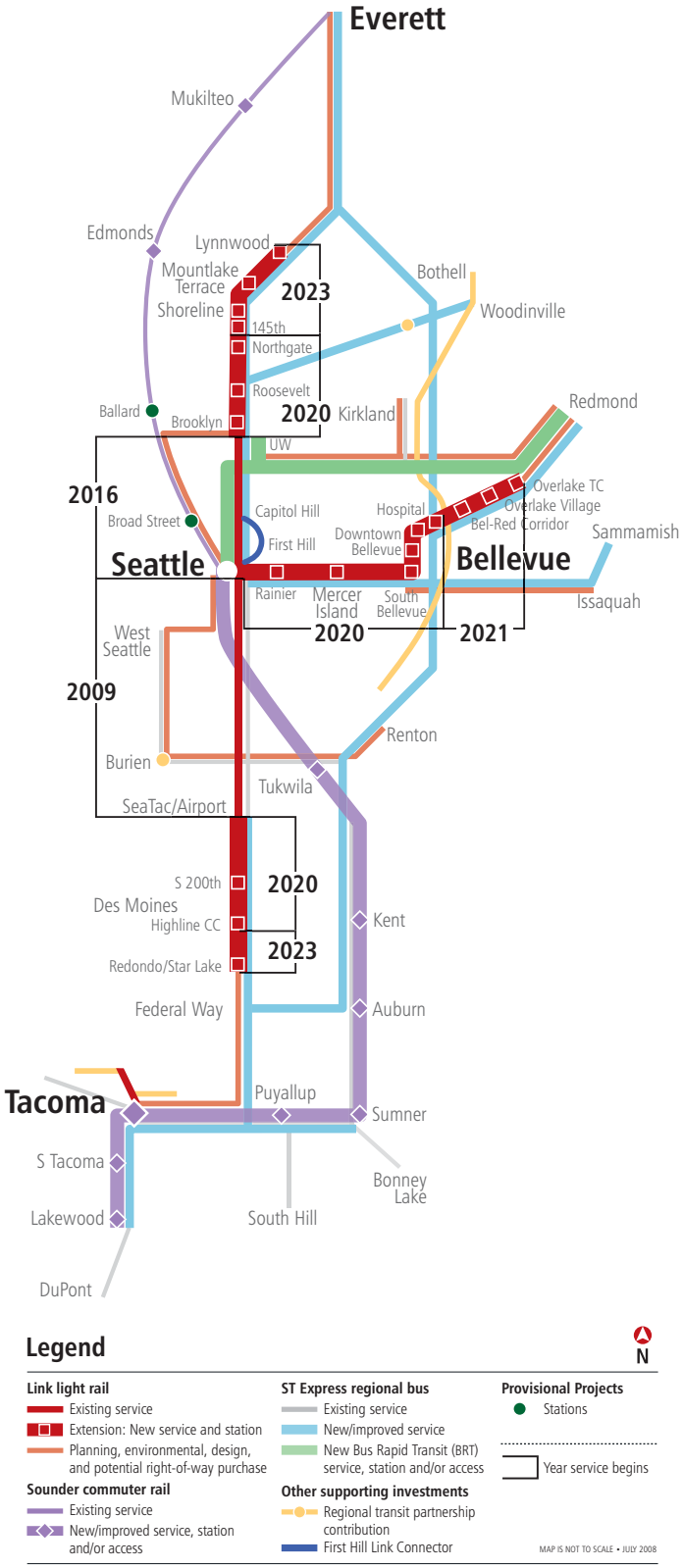
Increases Tacoma-Seattle Sounder commuter rail service by adding four new daily round trips and by increasing platform lengths to accommodate longer trains. This increases passenger capacity by 65 percent to meet strong rider demand in the corridor, providing reliable and congestion-free travel as population growth continues to worsen roadway congestion. Includes two provisional rail stations at Broad Street and Ballard that can be implemented subject to the availability of additional funds.

Contingent upon negotiations with BNSF Railway.

ST EXPRESS REGIONAL BUSES

Expands regional express bus routes serving the region's busiest housing and job corridors; more buses will be in service quickly to provide near-term relief while capital projects are under construction. ST Express buses operate from early morning to late at night, traveling on existing freeway HOV lanes. The draft plan boosts service with:

- Rapid delivery of expanded ST Express service, with an increase of 17 percent in 2009
- Service increases of 10 to 30 percent in key corridors, with reinvestment of existing services as rail services come on line
- Expands Sound Transit's bus fleet by 25 percent
- New Bus Rapid Transit service on SR 520 to coincide with bridge replacement and tolling.



Sound Transit plans, builds and operates regional transit systems and services to improve mobility for Central Puget Sound.

LINK LIGHT RAIL FEATURES

In addition to extending the Central Link light rail line with 34 miles of new light rail, the package supports moving forward rapidly with further extensions to Tacoma and Redmond in a future phase by funding environmental review, preliminary engineering and early right-of-way purchases. The package also includes planning for a future extension to Everett.

Fast, frequent service

Environmentally friendly electric light rail trains operate in their own right-of-way, providing fast, reliable service that isn't delayed by congestion. Trains will run 20 hours per day and every few minutes during rush hours.

Ample room to grow

System capacity can be expanded to meet long-term needs from continued population growth by running trains as often as every four minutes with up to four cars, each train carrying up to 800 riders, for an hourly capacity of up to 12,000 riders in each direction. Stations will act as hubs where riders transfer from buses onto congestion-free light rail service. Per passenger, light rail systems are on average 37 percent less expensive to operate than buses.

Sample light rail travel times	
Microsoft to downtown Bellevue:	11 min.
Northgate to downtown Seattle:	15 min.
Bellevue to Qwest Field:	20 min.
Lynnwood to UW:	21 min.
Lynnwood to downtown Seattle:	28 min.
Highline C.C. to Safeco Field:	37 min.

IMPROVED STATION ACCESS

Provides funds that will allow more people to access regional transit services at key locations. Access improvements in Auburn, Edmonds, Kent, Lakewood, Mukilteo, Puyallup, South Tacoma, Sumner, Tacoma and Tukwila will be tailored to the needs of each location and may include:

- Expanded parking
- Pedestrian improvements at or near stations
- Additional bus/transfer facilities for improved feeder service to stations
- Bicycle access and storage at stations
- New and expanded drop-off areas to encourage ridesharing.

EASTSIDE RAIL PASSENGER PARTNERSHIP

Provides funds for a potential capital contribution to a partnership for Eastside passenger rail operation on freight right-of-way there. Sound Transit and the Puget Sound Regional Council are currently evaluating the potential benefits of passenger rail operation on this corridor.

PARTNERSHIP PROJECTS TO IMPROVE MOBILITY

Contributes funds to complete projects in conjunction with other parties that will improve access to transit and travel times:

- Tacoma Link extension
- Bothell transit center/parking garage
- Burien parking garage.

RESPONDING TO REGIONAL GROWTH

Continued growth in the region's population and employment puts increasing pressure on our transportation system. The draft plan responds with targeted investments that provide new and expanded transit options to improve near-term and future mobility for people who live and work here. In 2030, 70 percent of the residents and 85 percent of the jobs in the Sound Transit District will be within easy access to light rail or commuter rail, either on foot or via a transfer-free bus ride.

Estimated growth by 2030	*Population*	*Employment*
Bellevue	+24%	+39%
Burien/Tukwila/Renton	+16%	+34%
Capitol Hill/Queen Anne	+20%	+23%
Downtown Seattle	+79%	+24%
Everett	+25%	+38%
Federal Way/Auburn	+17%	+33%
Kent	+35%	+30%
Lynnwood/Edmonds	+34%	+50%
North Seattle	+13%	+29%
Redmond/Kirkland	+26%	+40%
South Seattle	+7%	+29%
Tacoma	+18%	+28%

[Summary Needs Assessment, Parsons Brinckerhoff for Sound Transit, January 2008]

PROTECTING OUR ENVIRONMENT

With transportation the region's largest contributor to greenhouse gas emissions, one of the most important things people can do to reduce their carbon footprints is to use public transit. This package would bring about 147,000 more daily riders to regional transit services in 2030, increasing ridership by more than 20% over what it would be without transit system expansion. It would reduce greenhouse gas emissions by 99,550 metric tons of CO2 equivalents per year.

RIDERSHIP

This draft plan takes thousands more cars off roads, with expanded train and bus services moving people through the region's most congested corridors.

2030 Estimated Daily Ridership

Service	Without Plan	With Plan
Link light rail	124,000	286,000
ST Express buses	52,000	48,000
Sounder commuter rail	19,000	24,000
Total	**195,000**	**358,000**

Figures reflect near-term demand. Actual long-term system capacity will be much higher. Figures are preliminary and subject to refinement.

PLANNING FOR THE FUTURE

Funds several studies of future expansions: extensions of light rail from Lynnwood to Everett, UW to Ballard, Ballard to downtown Seattle, West Seattle and Burien, and Burien to Renton; and future high capacity transit services to Issaquah via I-90, along the I-405 corridor, and from UW across SR 520 to Redmond.

PAYING FOR EXPANDED SERVICES

- 5/10 of one percent sales tax increase, or five cents for every $10 retail purchase
- Typical new cost per adult is $69 annually
- Continuation of existing *Sound Move* taxes (0.4% sales tax and 0.3% vehicle license tax)

COSTS	2007 dollars	Year of expenditure*
Capital costs	$9.1 billion	$13.5 billion
Operating & maintenance (2008-2023)	$1.2 billion	$1.8 billion

Cost estimates as of 7/21/08, subject to revision.
*includes inflation

SOUNDTRANSIT

What is the program?
Sound Transit is the regional high capacity transit authority for the Central Puget Sound. Since 1993, the agency has been implementing a package of voter-approved high capacity transit investments to connect urban centers around the region, improve the speed and reliability of transit, and provide supporting capital infrastructure. The Sound Transit district serves the state's most populous area with nearly 3 million people – about 40% of the state's population.

Sound Transit operates long-haul, express bus service; commuter rail; and electric light rail. The agency has made significant capital investments in the State's HOV system, the BNSF freight rail corridor, transit centers, park-and-ride lots, and bike and pedestrian improvements. Sound Transit services and capital investments add significant transit capacity to the region, improve connectivity and reliability of transit and HOV travel, and greatly reduce vehicle miles traveled.

How does the program help reduce vehicle miles traveled (VMT)?
Sound Transit's entire regional high capacity transit system provides alternatives to single-occupant vehicle travel, increases customer access to transit services, promotes and enhances dense, livable communities, and improves speed and reliability of transit and HOV travel. Sound Transit provides 55,000 rides daily, thereby reducing VMTs and GHG by taking approximately 20,000 cars off the region's most congested roads daily. Major program elements include:

Regional express bus: Long-haul express bus service connecting major urban and employment centers. ST service and marketing is coordinated and integrated with other transit services and the State ferry system.

Capital connections: Major investments in the State HOV system, park-and-ride lots, transit centers, and bike and pedestrian transit access improvements. To date, ST has built ten HOV direct access ramps that improve the performance of the HOV system, built more than 10,000 parking stalls, and added 19 park-and-rides and transit centers around the region.

Commuter rail: Sounder commuter rail trains operate during peak periods on the BNSF freight rail corridor between Tacoma and Seattle (6 daily roundtrips) and between Everett and Seattle (3 daily roundtrips). Sounder uses ultra-low sulfur diesel fuel, and Sound Transit is in the process of implementing idle-minimization systems that have the potential to reduce fuel consumption by 34%. ST has invested more than $1 billion to improve the track and signal capacity in this 82-mile BNSF corridor, which also is shared by Amtrak, and to improve commuter access to the rail service. ST also runs special event service.

Electric light rail: Light rail service in the congested I-5 corridor between the Airport and downtown Seattle is expected to carry 45,000 riders each day by 2020, with service starting in 2009. Construction will start on the extension to Husky Stadium this year, and by 2030, this regional high capacity spine will carry 114,000 riders a day. In Tacoma, daily ridership on Tacoma Link is almost 3,000. Electric light rail has virtually zero emissions, reduces VMT, is unparalleled in contributing to transit-oriented communities, and has the greatest people-carrying capacity of any transit alternative.

What is happening now (current status/activities)?
Sound Transit currently provides 55,000 rides a day on regional bus and rail services. Here is a sampling of additional transit projects and services coming on line this summer and fall:

- I-90 corridor: Issaquah Transit Center will open, adding more bus bays more than 800 parking stalls; served by KCM and ST.
- I-90 bridge: new HOV lane and direct access ramp will open.
- I-5 corridor: South Everett Freeway Station will open this fall.
- Pierce County: Lakewood Station will open this fall. This transit center and parking facility will be served by Pierce Transit and ST, and will provide a future Sounder commuter rail connection.
- Commuter rail: This fall, ST will add two round trip commuter trains between Tacoma and Seattle, and one round trip between Everett and Seattle. The agency just opened a station in Mukilteo, providing an important connection for ferry riders.
- I-5 corridor: Construction of the electric light rail spine from downtown Seattle to the Airport is nearing completion and will be operation in 2009. Construction on the extension to Husky Stadium will start this year.

What can we do with existing resources to enhance the program's ability to reduce VMT?
ST's ridership continues to grow as we add service and facilities with existing resources, so additional VMT reductions will materialize, particularly when light rail comes on line in 2009. As the region prepares for the start of that service, Sound Transit is working with other transit providers and major employers and institutions to build greater awareness of transit options, increase ridership, and make the transit system easy for customers to access.

What could we do with additional resources to reduce VMT?
Sound Transit will have a mass transit expansion plan on the ballot this fall. The Sound Transit 2 plan is a 15-year investment package, with projects and services being implemented incrementally. The plan is financed through a combination of existing taxes and an increase in the sales tax of 5/10 of one percent.

ST2 will extend light rail to Redmond, Redondo/Star Lake near Federal Way, and Lynnwood; increase commuter rail and regional express bus service; and improve access and connections to transit services. The plan balances near-term improvements to regional mobility through more bus and commuter rail service with longer-term investments in light rail. ST2 will:

- Reduces vehicle miles traveled by 268,000,000 annually
- Saves between 8,700,000 gallons of fossil fuel annually
- Reduces 99,550 metric tons of CO_2 equivalents per year
- Makes transit system accessible to 70% of the residential population in the region and 85 % of the employment population
- Connects more regional employment centers with exclusive right of way transit

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Washington State
Department of Transportation

Summary of WSDOT's Urban Programs

This briefing packet contains information about some of WSDOT's statewide demand management programs. The briefing is intended to provide an overview of these programs and how they support the state's vehicle miles traveled reduction goals.

All of these programs will continue to evolve based on experience and the state's goals for reducing congestion, energy use, and greenhouse gas emissions. Through several of these programs, local governments, regions and the state have set goals to reduce vehicle miles traveled (VMT) per employee, and while these efforts are limited in scope, they can provide a foundation for broader initiatives.

How does the program help reduce VMT?

On February 7, 2007, Governor Gregoire issued Executive Order 07-02, which set targets for the state of Washington to reduce emissions of greenhouse gases to 1990 levels by the year 2020, and to 50 percent below 1990 levels by 2050. Currently, vehicle usage produces 47 percent of the state's emissions, with on-road transportation producing more than 72 percent of vehicle usage emissions[1]. It will be difficult to reduce emissions of greenhouse gases from transportation enough to meet the executive order targets without also reducing transportation demand. This is still true, even with recent federal legislation to improve vehicle fuel efficiency, and with aggressive development and use of biofuels.

The CTR program contributes to emission reductions and has an effect on total transportation demand. Commute trips by employees who work at CTR worksites account for 4.6 percent of statewide VMT. Even if all of the employees at CTR worksites switched to "zero emission" modes -- walking, bicycling, or teleworking -- statewide VMT and its associated greenhouse gas emissions would only decrease by 4.6 percent. This is because employees who work at these sites are only about 20 percent of total state employment, and because commuting accounts for between 18 and 33 percent of individual and household VMT. The addition of GTECs to the CTR program, via the CTR Efficiency Act and subsequent funding, makes roughly another 2 percent of VMT accessible to the program.

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

There are opportunities for Washington's demand management activities to make a more sizable contribution to achieving the goals of Executive Order 07-02. In the short term, focusing on longer commute trips, vanpooling, express bus service, and telework have the greatest potential to yield rapid reductions in VMT and emissions within the present base of employees in the CTR program. The 10 percent of employees who live farthest from their CTR work locations account for 30 percent of the VMT within the program, compared to less than 1 percent of the VMT for the 10 percent of employees who live closest. Shifting the focus to employees who live the farthest from work will require a change in marketing strategy by employers. They will need to identify and focus on their more distant employees, and support for transportation services to

[1] Off-road transportation refers to aviation, marine, and rail transportation emissions.

enable these employees to drive less frequently to work.

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement)?

In the longer term, the scope of demand management efforts will need to expand, both working with more than the present 20 percent of the state's commuters, and developing and implementing strategies to enable citizens in reducing their current VMTs on other non-work trips. Trips made for shopping, to get children to and from school, and for some types of recreation are probably the types of trips better suited for effective demand management. Enabling more people to live closer to work, school, and other activities – or closer to convenient transit options – would also help to reduce future demand for travel.

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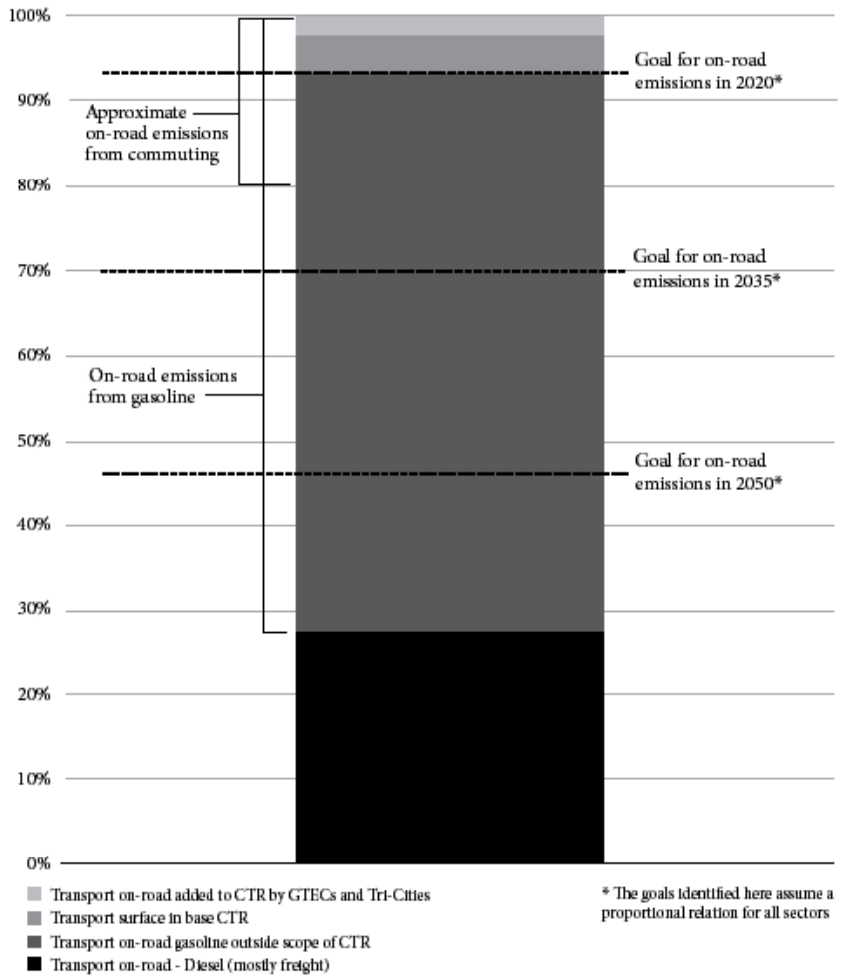
Percentage of Washington State On-Road Transportation Emissions in 2005



Washington State Department of Transportation

Commute Trip Reduction (CTR) Program

What is the program?

The legislature passed the Commute Trip Reduction (CTR) Law in 1991, incorporating it into the Washington Clean Air Act. The goals of the program are to reduce traffic congestion, air pollution, and petroleum consumption by encouraging employees at the state's largest employment sites to take the bus, vanpool, bicycle, walk, work from home, or use a compressed work week.

Since the law's passage, major employers[1] in the urban areas of the state have implemented commute options programs and demonstrated strong support for the program. The Governor's CTR Board, comprised of representatives from major employers, transit agencies, local governments, regional transportation planning organizations (RTPOs), and state agencies, provides policy oversight and establishes the funding priorities for the program. The Washington State Department of Transportation (WSDOT) distributes program funding and provides policy direction and technical assistance to participating local governments; these local governments work directly with major employers to ensure effective implementation of their programs.

In 2006, the legislature passed the CTR Efficiency Act and made significant changes to the CTR law. These changes focused the program on urban growth areas served by congested highway corridors, introduced a planning role for the state's RTPOs and required local governments to set new goals for reducing drive-alone trips and vehicle miles traveled (VMT). The changes were intended to strengthen the CTR program's tie with the Growth Management Act and local land use and transportation planning.

Approximately 570,000 employees commute to CTR worksites on a daily basis. This is roughly 20 percent of the total number of workers in the state. Commute trips by employees who work at CTR worksites account for 4.6 percent of the statewide VMT.

How does the program help reduce VMT?

The CTR program contributes to emission reductions and has an effect on total transportation demand. While the VMT covered under the CTR program is only a small portion of the state's total VMT, the program's strategies and new policy direction can be a foundation for broader efforts. The CTR planning process provides addresses the transportation and land use connection in local comprehensive planning.

Local governments in the affected urban growth areas of the Central Puget Sound have already set goals to reduce VMT per employee, in line with the Climate Advisory Team recommendations (T-2). The CTR plans can be built upon to develop local, regional, and state VMT reduction goals that are broader than CTR worksites, and the experiences and lessons learned through the CTR planning process can help inform future VMT reduction recommendations.

[1] Major Employers refers to employers with more than 100 full-time employees. Those employees also work throughout the year and are scheduled to arrive at work between 6 a.m. and 9 a.m.

How is the program performing?

The CTR program achieved record results in 2007. The percentage of people who drove alone to work to CTR worksites declined from 70.9 percent in 1993 to 65.5 percent in 2007 (a decrease of more than five percent). Employees make decisions about how to travel to work based on a variety of factors – cost, convenience, distance, time, etc. CTR provides information and incentives for employees to choose alternatives to driving alone. Employees commuting to CTR worksites made nearly 26,000 fewer vehicle trips each weekday morning in 2007 than they did when they entered the program. The absence of these trips has a significant impact on congestion, reducing delay by approximately 18 percent during the peak period on average mornings in the region.

Statewide, employees' round-trip commutes to CTR worksites accounted for just more than 2.4 billion VMT in 2007. Without the changes in employee travel, the commute VMT to these sites would have been 6.7 percent higher – an estimated difference of nearly 170 million miles.

What's happening now?

After the passage of the CTR Efficiency Act in 2006, local governments and RTPOs developed new CTR plans. All of the state's participating cities, counties and regions have set two goals for their affected urban growth areas (in Clark, King, Kitsap, Pierce, Snohomish, Spokane, Thurston, Whatcom, and Yakima counties):

- Reduce the number of drive-alone commute trips to CTR worksites by 10 percent by 2011. Achieving this goal would reduce 27,800 more drive-alone commute trips, nearly doubling the number of trips reduced since the program began.
- Reduce the number of VMT per employee to CTR worksites by 13 percent by 2011.

These goals represent a shift in the CTR program; now, individual employer goals are tied to the goals of the city or county. Local governments have greater flexibility to determine which employers to focus on and which strategies to emphasize to meet their goals. Through the planning process in 2007, they identified potential improvements to local plans, policies and strategies that could support employers and meet their CTR goals.

Local governments and regions are now implementing their plans. Progress toward the goals will be measured in 2009 and 2011. However, local agencies face challenges meeting these goals. They have:

- large unfunded pedestrian and bicycle safety and mobility needs
- transit service improvement needs
- infill demand needs
- fewer funding sources to help meet these needs and demands

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

Through state agency leadership there are short term opportunities to focus on longer commute trips by using vanpooling, express bus service, and telework to yield rapid reductions in VMT and emissions within the present base of employees in the CTR program. Shifting the focus this way will require a change in marketing strategy by employers, to identify and focus on their

more distant employees, and support for transportation services to enable these employees to drive less frequently to work.

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement)?

Local governments and regions have identified numerous strategies and programs that will help them achieve their goals, including incentives, marketing, and capital investments. Many of the needs identified by cities, counties, and towns are currently underfunded. Additional funding resources would allow for expansion of the CTR program and additional state support through measurement and technical assistance.

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Washington State
Department of Transportation

Growth and Transportation Efficiency Center (GTEC) Program

What is the program?

The Commute Trip Reduction (CTR) Efficiency Act of 2006 authorizes local governments to designate employment and residential centers as Growth and Transportation Efficiency Centers (GTECs) and to establish a transportation demand management program in the area (RCW 70.94.528). The program's purpose is to increase the state's transportation system efficiency in areas with high concentrations of jobs and housing, while supporting local goals and policies to direct growth and economic development into urban centers.

What are some of the GTEC program strategies?

GTECs plan for an array of strategies to meet their goals. As part of GTEC development, regional and local agencies are identifying associated changes to the built environment and transit services. Some of the strategies include:

- Capital investments in non-motorized and transit amenities identified in transportation management plans, local comprehensive plans, or the local CTR plan, such as:
  - Signage and travel information
  - Bicycle lanes
  - Sidewalk improvements
- Trip reduction incentives for commuters and/or residents, such as:
  - Incentives for ridesharing, using transit, telecommuting, biking, and walking
  - Transit passes
- Engaging and working with small employers to support:
  - Incentives
  - Employer training
  - Promotions and education
- Policy and funding initiatives:
  - Parking management
  - Multimodal concurrency
  - Investments in increased transit services designed to meet commuter needs

How does the program help reduce vehicle miles traveled (VMT)?

CTR is focused on commute trips, which are between 18 percent and 33 percent of all trips on the transportation system. The GTEC program – when compared to CTR program – expands the proportion of the travel market that is influenced by demand management strategies by:

- working with smaller employers than the CTR program
- working with residents
- addressing other trip purposes, such as trips to school

Each GTEC's drive-alone and VMT per capita reduction goals must be incorporated into local comprehensive plans. The VMT per capita reduction goals established by the GTECs are more aggressive than the CTR goals and support the new VMT per capita reduction goals in statute.

The long-term focus of the GTEC program is to build private and public sector partnerships that integrate land use and transportation decision-making. The GTEC planning process brings together the private sector, transit agencies, local governments and others to implement a common vision of commercial and residential development tied to transportation goals. As growing communities implement successful demand management and transportation-efficient land use policies, there will be improved access to jobs, less demand for new parking, more room for commercial and residential development, and less greenhouse gas emissions.

What's happening now?

In 2007, 14 cities from the central Puget Sound, Vancouver and Spokane urban areas volunteered to develop GTEC plans and applied for funding from the Governor's Commute Trip Reduction Board. The board selected seven GTECs, using the $2.4 million one-time funding provided by the legislature in the 2007-2009 transportation budget. Three additional cities are implementing their plans without state funding support.

Currently, the state's designated GTECs are:

- Downtown Seattle
- Downtown Bellevue
- Redmond/Overlake
- Downtown Tacoma
- Kirkland/Totem Lake (not funded)
- Tukwila (not funded)
- Puyallup South Hill (not funded)
- Downtown Olympia/Capitol campus
- Downtown Vancouver
- Downtown Spokane

Each of the GTECs have voluntarily set goals to reduce drive-alone trips and VMT per capita and have identified transportation and land use strategies to meet the goals. These GTECs are presently implementing their plans by establishing baseline measurements, reaching out to target populations, and developing new services and policies. Washington State Department of Transportation (WSDOT) is supporting the ten GTECs with measurement support and technical assistance.

WSDOT estimates that if these ten GTECs were to meet their 2011 goals, about 14,000 drive-alone commute trips to key employment destinations would be reduced. Commute VMT per employee in the GTECs would be reduced by an estimated 13 percent from 2007 levels. In 2009 and 2011 WSDOT will measure the progress of the GTECs toward their goals.

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

Current funding supports implementation of GTECs through June 30, 2009.

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement?)

The GTEC program is still in its start-up phase and there will be many lessons learned during implementation. Additional resources are needed to provide technical support, data collection and marketing to support GTEC programs, as well as state and regional leadership in land use policies, such as parking management and multimodal concurrency.

The legislature has directed WSDOT to provide a report by 2009 on the initial program and recommendations on future funding levels. WSDOT's preliminary recommendation would fund a total of 18 GTECs (8 new GTECs with funding for these plus the original 10 GTECs) with

50 percent local match for a projected reduction of 14,000 drive-alone trips (above and beyond the CTR program) by 2011.

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Washington State
Department of Transportation

Vanpool Investment Program

What is the program?

In 2003, the legislature developed a 10-year, $30 million transportation plan to expand vanpooling statewide. The funds are designated for public transit agencies and can only be used for the capital costs of placing new vans on the road, or incentives to employers to increase vanpool use. Since 2003, more than $12 million has been invested to purchase 577 vans for 20 transit agencies. At that time, vanpool operators set a goal of doubling the number of operating vanpools in Washington to a total of 3,180 operating vans by 2013.

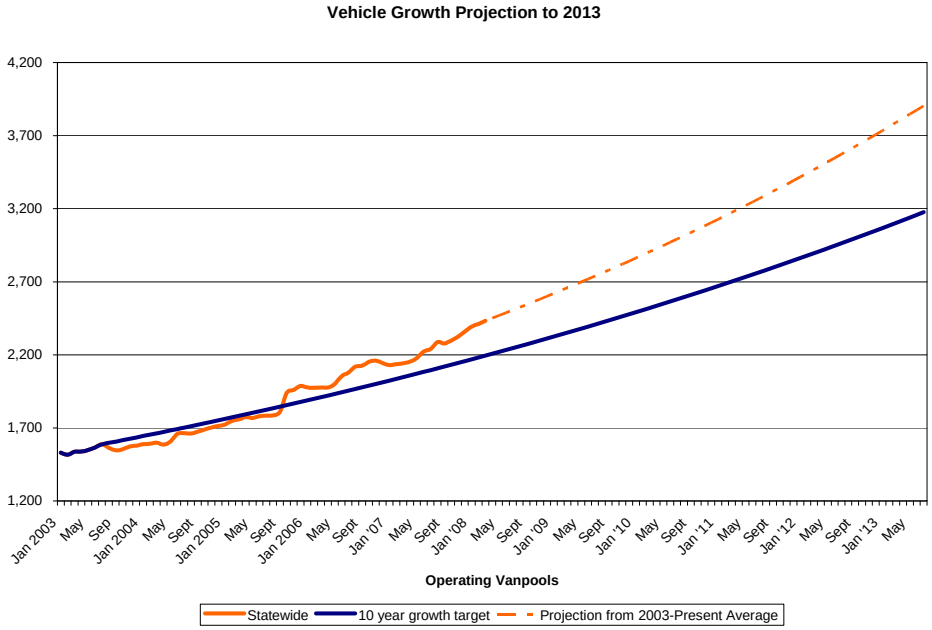
Vanpooling is a key strategy for local and state goals to reduce drive-alone commute trips and vehicle miles traveled (VMT) per capita. It also supports rural economic development by providing an economical choice for commuters to travel long distances to work sites such as the Department of Energy's Hanford site.

How does the program help reduce VMT?

Vanpooling is a crucial approach for reducing VMT per capita. The 10 percent of commuters in the Commute Trip Reduction (CTR) program who live furthest from their work locations account for 30 percent of the VMT in the program, compared to less than one percent for the 10 percent of employees who live closest. This means that shifts from driving alone to vanpooling by even a relatively small segment of the long-distance commuter would have large reductions in VMT per capita. The long-distance commuter market should be a primary emphasis of the state's efforts to reduce commute-related VMT.

What's happening now?

Washington State continues to lead the nation in vanpooling with the largest public vanpool fleet in North America. Vanpools traveled 29.3 million miles in 2007. For the central Puget Sound in 2006, the number of passenger miles traveled in vanpools was 2.8 percent of the peak period VMT. As of January 2008, there



were 2,360 vans operating statewide, at an average passenger count of 8.14, traveling 2,229,300 miles.[1]

Between June 2003 and January 2008, the number of vanpools in the state increased 51 percent to 2,360 operating vehicles. Ridership increased 53 percent during the same period. This dramatic growth can be attributed to several factors, including state investment, strong local programs, enhanced collaboration among agencies, and increasing gas prices. A significant portion of these vanpools travel to current CTR worksites.

Due to high commuter demand for vanpooling, the program is growing quickly. If current growth rates are maintained, the program will meet its 2013 goal by February 2011. Even with substantial state investment, transit agencies report waiting lists with formed groups for vanpools. WSDOT will not be able to meet the demand for new vans with the funding remaining in 2007-2009.

The statewide vanpool team is currently developing a new expansion plan and seeks to tie its ridership and van growth goals to the 2020 climate change goals.

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

The state is purchasing as many vans as possible with current resources. Local transit agencies operate and maintain the vans. Currently, the program provides vans to transit agencies based on their requests. Because funding is not sufficient to meet demand, WSDOT is developing criteria to prioritize the allocation of vans. For example, prioritization could be based on providing vans to those groups traveling the longest distances, or prioritizing groups for drive-alone commuters over carpoolers.

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement)?

WSDOT estimates that the anticipated funding level of $7 million for the 2009-2011 biennium will not fully meet the demand for new vanpools. Additional resources would allow the transit agencies to continue current growth rates in vanpooling and reduce more VMT per capita. If additional funding was provided to maintain the program growth rates, between 2,700 and 4,100 additional drive-alone a.m. trips per day would be reduced from June 2009 to June 2011.

Current funding is limited to purchasing new vans or providing incentives for employers. If new funds were more flexible, a portion could be used for outreach and education to long distance commuters, technology improvements for improved data collection, and enhanced ridematching systems. These operational enhancements would develop a larger vanpool market and increase the average occupancy of each van.

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[1] WSDOT has limited data on the modes vanpool passengers shift from to join a vanpool, but the data available indicates that about 4.6 trips at that average passenger load would be shifting from a drive-alone mode. We therefore estimate that the VMT reduction for the month by vanpool passengers to be about 10.3 million miles for the month. While this figure doesn't directly annualize due to program growth, stretching this figure out for a 12 month period would generate a 124 million mile savings.

The growth of the statewide vanpool program is constrained by transit system demands for other fleet capital replacement or expansion, demands for vanpool capital replacement, limited maintenance base capacity, and fuel costs.

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Washington State Department of Transportation

Trip Reduction Performance Program (TRPP)

What is the program?

The legislature created the Trip Reduction Performance Program (TRPP) in 2003 as a way for the state to fund organizations that implement sustainable, cost-effective projects that increase the capacity of the transportation system by reducing the number of drive-alone trips and vehicle miles traveled (VMT) for commute purposes. TRPP funds are awarded on a competitive basis to entrepreneurs, private employers, public agencies, nonprofit organizations, developers and property managers who provide financial incentives to commuters for using alternatives to driving alone.

The purpose of the program is to create a trip reduction "market" in which the Washington State Department of Transportation (WSDOT) takes "bids" from organizations to reduce commute trips. WSDOT sets a cap on the price it is willing to pay per trip reduced over the course of a year. The program is different from a standard grant program in that the final award for a contractor is dependent on the performance of a project. Contractors are eligible for financial bonuses (up to a cap) if their projects exceed their goals.

The legislature provided $1.5 million for each of the first two cycles of the program in 2003-2005 and 2005-2007. In each biennium, the program exceeded its trip reduction goals as shown in the table below.

How does the program help reduce VMT?

TRPP offers a mechanism for the state to fund innovative projects to reduce drive-alone commute trips and commute VMT. As WSDOT and the Commute Trip Reduction (CTR) Board evaluate the program, there will be an opportunity to recommend changes, and the program focused specifically on the state's goals for reducing VMT per capita.

What's happening now?

The legislature provided $2.5 million in 2007-2009 for the TRPP. WSDOT awarded the funds in two separate calls for projects. If the program meets its 2007-2009 goals, 6,900 drive-alone trips will be reduced daily; many of these trips will be to CTR worksites. Results will be measured by June 2009 and final payments will be made based on project performance.

Trip Reduction Performance Program

	Estimated Trips Reduced	Actual Trips Reduced	Amount per Trip
2003 - 2005	3,427	5,150	$243
2005 - 2007	3,906	4,379	$234
2007 – 2009 Round One	4,271	-	$321*
2007 – 2009 Round Two	2,668	-	$375*

* Proposed amount - final amount per trip will depend upon results

WSDOT is currently evaluating the TRPP model to see how it can be improved based on the experiences of two completed funding cycles. WSDOT will also be working with

the CTR Board to determine the effectiveness of the program compared to the Rideshare Tax Credit, which offers credits in the business and occupation tax to employers that subsidize or offer incentives to their employees to use alternatives to drive-alone commuting. The Tax Credit program is funded at $5.5 million per biennium. The legislature has directed the CTR Board to make recommendations about the effectiveness of the two programs and if funding should be shifted between them.

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

WSDOT is evaluating the program and considering how TRPP can be more effective. Part of this evaluation is determining ways the program can focus on VMT.

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement?)

In its evaluation of TRPP, WSDOT is considering several policy options, including:

- Shifting the focus from drive-alone commute trips to all trips, or to all trips in the peak period
- Shifting the bids and performance payments from drive-alone trips reduced to VMT reduced
- Shifting the focus to specific corridors where the need for trip reduction is greatest
- Whether TRPP can be used to supplement programs at CTR worksites or within Growth and Transportation Efficiency Centers (GTECs) as it does currently, or whether it should be focused on commuters that are not already exposed to these programs
- Dedicating a portion of the funds to innovative projects that may not perform well, but will advance the state of the practice, while awarding the rest of the funds for more proven strategies based on performance

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Washington State
Department of Transportation

Park and Ride Program

What is the program?

The Washington State Department of Transportation (WSDOT) is currently developing a formal park and ride program. Limited capacity at park and ride lots is constraining the efficiency of the transportation system. A state role is critical in developing financial partnerships to expand capacity and maintain a safe and reliable park and ride system.

How does the program help reduce vehicle miles traveled (VMT)?

The park and ride system is a crucial piece of infrastructure in providing transportation choices. Park and ride lots provide the location where commuters transfer from single occupancy vehicles to carpools, vanpools and transit, thus each parked vehicle represents some amount of reduced vehicle miles traveled. Overcrowded lots indicate there is unmet demand. At occupancy levels above 70 percent, the risk of not finding a parking space becomes an issue for potential users and discourages expanded use of ridesharing and transit.

The most crowded lots are located along the most congested corridors including I-5, I-405, State Route 520, and I-90. Many of the park and rides are full throughout Puget Sound, Clark County, and Spokane.

Park and ride demand and the development of new park and ride capacity are critical to implementation of transportation demand strategies and vital for increasing transit market share. Efforts to promote transit and ridesharing are hampered by insufficient capacity at many commuter park and ride facilities.

What is happening now (current status/activities)?

There is no dedicated state funding for park and rides. Park and ride lots in Washington are built, owned, and operated by transit and governmental agencies. Washington's park and ride network has developed incrementally based on partnership opportunities, funding availability, and need. By the end of 2000, there were roughly 350 park and ride lots in Washington offering more than 45,000 parking spaces.

WSDOT is developing a comprehensive statewide park and ride program to plan, coordinate, develop, and implement partnerships for park and ride facilities. WSDOT intends to update the statewide park and ride inventory, establish an investment policy, and develop a needs assessment for the park and ride system by December, 2008.

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

The Regional Mobility Grant program has contributed funding for the park and ride program in the past. The Regional Mobility Grant program could amend the funding criteria to prioritize VMT reduction.

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement)?

WSDOT is developing short-term strategies for improving the park and ride system, such as leasing lots (from churches, grocery stores, and other parking suppliers), adding safety and security amenities to boost utilization of unpopular lots, and providing enhanced traveler information so that commuters know before they arrive at a lot whether there are spaces available.

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Washington State
Department of Transportation

Construction Traffic Management Program

What is the program?

The Washington State Department of Transportation's (WSDOT's) Construction Traffic Management program includes a variety of strategies to help keep people and traffic moving during construction. Nationally, 10 percent of traffic congestion is due to construction. With an unprecedented highway construction program and a growing population, this percentage is likely to be notably higher in Washington State. We must intensify these strategies, improve efficiency and manage demand to keep people and goods moving while delivering an unprecedented amount of construction.

How does the program help reduce vehicle miles traveled (VMT)?

The Construction Traffic Management program helps reduce VMT by:

- Allowing us to develop demand management partnerships and implement demand management projects and programs targeted to key construction projects, schedules and corridors
- Through construction closures providing a compelling reason for drivers and employers to sample efficient travel alternatives like carpools, transit, vanpools, walking, teleworking, bicycling, variable work schedules and incorporate them into their daily lives. Construction mitigation projects and programs provide capacity and access to these alternatives so they are viable during construction
- Many capital and operating investments tied to construction management will have utility beyond construction
- Allowing us to test and measure performance of demand management projects and services

What is happening now (current status/activities)?

Pilot programs to reduce demand on affected highways are underway on the Eastside of Lake Washington to support I-405 construction and will begin in the Seattle area next year to support Alaskan Way Viaduct construction south of the stadiums. Performance measurement results will help inform future demand management decisions. WSDOT is also:

- Conducting more advance construction schedule planning and analysis, which sets the stage for more robust traffic management and mitigation efforts
- Developing new systems to track construction schedules and analyze their likely impact on traffic
- Working with transportation demand management implementation partners to engage them in advance to plan for traffic impacts due to construction

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

To enhance the Construction Traffic Management program's ability to reduce VMT, WSDOT can:

- Continue to enlist local and regional partners to collaborate
- Incorporate construction traffic management as criteria for grant programs
- Develop mitigation projects and services that support multiple construction projects
- Develop technology to streamline construction and TDM coordination, analysis and measurement
- Expedite traveler information system improvement
- Share information about performance of mitigation efforts
- Incorporate mitigation planning and funding into early phases of project development, including programming, planning and design

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement)?

Additional funding and staff resources would allow WSDOT to:

- Test concepts and measure their performance related to VMT reduction and system efficiency during construction
- Systemwide and targeted mitigation implementation projects and services
- Provide support construction tracking, analysis and performance measurement
- Ensure that implementation partners like transit agencies, local jurisdictions, businesses, non-governmental organizations and other WSDOT programs, have the capacity to accommodate additional demand for travel alternatives
- Improve traveler information

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Washington State
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Regional Mobility Grant Program

What is the program?

The Regional Mobility Grant program provides funds to local governments to improve inter-county transit services, park and ride lots, rush hour transit service and capital projects that improve transportation system connections and efficiency. The program is designed to improve the coordination of transit services and to increase the use of transit to reduce congestion on our most heavily traveled highways.

The program helps local governments by funding projects such as:

- Inter-county connections between transit agencies
- Park and ride lots
- Rush hour transit service on congested roadways
- Projects that reduce delay for people and goods

How does the program help reduce vehicle miles traveled (VMT)?

The program provides support for service and capital improvements to make transportation alternatives more viable and appealing. This program leverages local and federal funds.

What is happening now (current status/activities)?

This competitive grant program provides $40 million per biennium in state dollars to support projects and service. We are starting our third grant cycle for the 2009-2011 biennium. We are tracking project delivery and are beginning to track performance of completed projects.

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

- Track and report performance of completed projects and use the information to influence future decision-making; and
- Retain VMT reduction as one of the competitive selection criteria.

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement)?

- Expand amount of money available for grants;
- Provide additional funds and staff to enhance performance measurement; and
- Provide additional funds and staff to support additional analysis during grant selection process.

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Washington State
Department of Transportation

Kitsap Telework Pilot Project (Proposed Program)

What is the program?

The legislature provided $150,000 in 2007-2009 for the Kitsap Telework Pilot Project. The primary purposes of the pilot project are to educate employers about teleworking; develop telework policies and resources for employers; and reduce traffic congestion by encouraging teleworking in the workplace. The Kitsap Regional Coordinating Council is implementing the pilot project. The council will recruit public and private sector employer participants throughout the county, identify telework sites, develop an employer's toolkit, and create a teleworking template that may be used in other communities. WSDOT is administering the state funds and providing technical assistance to support the project.

How does the program help reduce vehicle miles traveled (VMT)?

Telework reduces commute VMT because teleworkers work at home or at a telework center that is closer to home than the workplace. A successful pilot project could lead to a reduction in commute vehicle miles traveled for many Kitsap peninsula residents.

What is happening now (current status/activities)?

project is in the start-up phase as of May 30, 2008. The Kitsap Regional Coordinating Council is gathering existing materials and best practices and beginning to reach out to employers. The council is required to submit a summary of the program results and recommendations for future telework strategies to the legislature by July 1, 2009.

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

This is a pilot project and the scope has fully utilized existing resources. The lessons learned and recommendations from the pilot can help guide future investments and policies for telework and VMT reduction.

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement)?

Additional resources could be distributed as grants to organizations that seek to introduce or expand teleworking in the state. Tax credits could be provided for organizations that provide incentives for telework or have measured reductions in VMT from teleworking. The lessons learned and recommendations from the pilot can help guide future investments and policies for telework.

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Washington State
Department of Transportation

Transportation Demand Management Strategies for Schools Study

What is the study?

In 2007, the Washington State Legislature asked the Washington State Department of Transportation (WSDOT) to conduct a study, develop strategies and make recommendations to reduce auto congestion around schools. The legislature is interested in finding ways to effectively address congestion associated with high traffic flow created by students and parents commuting to school. In the case of elementary and junior high schools, parents driving their children to school can create high traffic flows in surrounding neighborhoods. High schools and universities generate congestion from students driving themselves.

WSDOT's Safe Routes to Schools program provides technical assistance and resources to cities, counties, schools, school districts and state agencies for engineering, education, encouragement and enforcement, improvements that will get more children walking and bicycling to school safely. The Safe Routes to Schools program is the primary state grant program to address trips to kindergarten through 8th grade schools.

This transportation demand management strategies for schools study is looking at other opportunities to address trips to school (kindergarten through 12th grade (K-12) and colleges universities). The study's recommendations are due to the legislature by January 2009.

How does the study help reduce VMT?

Schools represent a significant generator of trips, and communities can benefit from reducing traffic impact on surrounding roads. Considerable number of vehicle trips is generated by taking students to school. Educating students and parents about alternative modes of transportation can have major long term effects on the reduction of drive-alone vehicle trips. Reducing the emissions associated with vehicle trips further fits with the overarching goals of the Governor's Climate Change Challenge. The strategies for schools study will help determine the potential for inclusion in Washington's Commute Trip Reduction (CTR program).

What is happening now (current status/activities)?

WSDOT has divided the study into two phases. To help guide the study, WSDOT assembled an advisory group of various experts on schools and school transportation issues. The advisory group helped the study team focus on the most significant issues affecting travel to school and suggested potential models for study.

Phase 1 of the study included a literature review summarizing the level of knowledge about the subject and helps to identify models and strategies. The models that were identified guided the statewide search for potential programs of interest to examine and learn from in Phase 2. These programs of interest include:

- Safe Routes to Schools in urban and small city elementary schools
- The use of fare-free transit
- An introduction of mobility education curriculum in high schools
- A mandatory universal pass program at a university
- A ride sharing Web site
- The inclusion of a school in a growth and transportation efficiency center under the state's CTR law

What can we be doing with existing resources to enhance the study's ability to reduce VMT?

Legislative direction has focused the study on relieving congestion around schools. Recommendations from the study are due to the legislature by January 2009.

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement)?

Additional funding would provide expansion of the study to a program based on the final study results.

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Washington State
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The High Occupancy Vehicle Program

What is the program?

The High Occupancy Vehicle (HOV) system is a network of freeway lanes in the Puget Sound area that are for use by high occupancy vehicles such as transit, vanpools, and carpools. Approximately half of the lanes operate as HOV-only around the clock, and the other half are open to all traffic at night (after 7:00 pm).

The system includes direct access ramps, which allow HOVs to enter and exit HOV lanes when the HOV lane is situated on the far left side of the freeway next to the center median. Direct access to the left-side HOV lanes allows HOVs to bypass metered on-ramps and eliminates the potentially dangerous and traffic delaying weave across other freeway lanes.

In May of 2008 the HOV lanes on SR 167 were converted to high occupancy/toll or HOT lanes. When there is extra space in the HOT lane, solo drivers can pay an electronic toll using a interior car-mounted transponder for a faster, more reliable trip. Toll rates increase and decrease with the level of congestion to ensure that traffic in the HOT lane always flows freely and carpools, vanpools and transit enjoy the same reliable trip they have in HOV lanes.

The HOV system increases freeway efficiency by moving more people in fewer vehicles and by providing an additional incentive to rideshare.

The goals of the HOV system are:

- To maximize the people-carrying capacity of the freeway system by providing an incentive to use buses, vanpools and carpools.
- To provide capacity for future travel growth.
- To help reduce transportation-related pollution and dependency on fossil fuels.

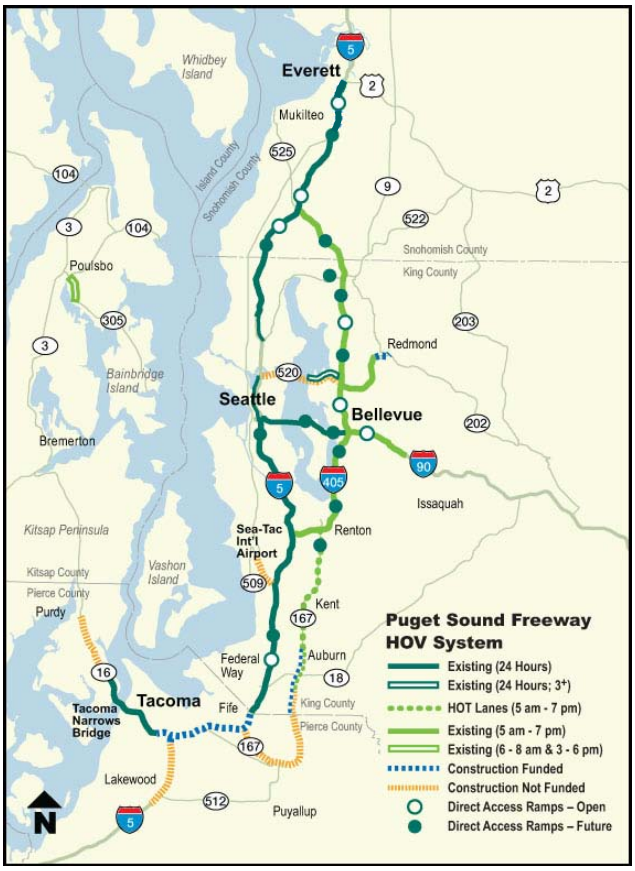
HOV and transit-only lanes also exist on some arterials. These generally fall under the jurisdiction of the local municipality and are not included in this description.

How does the program help reduce VMT?

HOV lanes support carpool, transit, and vanpool traveltime savings and reliability. They have also been shown to encourage mode shift from single occupant vehicles to shared ride modes. The main reasons cited for using shared rides in the HOV lanes are travel time, convenience, saving money, and less stress.

Survey data indicates that 99 percent of system users have at least one working vehicle at home. This indicates the HOV system is succeeding in shifting people from single occupancy vehicle (SOV) to shared ride modes. HOV system mode split in 2006 was 65 percent carpools, 20 percent transit, and 4 percent vanpools. The majority of HOV system users are two-person adult carpoolers.

The current system is moving about 34 percent of peak period freeway travelers in only 19 percent of overall freeway vehicles traveling in the peak directions. Approximately 200,000 one-way trips are made on the freeway HOV system on an average weekday.



What is happening now (current status/activities)?

The first freeway HOV segment opened almost 40 years ago. Approximately 235 lane-miles of a planned 310 mile system are currently operating. Seven direct access ramps out of a planned 20 have been built.

Projects totaling another 10 lane-miles and three direct access ramps are currently under construction. Another 15 miles of funded projects and one direct access ramp have not broken ground. Funding is still required to complete the remaining 50 miles of the system and nine direct access ramps. Existing, funded, and unfunded parts of the system are shown in the map to the right.

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

Freeway HOV lanes are currently congested on I-5 and I-405 during the peak periods in the peak directions. Congested HOV lanes reduce the travel time and reliability benefits of shared ride modes and thus reduce HOV lane's effectiveness in shifting demand to HOV modes. However, raising the vehicle occupancy requirement from two or more people (2+) to three or more people (3+) would push two-person carpools into already congested general purpose lanes and diminish the incentive for two people to carpool. The loss of incentive to carpool in the general purpose lanes would probably result in a shift back to single occupant vehicles and increase total VMT.

Though the I-5 and I-405 HOV lanes have little ability to accommodate additional vehicular traffic during peak periods, there is considerable additional person-carrying capacity in the vehicles that use the HOV lanes. This suggests there may still be potential for targeted transportation demand management (TDM) programs to reduce VMT by shifting SOV travel to HOV modes. Other approaches to managing HOV system capacity are being developed, some of which could be relatively inexpensive.

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement)?

- A study is being finalized which looks at both short and long-term treatments for easing congestion in the I-5 HOV lanes. This was a low-cost fast-track study which could be expanded to look at other parts of the system, in conjunction with other planning and studies, to address short-term issues. The study could be expanded to look at certain locations and applications in more depth where required.
- Completion of the HOV system (SR 16 northeast to Purdy, I-5 south to Lakewood, and SR 167 down to Puyallup and back up to Fife at the I-5/SR 167 interchange) as shown on the map is not fully funded. The remaining nine direct access ramps are also unfunded. Direct access ramps have been largely funded by Sound Transit.
- Beyond completion of the currently planned HOV system, further expansion in the Puget Sound and other metropolitan areas of the state could be studied in conjunction with tolling and other congestion management plans. Expansion of arterial HOV, transit-only and BAT (**b**usiness **a**ccess and **t**ransit) lanes could also be performed in conjunction with the appropriate municipalities.

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Washington State
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Tolling and Pricing Program

What is the program?

The Washington State Department of Transportation (WSDOT) has initiated tolling on the State Route (SR) 16 Tacoma Narrows Bridge, and on the High Occupancy Toll (HOT) lanes pilot project on SR 167. We are also planning for tolls to help finance replacement of the SR 520 Evergreen Point Bridge. In partnership with the Puget Sound Regional Council (PSRC) and others we are examining additional uses of tolling to raise transportation revenues and manage congestion.

How does the program help reduce vehicle miles traveled (VMT)?

In theory, if drivers become more aware of the cost of each trip through paying a toll, they will – when they have a choice – conserve travel by:

- making fewer and shorter trips,
- telecommuting,
- using transit, vanpools or carpools,
- walking or bicycling.

Different approaches to tolling may have different impacts on VMT. Through practical experience and improved analysis tools we will be better equipped to predict VMT document reductions

What is happening now (current status/activities)?

Some of the current tolling activities we are working on include:

- Tolling the Tacoma Narrows bridge
- Conducting a pilot project to test and evaluate HOT lane implementation on SR 167
- Received a federal Urban Partnership grant to accelerate implementation of tolling on SR 520 prior to bridge reconstruction in partnership with King County and the Puget Sound Regional Council. This project will also provide documentation of the effect of tolls on travel behavior.
- Conducting public outreach during the Summer of 2008 on toll concepts to fund SR 520 bridge replacement.
- Working with PSRC to develop tolling options to include an update to the Metropolitan Transportation Plan (MTP).
- Express toll lanes, with two express lanes per direction, are being evaluated for I-405.

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

Implementation and expansion of tolling will require:

- Regional agreement on tolling policies and strategies
- Public outreach and acceptance
- Positive results from initial tolling efforts.

In the short term without new funding we could be developing tolling, high occupancy vehicle (HOV) and traffic management policies to guide future tolling projects.

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement)?

Based on the results of our current pilot high occupancy toll (HOT) lanes project we will assess potential for future applications.

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Washington State Department of Transportation

Active Community Environments Initiative

What is the program?

The Center for Disease Control's five year partnership project with Washington State Department of Health and Washington State Department of Transportation, called *the Active Community Environments Initiative*, promotes walking, bicycling, and the development of accessible recreation facilities. It was developed in response to data from a variety of disciplines, including public health, urban design, and transportation planning. These data suggest characteristics of our communities such as proximity of facilities, street design, density of housing, and the availability of public transit, pedestrian and bicycle facilities play a significant role in promoting or discouraging physical activity.

This initiative encourages environmental and policy interventions that will affect increased levels of physical activity and improved public health. The goals are to:

- encourage the development of pedestrian and bicycle friendly environments
- promote active forms of transportation like walking and bicycling
- disseminate information and technical resources related to Active Community Environments Initiative

How does the program help reduce vehicle miles traveled (VMT)?

In Washington State, over half of all trips are under three miles, yet 80 percent of these trips are made by car.[1] Part of the earliest and most effective areas on which to focus for reducing VMT and related emissions is lowering the number of short vehicle trips – especially focusing on urban and urbanizing areas. Most people drive for short trips because, in many places, the built environment makes walking and biking either uninviting or very difficult.

Biking and walking are increasing in Washington, particularly in urban and urbanizing areas where housing infill is occurring. Bicycle commuting has increased 75 percent in the past ten years.[2] Biking and walking currently account for about 6 percent of statewide commute trips.[3] In the Puget Sound Region, bicycling and walking account for 9 percent of all trips.[4] In several urban core areas across Washington, bicycling and walking account for 15 percent of all trips.[5] Bicycle touring has also become increasingly popular and contributes more than $6 million annually to local economies in the state.[6]

What is happening now (current status/activities)?

Current statewide activities to promote the goals of the Active Community Environments Initiative include:

- develop the Kids Walk-to-School program to promote walking and bicycling to school.
- collaborate with public and private agencies to promote Walk-to-School Day.

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[1] National Household Travel Survey (NHTS), www.bts.gov/programs/national_household_travel_survey/.
[2] US Census, www.census.gov/.
[3] NHTS; US Census;
Regional Household Activity Survey Analysis Report, PSRC (2006)). www.psrc.org/data/surveys/hhsurvey/index.htm.
[4] Regional Household Activity Survey Analysis Report, PSRC (2006)). www.psrc.org/data/surveys/hhsurvey/index.htm.
[5] Ibid.
[6] Bicycle Alliance of Washington, www.bicyclealliance.org/.

- develop the Active Community Environments guidebook for public health practitioners to use to partner with transportation and city planning organizations to promote walking, bicycling, and close to home recreation facilities.
- promote the development and use of close-to-home parks and recreational facilities through a partnership with the National Park Services Rivers, Trails, and Conservation Assistance Program.
- collaborate on the King County HealthScape study to review the relationships of land use, transportation, air quality, and physical activity.
- collaborate with the Environmental Protection Agency on a national survey to study attitudes of the American public toward the environment, walking, and bicycling.

Additionally, Regional Transportation Planning Organizations across the state have joined the Active Community Environments Initiative and are benchmarking their efforts to connect bicycle and pedestrian facilities and improve safety using a Community Assessment survey developed by the statewide team.

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

Funding to continue the efforts of this program beyond this year is uncertain. However, the Center for Disease Control has named this program one of the top ten initiatives of the year.

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement)?

Additional funding would fund Community Assessment surveys at additional locations to be administered by Regional Transportation Planning Organizations and expand WSDOT and DOH technical assistance services.

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Washington State
Department of Transportation

Bicycle and Pedestrian Program

What is the program?

The Bicycle and Pedestrian program provides technical assistance and resources to improve conditions for bicycling and walking and promote partnerships between WSDOT, local agencies, school districts, tribal nations and stakeholder groups.

In 2005, the Washington State Legislature committed $74 million to support pedestrian and bicycle safety projects such as pedestrian and bicycle paths, sidewalks, safe routes to school and transit. The Bicycle and Pedestrian program administers this funding program. To date, grants have been awarded to more than 100 projects that help reduce the over 400 annual fatal and injury crashes involving bicycles and pedestrians and improve conditions for biking and walking across the state.

The Bicycle and Pedestrian program offers assistance and resources to project offices, traffic engineers, communicators, designers and planners in several specialty areas including:

- Improving pedestrian and bicycle safety and mobility,
- School zone and walk route design,
- Trail and path design, and
- Design for access/universal design

How does the program help reduce vehicle miles traveled (VMT)?

In Washington State, more than half of all trips are under three miles, yet 80 percent of these trips are made by car.[1] One of the most cost effective focus areas for reducing VMT and related emissions is lowering the number of short vehicle trips. Most people drive for short trips because, in many places, the built environment makes walking and biking either uninviting or difficult.

Biking and walking are increasing in Washington, particularly in urban and urbanizing areas where housing infill is occurring. Bicycle commuting has increased 75 percent in the past ten years.[2] Biking and walking currently account for about 6 percent of statewide commute trips.[3] In the Puget Sound Region, bicycling and walking account for 9 percent of all trips.[4] In several urban core areas across Washington, bicycling and walking account for 15 percent of all trips.[5]

"In preparation for a two year pilot study of the potential impacts of bicycle/pedestrian transportation, Federal Highway Administration (FHWA) conducted baseline travel surveys in four pilot and one control community. They found that bicycling and walking trips currently substitute for an estimated 156.1 million VMT annually in the four pilot communities.[6] A second

[1] National Household Travel Survey (NHTS), www.bts.gov/programs/national_household_travel_survey/.
[2] US Census, www.census.gov/.
[3] NHTS; US Census;
Regional Household Activity Survey Analysis Report, PSRC (2006)). www.psrc.org/data/surveys/hhsurvey/index.htm.
[4] Regional Household Activity Survey Analysis Report, PSRC (2006)). www.psrc.org/data/surveys/hhsurvey/index.htm
[5] Ibid.
[6] FHWA Interim Report to the U.S. Congress on the Non-motorized Transportation Pilot Program SAFETEA-LU Section 1807, November 2007.

phase of the FHWA study focusing on impacts of specific bicycle and pedestrian improvement projects is due to be completed in 2010, with preliminary findings available this year.

What is happening now (current status/activities)?

The recent update of the State's Bicycle and Pedestrian Plan found that cities, counties and ports in Washington have identified more than $1.2 billion in unmet pedestrian and bicycle improvement needs. This year WSDOT received 93 applications from cities, counties and schools for bicycle and pedestrian projects totaling $36 million and expects to be able to provide $7 million in funding to meet a portion of these needs.

Bicycle and Pedestrian program has also developed a partnership with the Department of Health and regional transportation planning organizations using funds secured through the Center for Disease Control (CDC). This partnership project, called *Active Community Environments Initiative*[7], aims to improve the health and quality of life for Washington's citizens by improving and increasing opportunities to bicycle and walk.

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

As outlined in the State Bicycle and Pedestrian Plan, the effectiveness of the Bicycle and Pedestrian program could be increased by:

- Additional benchmarking and tracking performance statewide including the development of a user count database.
- Expanding resources and technical assistance provided through the Bicycle and Pedestrian program.
- Requiring bicycle and pedestrian design and funding training for agency staff, particularly as part of new engineers' training.
- Considering bicycle and pedestrian needs in all planning and corridor studies.
- Revising the scoping process to include more definition for bicycle and pedestrian components and increased coordination with local agencies and transit providers.

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement)?

With gas prices rising and housing infill projects increasing across the state, there is an increasing demand for the services and resources of the Bicycle and Pedestrian program.

In addition to meeting increased demand for services, there is an immediate opportunity for bicycle and pedestrian infrastructure investments (i.e., trails, sidewalks) to be included as part of a WSDOT programmatic environmental strategy.[8] WSDOT's work with DOH conduct new

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[7] See WSDOT's Active Community Environments Initiative briefing paper for more detail. The briefing paper is located on the Transportation Implementation Working Group (IWG) web page: www.ecy.wa.gov/climatechange/2008CATdocs/IWG/tran/060908_tran_ActiveCommunityEnviroInitiative.pdf

[8] **NOTE**: A recent study conducted by the Bay Area Air Quality Management District has taken the next step in estimating impacts of new trails and bike lanes on VMT and CO2. This study found, based an evaluation of many types of projects ranging from rideshare programs to vanpooling to traffic operations improvements, that trails and bike lanes are one of the most cost effective investments in terms of VMT and CO2 reduction (an average cost of $340 per ton of CO2 eliminated)." ICF Consulting, Performance Review of Selected TFCA Project Types Final Report, Prepared for the Bay Area Air Quality Management District, August 1, 2006.

research on the impacts of biking and walking on air and water quality and public health is currently unfunded and additional resources would enable this work to continue.

Additional resources are also needed immediately to improve regional travel demand models and their ability to consider bicycle and pedestrian improvements or develop new modeling tools that more accurately weigh the costs and benefits of all types of transportation investments, more accurately capture the amount of bicycling and walking and the impacts of bicycle and pedestrian investments.

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Washington State
Department of Transportation

Context Sensitive Solutions

What is the program?

Context Sensitive Solutions (CSS) was originally a Federal Highway Administration initiative to "promote transportation solutions that enhance communities and protect the natural and built environment." Its essence is that a proposed transportation project must be planned and designed not only for its physical aspects as a facility serving specific transportation objectives, but also for its effects on the aesthetic, social, economic and environmental values, needs, constraints and opportunities to fit into its setting.

How does the program help reduce vehicle miles traveled (VMT)?

Transportation design is more of a process than a product. The CSS process produces a result that is visible on streets and roads. It is what people and communities see and experience, whether it is a Main Street or a scenic rural road. CSS is creating new approaches to the flexible application of design controls and standards and more attention to all modes of transportation, including pedestrians, bicyclists, freight mobility and transit. A transportation facility that provides for and promotes walking, biking, taking transit or improves freight mobility, will likely result in significant reductions in vehicle miles traveled.

What is happening now (current status/activities)?

The Washington State Department of Transportation (WSDOT) is guided by a statewide vision for transportation and livable communities, which is part of the Washington Transportation Plan, "Washington's transportation system should serve our citizens' safety and mobility, the state's economic productivity, our communities' livability and our ecosystem's viability." To support this vision, WSDOT is integrating a CSS approach to doing business agency-wide.

WSDOT encourages its employees to look beyond basic transportation issues and develop projects that are integrated with unique contexts within a project setting. WSDOT's Executive Order on CSS drives this approach at all levels in the organization from Executive to technical staff in all aspects of work. The Executive Order provides the foundation and the case for change for the agency. It recognizes that the consensus or informed consent generated through development of CSS can benefit all parties and may help avoid delay and other costly obstacles to project implementation.

To support integration of CSS, WSDOT has developed guidance documents, outlining processes for working with stakeholder groups, providing an overview of what CSS is, and a resource for balancing flexibility in transportation design. WSDOT has also implemented training in CSS processes for transportation system designers.

The strength and viability of WSDOT's award winning CSS approach is ensured through its numerous informal and formal partnerships. The agency commitment to CSS is further demonstrated by a strong support for staff development of CSS skills, internal and external

Another current effort to reduce congestion centers on retiming of WSDOT owned and operated traffic signals. WSDOT Signal Operations tracks and reviews the performance of around 885 signals owned and operated by WSDOT statewide. This translates to an estimate of more than 22 million vehicles traveling through WSDOT signals on a daily basis. Careful coordination of signals contributes to a significant aggregated reduction in traffic delay.

HOV Lanes – Approximately 220 miles of a planned 300 mile HOV system are now complete and another 10 lane miles are under construction. HOV lanes move over one-third of the people on rush hour highways using only 19 percent of the vehicles, making them an effective tool in reducing congestion and VMT.

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

Additional funding and Full Time Employees (FTE's) for Signal Retiming will allow the Region Traffic Offices to improve traffic signal operations, improve vehicle travel time and reduce traffic delay and green house gas emissions. A recent state audit cited that even a modest level of signal coordination in the Puget Sound could reduce delays by 15 to 20 percent. This equates to an estimated annual savings of $300 to $400 million in travel time and vehicle operating costs. Also, annually, for each second of average delay reduction, more than 12,000 metric tons of Carbon Dioxide Equivalent can be prevented from entering into the atmosphere.

What could we (or should we) be doing with additional resources?
(i.e. where are the opportunities for growth/enhancement)?

WSDOT is currently studying Active Traffic Management techniques being used successfully in other countries to improve traffic flow and increase safety. Techniques under consideration are: speed harmonization, overhead gantries employing variable speed limits, queue warning, hard shoulder running, dynamic rerouting, travel time signing and junction control.

ATM strategies hold the greatest promise in reducing congestion, traveler delay and greenhouse gases from vehicles stuck in traffic. Additional funding will allow quicker implementation of proven ATM functions.

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Washington State
Department of Transportation

Advanced Traffic Operations

What is the program?

The primary objective of Advanced Traffic Operations is to fully utilize the existing highway system while ensuring the safety of system users and reducing congestion. Regulatory measures, traffic control devices and innovative operational techniques are used to maximize the capacity of the system. Traffic Operations also provide services and information that travelers need to safely and efficiently use the transportation system. A more efficiently run system means fewer stopped vehicles idling in traffic, and fewer greenhouse gas emissions being released into the atmosphere.

Currently, Traffic Operations focuses it congestion reduction efforts in the Puget Sound urban core using ramp meters, reversible lanes, traffic data sensors, real time traffic information, High Occupancy Vehicle (HOV) lanes, Incident Response Vehicles, and traffic cameras. Intelligent Transportation System (ITS) devices are essential for communicating traffic and weather conditions to the public, managing traffic flow, collecting traffic data and other functions.

The Washington State Department of Transportation (WSDOT) is in the early stages of implementing High Occupancy Toll (HOT) Lanes and variable tolling. HOV lanes and variable tolling are strategies that can help reduce VMT.

Active Traffic Management (ATM) techniques like variable speed limits, additional travel time displays and other dynamic traffic controls are planned to help reduce congestion on Puget Sound highways.

How does the program help reduce VMT?

According to the American Association of State Highway and Transportation Officials (AASHTO)'s *Primer on Transportation and Climate Change*, management of traffic flow by traffic operations programs in transportation agencies is one of four major factors that affect levels of greenhouse gas emissions. WSDOT agrees with the leaders of many transportation agencies that believe reducing traffic congestion can make a significant contribution to reducing greenhouse gas emissions, and has instituted policies that support congestion reduction. It has been documented that the significant amounts of wasted fuel burned by vehicles stuck in traffic is reduced and fuel consumption is optimized by vehicles traveling at consistent speeds.

What is happening now (current status/activities)?

One highly successful technique for reducing congestion is the Incident Response (IR) Program. Over 50 percent of all congestion on urban highways is caused by non-recurring incidents, like collisions, disabled vehicles, spills or other incidents that impede traffic flow. This can result in four to ten minutes of accrued traffic back up for every minute a lane remains blocked.
IR responds to approximately 12,000 incidents each month effecting a sizeable reduction in incident clearance time.

communication of the agency's CSS approach, and a rigorous, agency-wide performance measurement program.

What can we be doing with existing resources to enhance the program's ability to reduce VMT?

WSDOT has taken significant steps to integrate CSS into all facets of the agency's business from the executive level to technical staff, and from early planning through delivery and operation. WSDOT, guided by an Executive Order and a rigorous accountability process, is identifying new ways to move CSS forward each day. Some areas of current focus include:

- Continue efforts to implement CSS processes as WSDOT's only method for project delivery.
- Establishing processes to ensure consistency between WSDOT projects, local comprehensive plans and regional plans.
- Developing accountability and performance measurement tools that link CSS processes to project development and delivery.
- Continuing to take steps to foster an ecosystem approach to planning, developing and operating the transportation system.
- Continuing to conduct research to address some of the outstanding questions related to flexibility in design (e.g, state highways as main streets, urban street and rural road design, balancing safety and aesthetics).

What could we (or should we) be doing with additional resources? (i.e. where are the opportunities for growth/enhancement)?

Increased funding and integration with land use density practices can help create transportation designs that are sensitive to the environment and reduce VMT.

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Appendix 6 – Washington Trucking Associations and AAA Washington Minority Report

AAA Washington

Washington Trucking Associations

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Minority Report

To The Climate Action Team
Prepared by
Washington Trucking Associations
AAA Washington

November 13, 2008

Transportation IWG Minority Report Introduction

The Washington Trucking Associations and AAA Washington appreciated the opportunity to participate in the Transportation Implementation Working Group of the CAT (Climate Action Team), however, we do not endorse many of the conclusions reached in the TIWG's Final Report. One of the most significant areas of concern in the Transportation Implementation Work Group's report is the lack of a cost/benefit analysis for the proposals being forwarded to the CAT, from which legislative recommendations will be made to the 2009 Washington Legislature. We do not believe the legislature can make informed decisions about most of the recommendations in this report because the process did not involve any type of vetting of the numbers used to substantiate the proposals. For example, even though estimated reductions in Greenhouse Gases (GHG) and Vehicle Miles Traveled (VMT) are attached to some elements, there was no discussion about what the associated costs would be or how to pay for those costs. It is not good public policy to make long-term funding and pricing recommendations to the legislature without first thoroughly assessing their potential costs and impacts. While the report is heavily laden with 'blue sky' proposals, it is seriously lacking in empirical documentation to support those proposals.

Further, nowhere in the report is the timing of the recommendations discussed. Fundamental public policy changes, like those outlined in the Transportation Implementation Work Group's Final Report, have long-term implications for how all of us in Washington will live**,** work and play. AAA and the Washington Trucking Associations believe that before we rush to implement such a broad-based set of transportation pricing and funding strategies, it is critical that we first accurately determine their financial impacts and then establish achievable tactics to ensure that what we bring to our state is a program that meets the goal of reducing greenhouse gases while maintaining a vital economic environment and improving personal mobility.

Discretionary and Non Discretionary Highway Users

The TIWG in its report doesn't take into consideration that there are different categories of highway users, namely discretionary and non-discretionary. Non-discretionary users would be the trucking industry, and any business that provides goods and services that must use the highway system.

The reason we believe these definitions are important is that the entire thrust of this project is to decrease VMT and GHG, which if you are a non-discretionary user, is not possible. Given the cost of operation per mile of a heavy truck, automobile or light truck in commercial use, it is safe to assume that there are no unnecessary trips being made currently. To further tax commercial highway users by applying tolls and congestion pricing does nothing to achieve the goal of VMT and GHG reduction, but rather extracts dollars from the economy with no corresponding cost benefit. We accomplish nothing if we impose punitive per capita VMT restrictions that ruin the economy.

In addition, the report contends that tolling/congestion pricing will reduce VMT and GHG, without identifying a targeted class of highway user. The report seemingly leans toward mitigating impacts on vulnerable constituents, once again without defining vulnerable. We cannot identify who is to be targeted to accomplish the VMT/GHG reduction goals.

Especially disappointing is the fact that the Transportation Implementation Work Group's Final Report said little about the role of creating incentives for people to reduce travel or purchase hybrids and other more fuel efficient vehicles. Instead, the group chose to focus on restricting mobility. Such an approach treats users of all types of motor vehicles the same. The driver of a Honda Civic would be penalized the same as the driver of a gas-guzzling Hummer. Our goal should be to reduce Greenhouse Gas Emissions, not force people out of their vehicles.

Washington Transportation Access Network

The report spends a great deal of time discussing choices for highway users. However, there is no mixture of carrot and stick. It is simply all stick. When one looks at the definition of "choices", the word means "the opportunity or privilege of choosing freely". This is simply not the case here, where the goal appears to be placing a high enough toll on an as yet unidentified segment of highway users, thereby forcing them off the highway infrastructure.

In addition, the report recommends a major policy change in regards to transit, bike, and pedestrian investments, seemingly indicating that the **State** should assume these funding burdens utilizing newly implemented tolling, congestion, and other taxes.

We are of the firm belief that if transit governance is local or regional, the funding mechanism should also be local or regional. The current transit system in the three county Puget Sound Region is inefficient, with duplicative maintenance and administrative costs and a lack of coordination between agencies. This makes the proposed plan problematic from an investment standpoint.

As we indicated earlier, it has been difficult throughout the committee's deliberations to fully understand the impact of many of the proposals, simply because there is no data as to the capital or operating costs of implementing many of the recommendations. This is particularly true when discussing the Washington State Transportation Access Networks proposals to dramatically increase transit service levels across the State of Washington. When asked to make an investment of this magnitude, cost data needs to be included for purposes of financial analysis.

Transportation Pricing

While tolling can certainly play a role in future transportation funding in Washington State, it would be irresponsible from a public policy standpoint to look to tolling as a panacea for all of our transportation funding needs. It is not financially or operationally practical to toll all highways, roads and streets with today's technology anytime in the near future.
In general, we do not support implementation of a broad-based set of pricing strategies to reduce VMT until policymakers have established a quantifiable service level threshold for all transportation options.

We do not agree with Transportation Pricing Recommendations 4 and 5, or the statement, "Tolling should be applied more broadly to promote greater achievement of revenue, efficiency, and GHG emission reductions. In addition, broad application also helps avoid geographic inequity due to tolling some roads and not others, and could set a context allowing more flexible use of revenues and greater consistency in the application of tolls from the customer's point of view."

The greatest consistency in the application of tolls from the customer's point of view is to simply toll new facilities, use the revenues to pay for the construction, improvement and maintenance of the new facility from which the tolls are collected, and ensure that the tolls have a sound economic basis, i.e., reflect the actual costs of the facility and debt service. Further, such financial investments should improve safety**,** reduce congestion, and enhance mobility. We do not support the second recommendation which calls for the 2010 state legislature to establish a task force to "…explore how to move towards a system-wide application of tolling, rather than on a project-by-project approach." We do not have enough validated cost effectiveness information to support the use of comprehensive, or system-wide tolling as a traffic management strategy for reducing VMT and GHG emissions. Our objective should be to provide transportation facilities in the forms most suitable to meet public demand within the limits of economic and operational feasibility, as determined by sound transportation planning.

We further believe that any taxes or fees that apply to highway users should be afforded protection of the 18th amendment of the Washington State Constitution. That is not to say that we don't support a dedicated funding source for transit that is more broad based. Transit has a very important role to play in helping to solve our transportation congestion problem, but taking critical dollars away from building, maintaining, and upgrading our state's roads, highways and bridges is not the solution. It would simply exacerbate the problem.

We do not support Transportation Pricing Recommendation 2, which states "Toll revenues should be used to fund more sustainable travel options (e.g. transit, ridesharing)." The Blue Ribbon

Commission on Transportation issued its report in December 2000 after two years of work. In its final recommendations to the governor and legislature, the Commission said, "Washington's transportation system is on a collision course with reality." It went on to say, "Thirty years of population and economic growth have led Washington into a transportation crisis. We must act now to prevent the gridlock on our roads and highways from irreparably damaging the state's environmental health and economic prosperity and diminishing the personal well-being of citizens." The Commission acknowledged that the cost of solving the crisis is not cheap. "There is $150 billion worth of transportation needs across the state over the next 20 years." This is a compelling argument for utilizing toll revenues to fund the preservation and maintenance of our state's highways, roads, and bridges.

Transportation Pricing Recommendation #1

The report recommends that VMT/GHG reduction be considered as a third objective to DOT's existing tolling objectives of revenue generation and efficient traffic management in project design, development and pricing strategies and actions, and in the regulation of toll rates. This would likely ensure that few additional highway lane miles would ever get built in the future, thereby bringing into question the benefit to be derived by highway users from billions of highway tax dollars to be paid under this plan. Once again it appears that billions of dollars would be extracted from the economy without any guaranteed improvement in commute times or congestion. This is especially true, since the TIWG rejected the inclusion of performance standards on facilities with tolls/congestion pricing.

Diesel Engine Emission Reductions And Fuel Efficiency Improvements

While we appreciate the Transportation Implementation Working Group's recommendation to use tolling revenues to provide incentives for new or retrofitted trucks with reduced emissions and/or charge higher prices for more polluting vehicles, we would suggest that government's intervention in this marketplace might be more disruptive than helpful. It must be remembered that Washington-based trucking companies compete on an interstate level with carriers coming in from outside the State of Washington. Additional costs placed on Washington based carriers would make them uncompetitive. Further, the industry is already in the midst of a conversion to cleaner vehicles. Not too many years ago, a new engine cost $17,000 to $19,000. The 2007 engines running low sulfur fuel and new emission reduction technology, cost $30,000 to $35,000. The 2010 engine systems are predicted to cost approximately $42,000. Once again we would caution against intervention amongst this group of highway users.

Rail Recommendations

Under improvements to freight railroads and intercity passenger rail, the report recommends a long term, consistent public funding commitment to make necessary improvements to facilitate potential GHG emissions reductions and economic competitive advantages of expanded rail use. While we do not object to that recommendation, we would caution as with mass transit, if there is going to be a

public investment in rail, there needs to be a new revenue source that does not further burden highway users. In addition, throughout the rail section, where freight rail is discussed**,** it repeatedly touts shifting freight from truck to rail. This might be possible if the freight volumes remain static, however, freight volumes are predicted to increase tremendously in coming years, so it is unrealistic to expect that trucks will play a lesser role in the future. It must be understood that trucks and trains are complementary in the movement of freight. In fact, trucking is railroad's largest customer. If VMT and GHG reductions are predicated on fewer trucks being on the road in the future, a false premise is created.

Summation

The common thread throughout the report, besides VMT/GHG reductions is the underlying current of social engineering, which will dramatically and irrevocably change the way Washington's citizens work and live. At one point the report indicates, "The majority of people in Washington State will need to live and work in pedestrian oriented places with land uses that support bicycling and walking for shorter trips and public transportation for longer trips." A reduction in transportation related emissions "will require significant changes in how we live, travel and think about mobility, addressing not just emissions per mile, but also the number of vehicle miles traveled." Because this vision of Washington's future is drastically different from our current lifestyle, in our opinion it is necessary to step back and thoroughly analyze the societal costs – economic impact, ease of mobility, and lifestyle choices – that would be required to meet the current VMT reduction goals. We believe that vehicle technology advancements in the near future will provide the public an opportunity to be both environmentally friendly while retaining their choices for a more mobile lifestyle.

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The Next 50 Percent

Introduction

The Beyond Waste Implementation Working Group (IWG) has developed proposals that will contribute to reductions of greenhouse gas (GHG) emissions generation associated with solid wastes when implemented, building on the prioritized recommendations from the 2007 CAT process known as *AW-3: Significant Expansion of Source Reduction, Reuse, Recycling, and Composting* and the CAT's 2007 interim report headline titled*: Recommendation 11 Reduce waste and Washington's emissions of GHGs through improved product choices and resource stewardship.* Additional information and recommendations related to 2007 CAT priorities are in Appendix A.

Through the waste reduction and recycling efforts of the last 20 years, Washington is now diverting about 48 percent of the solid waste generated in the state to reuse, recycling and beneficial use applications. Though we don't know exactly how much GHG emission reductions this represents it is several million metric tons of CO_2 equivalents ($MMTCO_2e$) per year, probably more. We believe that pursuing the recommended strategies to recycle "the next 50 percent" will result in at least a measurable 7 $MMTCO_2e$ per year being reduced.[1]

The goal of the Beyond Waste IWG is to significantly expand source reduction, reuse, recycling and composting and build on what is best and most successful in current waste management system by developing an implementation plan targeting products with the largest GHG reduction potential.

To accomplish the goal the IWG was charged to build on existing source separation strategies and the state's solid waste management plan – the Beyond Waste Plan - implementation approaches. The group was to develop an implementation plan considering actions that:

- Optimize the collection and processing infrastructure needed to more effectively capture recyclable materials with the highest carbon footprint generated from industrial, commercial, agricultural and residential sources;
- Expand, recruit or develop in-state businesses that use recyclable materials in their manufacturing processes (including investment, financing and incentives);
- Remove organics from the disposal stream so that they can be beneficially used for healthy soils, bioenergy production and new products;
- Create product stewardship framework legislation applicable to consumer products focusing on the full product life-cycle including cradle-to-cradle design, material and energy content, manufacturing and end of life recycling/reuse;
- Determine actions to expand byproduct synergy, zero waste business practices, design for the environment and other emerging commercial activities;

[1] Based on EPA's Waste Reduction Model (WARM). WARM has received occasional criticism for overstating emission reductions for some materials. However, WARM does not provide GHG calculations for all materials covered in these recommendations so the gross GHG reductions may in fact be greater than what can be modeled.

- Review implementation of existing environmentally preferred purchasing policies and recommended new environmentally preferred purchasing policies to be used by state and local government entities, that will result in reduced GHG generation; and
- Support and expand consumer product reuse and related business activities.

Through the IWG deliberations, the following materials were targeted as have significant GHG emission reduction potential:

- Paper 1.6 $MMTCO_2e$
- Metals 0.4 $MMTCO_2e$
- #1 & #2 plastics 0.1 $MMTCO_2e$
- Other plastics 1.5 $MMTCO_2e$
- Construction & demolition 1.7 $MMTCO_2e$
- Organics 1.5$MMTCO_2e$
- Contaminants (GHG reduction potential is not known, however, contaminants reduce the recyclability of the targeted materials above)

The tonnage estimates reflect the results of using the USEPA Waste Reduction Model (WARM) for calculating GHG reductions related to alternative solid waste management methods. WARM does not calculate GHG reduction potential for all products and materials. So, the potential for realizing additional GHG emission reductions is high.

In addition, there is the potential of .8 $MMTCO_2e$ to be realized through anaerobic digestion of dairy wastes. This potential becomes greater with the addition of other organic farm and food processing wastes.

The IWG developed many action proposals to accomplish the outlined tasks. To winnow the many ideas down to the few, the criteria of "readiness to proceed" and "GHG reduction potential" were used.

It is important to remember that the solid waste management system is part of larger systems. Materials are extracted, turned into products, used and then disposed. The solid waste management system has traditionally focused only on the last point in the system – disposal. Recycling has been demonstrated to be an effective strategy to reduce the impacts of disposal. It is now recognized as being an effective tool to reduce the upstream impacts of extraction, product and use as well. The action proposals set forth below keep these farther reaching benefits in mind.

Action Recommendations and Implementation Timeline

FOR 2009 LEGISLATIVE SESSION:

1A: *Optimize the Solid Waste Collection System* – focuses on collection and creates financing mechanisms to accomplish these actions
1B: *Product stewardship framework legislation* – Aimed at improving the environmental performance of products, specifically reducing their carbon footprint and increasing their recycling.
1C: Establishing a comprehensive organics management system -

1. Green electricity – Bio-power/Anaerobic Digestion Legislation
2. Compost products use subsidy
3. Compost product procurement by the Department of Transportation

NON-LEGISLATIVE ACTIONS FOR 2009:

2A: Collaborate with industry to influence the supply chain, particularly retail
2B: Establish a workgroup by Governor's Executive Order to develop an Environmentally Responsible Purchasing strategy for state and local governments

DEVELOP FOR THE 2010 LEGISLATIVE SESSION:

3A: Establish strong government environmental procurement and responsible purchasing practices in statute
3B: Gain legislative authorization of a sustainable product design institute

DEVELOP FOR THE 2011 LEGISLATIVE SESSION:

4: Stimulating Recycled Material Use

- Incentives for Industry
- Assure utilization of collected materials through aggressive market development strategies

Research and Development

Appendix B contains a funding matrix that describes the potential funding sources for the recommendations.

ACTION 1A: OPTIMIZE THE SOLID WASTE COLLECTION SYSTEM

2009 ACTION DESCRIPTION

- The goal of this action is to optimize the collection of recyclable materials and products, construction and demolition debris and organics for recycling in Washington State to meet a new recycling goal of 80 percent by 2020.

- The fundamental strategy to achieve this goal is to require source separation of solid wastes by residential and commercial generators into at least three categories: recyclable materials and products, organic materials, and residual solid wastes.

- Recyclable materials include at a minimum recoverable paper, container metals, container glass (with some exceptions) and plastics. Organics include at a minimum yard, garden and food wastes.

- Residential generators must separate their wastes and participate in provided collection services.
- Commercial generators must separate their wastes and can select their recycling service provider.

- The action will increase the collection of recyclables, organics and waste through required source separation and collection programs.

- Local governments will be required to update their local comprehensive solid waste management plans on a phased schedule based on population size and location or contract renewal, describing the services that will be provided.

- Local governments are to write plans to assure construction and demolition wastes are reused and recycled at registered recycling businesses.

- Financial incentives are provided to the private sector to encourage investment in the infrastructure needed to support this action.

BASIS FOR SELECTION

- The result of this action will contribute to the reduction of GHG annually by over five $MMTCO_2e$ when fully implemented, based on current waste generation calculations.

IMPLEMENTATION APPROACH AND MECHANISMS

- Amendments to Chapter 70.95 RCW are required, (see "Legislative Proposal Overview" , below, and draft language in Appendix C). The amendments require updates of local solid waste management plans.

- A funding mechanism is offered to increase revenues generated by the solid waste collection tax required by Chapter 82.18 RCW by increasing the tax rate on collection of garbage and applying a differential rate collection of recyclable materials and organics.

- There is concern over requiring commercial and industrial recycling expressed by the private recycling industry. The proposal, however, only requires that these generators source separate wastes and participate in recycling. It does not require them to use any specific recyclable collection service provider.

- It is not the intent to eliminate the potential for recycling to be a part of the new "carbon market" strategies by expanding collection.

SUPPORTING INFORMATION

- GHG Emission Reduction Potential if these targeted materials are recycled:
    - paper 1.6 $MMTCO_2e$
    - metals 0.4 $MMTCO_2e$
    - #1 & #2 plastics 0.1 $MMTCO_2e$
    - other plastics 1.5 $MMTCO_2e$
    - construction & demolition 1.7 $MMTCO_2e$
    - Contaminants (GHG potential not known, however, contaminants reduce the recyclability of the targeted materials above).

- **Costs or cost savings:** Recycling has proven to be more cost effective than disposal. Recycling costs less than disposal given that a disposal fee is avoided and that marketing of recyclables generates revenue. The cost of collection remains, in either case.

- **Distribution of costs and benefits:** Costs will be borne by rate-payers, the benefactors of the services provided. This is a pay as you go proposal.

- **Additional external benefits:** This action will create more green collar jobs in businesses and industries that collect, process and use recycled materials.

- **Engagement opportunities for individual action/behavior change:** Participating in recycling and engaging in waste reduction activities is direct and tangible way the general public can engage and be part of the climate change solution.

- **Economic Implications:** The climate change action agenda demands a shift in our economy. The traditional "dig and dump" economy relies heavily on resource extraction and waste disposal. The new "sustainable" economy will rely on resource conservation and materials reutilization. A robust recycling system, starting with collection, is the key to making this new economic system work.

- **Engagement opportunities for local and regional governments and private sector:** This action relies completely on the ability of local governments and the private sector to work collaboratively to provide services to the public.

LEGISLATIVE PROPOSAL OVERVIEW

- Legislation is proposed (see description below, and draft language in Appendix C) to optimize the collection of recyclable materials and products, construction and demolition debris and organics for recycling in Washington State to meet a new recycling goal of 80 percent by 2020.

Residential Waste

- The fundamental strategies to achieve this goal related to residential waste are to:
    - Maximize source separation of recyclable materials, organic materials and wastes by residential generators
    - Require participation in collection services where they are available.
    - Provide collection of recyclable materials, organics and wastes separately, at a minimum
- At a minimum, recyclable materials include paper products, container metals, container glass and plastics. Organic materials include yard and garden wastes, food waste and food contaminated paper. Construction and demolition wastes are not considered part of the residential waste stream.
- All recycling facilities that receive recyclable materials from residential generators are identified and properly registered.
- Applicability: Residential includes both single-family and multi-family dwellings.

Commercial Waste

- The fundamental strategies to achieve this goal related to commercial waste are to:
    - Require source separation of recyclable materials, organic materials and wastes by commercial generators;
    - Assure comprehensive collection services are available and provided for recyclable materials, organic materials and wastes separately; and
    - Verify that materials collected for recycling are recycled.
- Local solid waste planning jurisdictions must identify through the local comprehensive solid waste management plans:
    - Collection services that are available for metals, paper products and organics to commercial generators. Jurisdictions can consider a variety of alternatives.
    - Registered recycling facilities that receive recyclable materials from commercial generators.
    - How commercial generators will be informed of and have access to the recycling service options available.
    - What will be done if options are not accessible.
- Commercial generators must separate their unwanted materials into at least three material streams: recyclable materials, organic materials and wastes. They must have these materials collected by one of the available registered recycling businesses.

- Organics collection services may be phased if markets are not currently available. The local planning jurisdiction must write a plan to develop those markets, in collaboration with their local economic development councils.
- For all material categories, the local government may apply for a waiver of these collection requirements from Ecology if end-use markets fail to develop. The local government must demonstrate efforts to develop markets in collaboration with private industry before a waiver can be issued.
- Applicability: This includes all commercial businesses, non-profit organizations, and government facilities.

Construction and Demolition Debris

- The fundamental strategies to achieve this goal related to construction and demolition wastes are to:
    - Require local solid waste planning jurisdictions to develop construction and demolition wastes reduction, reuse and recycling elements within the local comprehensive solid waste management plan;
    - Provide technical assistance from Ecology to local planning jurisdictions via model ordinances that can be adopted by local governments; and
    - Verify that materials collected for reuse and recycling are reused or recycled.
- At a minimum, construction and demolition debris generators must separate their unwanted materials into at least two material streams: 1. reusable and recyclable materials; and 2. waste. Generators must have these materials collected by one of the available registered recycling businesses.
- Applicability: All construction and demolition projects requiring a building permit.

Local Government Planning Requirements

- Local governments will be required to update their local comprehensive solid waste management plans and must consider constraints such as contract renewals, etc. The updated plans will describe how services will be provided in all contiguous incorporated and unincorporated areas with a population density[2] of 333 persons per square mile according to the planning schedule below:
    - July 1, 2011 for the counties of Clark, King, Kitsap, Pierce, Snohomish, and Spokane and all the cities therein;
    - July1, 2012 for the counties of Benton, Franklin, Walla Walla and Yakima and all the cities therein;
    - July 1, 2013 for the counties of Cowlitz, Grays Harbor, Island, Lewis, Mason, Skagit, Thurston and Whatcom and all the cities therein; and
    - July 1, 2014 for the counties of Chelan, Clallam, and Grant and all the cities therein.
- Participation is optional for:
    - The counties of Adams, Asotin, Douglas, Ferry, Garfield, Jefferson, Kittitas, Klickitat, Whitman Lincoln, Pacific, Pend Oreille, Okanogan, Columbia, San Juan, Skamania, Stevens and Wahkiakum[3]; and
    - Any cities and areas in the state that do not have waste collection services as of January 1, 2009.
    - Any city with a population of 1,500 or less that is only bordered by an unincorporated area of a county within the counties required to write plan updates.
    - If these jurisdictional areas do choose to participate, their plans would be due no later than July 1, 2016.

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[2] There are 640 acres per square mile. Rural residential zoning that provides a minimum of one single family dwelling per five acres or 128 single family units per square mile has been commonly practiced within the state. The average persons per household in the U. S. were 2.6 in 2000. So, 128 X 2.6 is 333 persons per square mile.

[3] These 18 counties have less that 50,000 population each. The total combined population of these counties is 366,700 according 2005 population estimates. That is just less than 6% of the States' total population.

Financing for the Private Sector

- **Revenue Sharing Between Haulers and Generators** – Current law allows solid waste collection companies to retain up to 30 percent of the revenue generated from the sales of recycled materials as negotiated between the company and the local planning jurisdiction. 70 percent is returned to generators through reduction in their garbage bills. To provide a stronger incentive the solid waste collection companies, this revenue sharing lid should be increased to 50 percent. The amount of the revenue sharing should continue to be negotiated between solid waste jurisdiction and the collection service provider as a means to incentivize the collection service provider to improve recycling systems, improve the quality of recycled materials for market and increase market development efforts.

Issues That Have Not Been Addressed

- Funding: Potential mechanisms to fund state and local government responsibilities are described in the Funding Matrix in Appendix B.
- Public Education about this new approach is necessary. RCW 70.95 addresses public education. A funding mechanism is needed.
- Enforcement responsibility for the recommendations has not been assigned.
- If the stated recycling goal of 80 percent is attained, the Public Works Trust Account could be seriously reduced because of reduced revenue from one of its major funding sources, the Solid Waste Collection Tax.

ACTION 1B: PRODUCT STEWARDSHIP FRAMEWORK LEGISLATION

2009 ACTION DESCRIPTION

- The goal of this action is to establish a legislative framework utilizing product stewardship to minimize the environmental and health impacts of products throughout all stages of their lifecycle, including GHG emission impacts. "Product stewardship" policies require that producers take responsibility to manage and reduce the entire life-cycle impacts of their products from product design to end-of-life management.
- Product stewardship framework policy includes:
    - Requirements that producers (not local or state government) finance and provide product stewardship programs that provide environmentally-sound collection, transportation, reuse, and either recycling or disposal (as appropriate) of selected products.
    - An effective approach for decreasing GHG generation.
    - Language to encourage the design of products that are less toxic, more recyclable, more energy efficient, and have lower GHG emissions during the product's lifecycle.
    - A process for building markets for the recyclable materials.
    - A process for adding products to be covered by the legislation over time.
    - A process for evaluation of performance.

BASIS FOR SELECTION

Recycling Significantly Reduces GHGs

There is a large potential to increase the recycling and diversion of products that are currently being disposed and thus to decrease GHG emissions. This proposal could reduce GHG by over 0.9 million tons CO2e (see below). Additionally, a pending EPA report documents that 46 percent of US GHG production is a result products – production and provision of goods and materials and food, (EPA OSWER).

A Changing Waste Stream Requires Creative Solutions

A century ago, garbage was mostly coal ash and food waste with a small amount of simple manufactured products, like paper and glass. Now, product waste makes up 75 percent of per capita waste. Many of these products -- like paint, electronic products and fluorescent light bulbs -- are hard to recycle and contain toxic components. Local governments do not have adequate budgets to finance the special collection systems needed for these complicated products. And current recycling systems may be challenged to keep up with product design changes. Product stewardship links product design with disposal impacts so that producers take end-of-life impacts into account during the design phase.

Provides a Process to Maximize Producer Engagement and Private Sector Ingenuity

Framework policy provides a process for maximizing outreach to and input from producers of potentially covered products through an advisory committee and product selection and rule making processes. If a stewardship program is justified, producers assist in developing the rules and then they (not the government) design and manage the stewardship program. The framework establishes base criteria to be met, establishes a level playing field among competitors, and otherwise relies on private sector ingenuity and market forces.

Provides a Recycling Solution for Energy Efficient Products that Contain Mercury

Products such as fluorescent lights that can significantly reduce energy consumption do not currently have convenient, free, safe recycling options. This could create a disincentive for consumers to purchase and use these energy-saving products. Product stewardship programs provide a convenient and environmentally-sound management program for these products.

Provides an Incentive to Design Greener Products

There are currently few financial incentives for manufacturers to design products with smaller carbon footprints. Product stewardship links product design with end-of-life impacts so that producers take those end-of-life impacts into account during the design phase, so that their collection/processing costs for their products are reduced or eliminated over time. Framework legislation would require producers to be responsible for the product throughout the lifecycle of the product – thus providing an incentive to design products that are more environmentally benign.

Complements Collection Programs for Traditional Recyclables

Framework legislation makes producers responsible for handling products that may be toxic and difficult to handle in existing, effective programs, such as curbside collection. This cuts down on contamination and increases the recyclability of materials that continue to be collected at the curb and through other efficient methods. Some products may be most effectively collected through expanded curbside services or the creation of innovative new collection methods, which would therefore increase the economy-of-scale and efficiency of those services.

Framework Legislation in Place in Canada and Gaining Recognition in US

Framework policies exist in British Columbia and Ontario, Canada for paint, packaging, electronics, pharmaceuticals, solvents, pesticides, batteries, oil and tires. The Canadian Ministry of the Environment is currently working on a plan to harmonize framework policies across Canada. The Minnesota state legislature has passed a bill directing the state to establish a product stewardship framework policy. Framework legislation is being proposed in at least two other states in 2009.

Addresses the 2007 CAT's Recommendations

Framework legislation addresses the *2007 CAT Recommendation 11: Reduce waste and Washington's emissions of GHGs through improved product choices and resource stewardship*, and specific implementation elements outlined in the strategy identified as *AW-3: Significant Expansion of Source Reduction, Reuse, Recycling, and Composting, RCI-8: Consumer Education Programs, Including Labeling of Embodied Life-Cycle Energy and Carbon Content of Products and Buildings*, and *RCI-10: More Stringent Appliance/Equipment/Lighting Efficiency Standards, and Appliance and Lighting Product Recycling and Design*.

Framework Legislation Can Be Adapted to Address Single Products of Concern

The framework legislation text can be adapted to be used as legislation for addressing a single product of concern, such as fluorescent (mercury-containing) lighting. A sample is provided within this report.

IMPLEMENTATION APPROACH AND MECHANISMS

Pass Legislation

Framework legislation has been drafted that could be introduced into the 2009 legislative session (see Appendix D), or that could be adapted to address single products of concern (see Appendix E) until the time that the full framework legislation is passed. If the framework passed in 2009, the law would be effective in July 2009. Producers would fully provide recycling programs for an initial set of products by 2011, with additional products potentially added annually.

Key Support and Barriers to Implementation

Likely Supporters:

- Residents who want convenient recycling programs for many additional products.
- Schools, charities, and small businesses who want to be able to participate in free and convenient recycling programs for the products they discard.
- Non-profit advocacy groups interested in energy efficiency, GHG reduction, and increased prevention and recycling.
- Non-profit charitable reuse organizations, such as Goodwill, who often have unwanted products dumped on them as "donations" and then incur costs to properly dispose.
- Local governments who want their residents to be provided with recycling programs but are not able to adequately finance programs for many hard-to-handle products.
- State government. Product stewardship approaches have been identified as needed in numerous processes and reports by various agencies and are consistent with Washington's electronics recycling law.
- Retailers. Product stewardship typically has greater acceptability among retailers than fees at point of purchase.
- A few specific manufacturers and industries that could move toward support of this approach.

Possible Opposition:

- Manufacturers and industries that would be required to arrange and finance recycling programs for their products, as well as from industry associations representing the general business community. This is being addressed by building relationships with industries and industry members already in a good position to implement a product stewardship system, and by listening to their concerns and input regarding program structure. Additional outreach, education, and engagement with a diversity of producers will be needed and undertaken. Lessons are also being taken from the successes of the electronics product stewardship system in WA and other states.

Key Components of a Shared Responsibility Approach

In the proposed product stewardship system, responsibilities and roles would be shared as described below.

- *Program Implementation:* Producers – not state or local governments – would set up and pay for the recycling programs. The law would not prescribe specific program details, but instead allows the manufacturers flexibility in designing and providing the program. Producers would be responsible for developing stewardship plans, which the Department of Ecology would review and approve prior to implementation.

- *Sustainable Program Financing:* Financing for the manufacturer provided recycling programs comes from the manufacturers, not from State funds. The Department of Ecology would recover its minimal costs to administratively oversee and enforce the program from the manufacturers. This producer-pays approach minimizes costs to the State and establishes sustainable financing.

- *Stewardship Organizations May Operate the Program:* Producers are required to provide the collection, transportation and recycling programs for their products. Industry-run stewardship organizations may be contracted to operate the programs on behalf of the producers. Producers will work with processors and collectors, such as retailers, haulers, charities, and local governments

- *Consumer Participation:* Consumers will return their unwanted products to the stewardship programs.

- *Enforcement and Oversight:* The Department of Ecology will provide regulatory oversight and enforcement. Ecology, with accountability to the legislature, would also determine additional products to be covered by product stewardship programs through the use of an advisory committee and rulemaking process.

- *Education and Outreach:* A number of participants, including manufacturers, collectors, retailers, local governments and state government, will share responsibility for education and outreach.

SUPPORTING INFORMATION

Potential GHG Emissions from Products

Initial products that could be covered by stewardship programs include carpet, rechargeable batteries, fluorescent lighting, paint, and mercury-containing thermostats. In addition, agricultural chemical containers, additional electronics, and aerosol products containing ODS (Ozone Depleting Substitutes) used by non-professionals could be considered. The next tier of targeted products could include packaging and containers, plastic products, and propane gas tanks.

Potential GHG emission reductions include:

- Carpeting can potentially reduce GHG emissions by up to 897,000 tons CO2e (assuming 80 percent recycling).
- Paint, rechargeable batteries and mercury recycling have the potential to reduce emissions by an additional 9,610 tons CO2e.
- Stewardship of product packaging comprising paper packaging, container glass, PET bottles, aluminum cans, and tin cans has the potential for significant GHG reductions, but information is currently not available on the waste stream reductions achievable through stewardship of packaging.

Citizens Want Fluorescent Lamp Recycling Programs

Due to the new 2007 national appliance and equipment efficiency standards, people will need to purchase fluorescent lighting products as incandescent lamps are phased out. Washington needs a recycling program, paid for by the lamp manufacturers that will allow our citizens to safely recycle their lamps at no charge. By requiring that manufacturers be responsible for their product at the end of life, it provides an incentive for the design of new energy-efficient lamps that don't contain mercury or other toxic components.

Stewardship Programs Bring Jobs

Product stewardship programs utilize and build on existing and efficient collection, transportation and processing approaches and infrastructure, as well as create new business opportunities, processing activities, market development, and green jobs.

Citizens Want Stewardship Programs

Recent surveys have demonstrated that individuals support product stewardship concepts. A SoundStats™ survey that focused on unwanted electronic products found:

- 94 percent of respondents agreed that corporations that make electronic products should be responsible for designing them to be easily recyclable and less toxic.
- 92 percent also agreed that when these products contain toxic lead and mercury, these corporations should provide a safe and convenient way to recycle them.
- 71 percent of respondents would prefer that pre-paid recycling costs be included in the price of the product.
- Overt 61 percent of respondents would prefer to take their computers and electronic products back to a retailer for recycling.

LEGISLATIVE PROPOSAL OVERVIEW

Intent and Findings

- Convenient and environmentally sound product stewardship programs help protect our environment and the health of residents.
- Producers are the best entity to manage and finance product stewardship programs.
- Product stewardship programs encourage the design of products that have a lower carbon footprint and that are less toxic, less energy and material intensive, and more reusable and recyclable.

What is Product Stewardship?

"**Product stewardship**" means that producers take responsibility to manage and reduce the entire life-cycle impacts of their products and/or their packaging, from product design to end-of-life management.

"Product stewardship program" means a program that addresses the lifecycle impacts of a product and includes the collection, transportation, reuse, and either recycling or disposal, or both, of unwanted products, including historical products and the program's fair share of orphan products. The product stewardship program is financed as well as managed or provided by the producers of those products.

"**Producer**" means a person that:

(a) Has legal ownership of the brand, brand-name or co-brand of a covered product sold in or into Washington state;

(b) Imports a covered product branded by a producer that meets (a) of this subsection and that producer has no physical presence in the United States; or

(c) Sells at wholesale or retail a covered product and does not have legal ownership of the brand, and elects to fulfill the responsibilities of the producer for that product.

Product Stewardship Participation Requirements

Every producer of covered products and covered product categories sold in or into the state must participate in a product stewardship program by either:

- operating, individually or collectively with other producers, a product stewardship program approved by the department; or
- entering into an agreement with a stewardship organization to operate, on the producer's behalf, a product stewardship program approved by the department.

Initial Covered Products

The Legislature could decide to include an initial set of products and example text has been drafted for carpet, mercury-containing lighting, mercury-containing thermostats, paint and rechargeable batteries.

Product Selection Process

At least every two years, the department will consider and evaluate through rulemaking, product categories or products to designate for product stewardship programs. The department will also determine the covered entities, the implementation date, management requirements and any labeling requirements for each additional product category. The department will also determine whether a product's packaging is designated as a product.

Criteria for Product Selection

- Climate change impacts and benefits;
- Energy conservation potential;
- Public and environmental health and safety;
- Resource recovery and material conservation potential;
- Toxicity of the product;
- Opportunity to achieve greater waste reduction, toxicity reduction, design for recycling, recycled content, and recycling;
- Potential of a product to act as a contaminant in the materials streams collected in residential and commercial recycling programs;
- Concerns about disposing of the product in the waste stream;
- The costs of management to local governments, ratepayers, and taxpayers in the absence of product stewardship programs;
- The opportunity to use existing and new businesses and infrastructure to manage products or product categories proposed for designation and to use or increase markets that utilize the recovered materials from such products or product categories;
- Public demand;
- Success in collecting and processing similar products in other programs in the U.S. and other countries; and
- The advice of the Advisory Committee.

Advisory Committee to the Department of Ecology

The Department of Ecology will appoint and consult with an advisory committee of up to 15 members regarding new products or product categories, covered entities, implementation dates, management requirements, performance goals, labeling requirements, and other inputs requested by Ecology. The advisory committee shall vet the department's recommendations on new products or product categories.

The public may petition the department to consider products for inclusion in product stewardship programs required under this chapter. The department shall adopt rules describing the petition process. Public petitions will be considered during the product selection process established in this chapter.

Involvement of the Legislature

Before adoption of new products or product categories into regulations, Ecology must present the list of products or product categories to the appropriate standing committees of the legislature.

Product Stewardship Plan Requirements

Plans describing the product stewardship program must be submitted to the department for approval. The plans must include the following:

- Contact information and participating producers;
- Performance and recovery goals for the first three years of the program;
- Description of the collection system(s) that will be used, including how unwanted products will be collected in all counties in the state and for all cities with populations greater than 10,000;
- Description of the handling systems and processing or disposal systems that will be used;
- How hazardous substances will be tracked through to final disposition;
- Best management practices that will be used by first processors and their downstream vendors to assure that hazardous substances and wastes are not released into the environment or impact human health;
- Description of how the program will seek to use businesses within the state, including retailers, processors, and collection and transportation services, in the implementation of the plan.
- Amount of green house gas reductions anticipated from implementation of the collection, transportation and recycling program;
- Financing mechanisms that will be used;
- Strategies to manage and reduce life-cycle impacts of the products and packaging, from product design to end-of-life management;
- Description of how producers participating in the plan will communicate and work with processors and recyclers used by that plan to encourage sustainable design of products and packaging;
- Education and outreach strategy, including how the program will measure the effectiveness of education and outreach; and
- A description of the process used to consult with affected stakeholders about the contents of the plan.

Required Reuse or Recycling

All products that have been collected by a product stewardship program must be reused or recycled, except if the department determines the products are not recyclable.

No Fee to Covered Entity

Product stewardship programs shall be provided to covered entities without charging any fee at the time the unwanted products are delivered or collected for recycling or disposal.

Producers shall pay all the administrative costs, education and outreach costs, and operational costs associated with their product stewardship program, including the costs of collection, transportation, and recycling or disposal, or both, of the products covered by the program.

Education and Outreach

Product stewardship programs must conduct effective and measurable education and outreach efforts promoting their use. Programs must provide pertinent information, including a toll free telephone number and website where collection options are listed, to covered entities, wholesalers, retailers, collectors, and other interested parties.

Education and outreach efforts must be sufficient to meet required recovery rates and to ensure that collection options are widely understood by covered entities.

If the program does not attain the required recovery rate, it must describe in its annual report what actions it will take during the next reporting period to do so, including how it will increase and improve its outreach and education.

Prison Labor Prohibited

No product stewardship program may include the use of federal or state prison labor for processing.

Encouraging Collaboration

Producers are encouraged to collaborate with product retailers, certificated waste haulers, processors, recyclers, charities, and local governments within the state in the development and implementation of their plans.

Annual Report

Annual reports describing the activities of the product stewardship program during the previous year must be submitted to the department.

Recovery Rates

By June of the third program year for each product or product category, the department shall establish required recovery rates for the fourth and subsequent program years, and must establish a fine system for those producers and product stewardship programs that do not attain the mandated goals and rates.

The department will establish the fine system through rulemaking. Ecology will also establish through rulemaking a process for setting the recovery rates for the fourth and subsequent years and for adjusting recovery rates as needed.

Sale of Covered Products Prohibited

As of the implementation date established by the department for each product, no producer, retailer or other person may sell or offer for sale that product to any person in this state unless the producer of the product is participating in an approved product stewardship plan.

Enforcement

Producers who are not participating in an approved product stewardship program and whose products continue to be sold in or into the state 60 days after receipt of a written warning, and retailers who sell products from producers who are not participating in an approved product stewardship program 60 days after receipt of the written warning, shall pay a fine of $10,000 per day of noncompliance, beginning 60 days after receipt of the written warning.

Agency Administrative Costs Paid by Producers

The department may establish fees for administering this statute that are charged to the producers.

Anticompetitive Conduct

A producer or stewardship organization that organizes product stewardship programs is authorized to engage in anticompetitive conduct to the extent necessary to plan and implement its chosen organized product stewardship program and is immune from liability under state laws relating to antitrust, restraint of trade, unfair trade practices, and other regulation of trade or commerce for this purpose.

No changes to WUTC Authority

Nothing in this statute changes or limits the authority of the Washington utilities and transportation commission to regulate collection of solid waste in the state of Washington, including curbside collection of residential recyclable materials, nor does this statute change or limit the authority of a city or town to provide such service itself or by contract under RCW 81.77.020. (Note: consider additional reference to RCW 81.80 regarding commercial carriers.)

DRAFT FRAMEWORK LEGISLATION

Draft framework legislation is attached as Appendix D. This draft framework legislative text provides a means of identifying an initial set of products to be addressed or it could be run without identifying any specific products. The text can also be adapted to address a single product area of immediate concern if the Legislature is not ready pass an overall framework approach at this time. A sample of this approach using a product currently of particular concern, mercury-containing lighting, has been drafted and is provided to demonstrate the adaptability of the framework text.

DRAFT LEGISLATION FOR MERCURY-CONTAINING LIGHTING USING FRAMEWORK APPROACH

Draft legislation for mercury-containing lighting is attached as Appendix E. This sample draft legislative text for a product currently of particular importance and concern, mercury-containing lighting (fluorescent lighting), has been drafted and is provided to demonstrate the adaptability of the framework approach and text.

ACTION 1C) 1: GREEN ELECTRICITY – BIO-POWER/ANAEROBIC DIGESTION LEGISLATION

2009 ACTION DESCRIPTION

The specific action of this portion of the Beyond Waste Implementation Work Group package is to pass legislation to further the development of green energy - biopower/anaerobic digestion projects and remove barriers that prevent projects going forward. The legislation (proposed language is attached in Appendix F) has two parts:

- Broadening renewable energy credits (also known as renewable energy cost recovery/ or in Europe feed-in tariffs) to include all anaerobic digestion systems (not just livestock). The purpose of this broadening is to significantly improve the economics and environmental handling of anaerobic digestion projects including dairies and feedlots. This is an adjustment to the legislation previously passed for solar electric (photovoltaic), wind and anaerobic digestion using livestock manure established in law (see RCW 82.16.110 to 140 and RCW 82.08.900); and
- Requiring in-state utilities to wheel biopower/anaerobic digestion power to other in-state utilities in need to the renewable power. A modest fee not to exceed 5 percent of the value of the power or the standard utility transmission rate, which ever is lower, provides guidance.

Definitions: An adjustment to the definition of anaerobic digestion is needed to include all wet organic material not just dairy/livestock manure. The definition in RCW 82.16.110 (4) is done by reference to a retail sales tax exemption in RCW 82.08.900. Therefore, the definition found in RCW 82.16.110 is amended in a manner within the draft legislation to ensure that there is no unintended ripple effect of adding a broader retail sales tax exemption to RCW 82.08.900.

Procedural and administrative provisions and requirements: The administrative provisions for the renewable energy credits are already in place with the Department of Revenue and the WSU Extension Energy Program. Public and investor owned utilities have already implemented the original renewable energy credit application system. Utilities would need to enable the wheeling requirements of the legislation.

BASIS FOR SELECTION

Two rationales were used by the IWG to select this action:

- Early anaerobic digestion/biopower projects have run into a number of barriers blocking full implementation. Some of these barriers include: 1) A low price offered by some of the state's 66 local utilities (WA is blessed with a limited but oversubscribed source of cheap hydropower). This has been the case even though new power sources are considerably more expensive; 2) Issues of interconnection or wheeling to a neighboring utility (willing purchaser); and 3) The need for cost reductions for northern climate digesters (WSU has invested over $5 million in research and development to reduce this barrier). The legislation focuses on item one and two; and
- A goal of 100 to 150 anaerobic digesters in the state has been envisioned for several years. Only two dairy digesters have been built in our state. Dairy digesters receive a double GHG emission reduction: 1) The shut down of a manure lagoon is a methane reduction pathway; 2) The biopower produced offsets natural gas or coal based power production.

An explanation of this second rationale is as follows: The Northwest has had over a quarter century of very strong policy analysis of its power grid. This is a distinct advantage in sorting out the GHG impact of energy efficiency, renewable energy, and CHP. The Northwest Power and Conservation Council is one of the major analytical bases for the Northwest http://www.nwcouncil.org/ . If a megawatt (MW) of energy efficiency or CHP comes on line, what happens? The answer depends on whether or not the grid is in baseload mode or "on peak" (when a tough region wide cold snap occurs in winter for example). Our region has natural gas based "peaker" plants. They are also called "marginal resources". On peak, we use less standalone natural gas. On base, we use less standalone coal based power from the Southwest or Eastern Montana.

Note: Our hydropower system has been maxed out for years. So, we have wrapped around it energy efficiency, renewables, CHP, natural gas peaker plants, and imported coal based power.

Biopower/anaerobic digestion is viewed as baseload power and as such can best be compared to the GHG emissions production of coal based power. For an example of the depth of analysis see the I-937 presentation by the Northwest Power and Conservation Council staff (especially slides 25 to 31) at I-937 Rulemaking under conservation 2/23/07 "NWPCC Conservation Methodology Presentation http://www.cted.wa.gov/site/1001/default.aspx.

IMPLEMENTATION APPROACH AND MECHANISMS

Draft legislation is attached (see Appendix F)[4]. A fiscal note from the Department of Revenue will also be needed.

The three potential barriers to implementation are:

- 1) The low price for power barrier is eliminated in the legislation by providing a renewable energy credit (cost recovery) similar to solar electric/photovoltaic systems established in current law;
- 2) The checker board nature of Washington's utilities, with some needing the renewable power and wanting wheeling to occur and others unwilling to wheel the power to the other in-state utilities that need it, is resolved by requiring wheeling to occur for a modest fee; and
- 3) Capital costs.

A major capital cost reduction strategy has been underway by WSU for over 4 years and $5 million in research and development. A totally redesigned anaerobic digestion system which increases speed of digestion (reduces the major cost of cement), scrubs the biogas to reduce high wear and tear to the power generation systems and adds a number of new revenue streams. The new revenue streams include: 1) extraction of excess nitrogen and phosphorous for fertilizer, 2) upgrading the digested fiber as a peat moss substitute (peat moss is mined out of Canada); 3) development of co-digestion systems for food wastes/food processing wastes; 4) documentation of GHG emissions for sale. The WSU comprehensive digester system is now emerging from research and development and moving toward full commercialization.

SUPPORTING INFORMATION

GHG Reduction Potential and Underlying Assumptions

Quantifying all the GHG emissions reductions and offsets is difficult. For example, the WARM model is inadequate to address farm generated wastes. Quantification has been done in cooperation with the Stockholm Environment Institute and the Agricultural Sector Carbon Market Workgroup. A partial calculation yields $MMTCO_2e$.

- For dairies lagoon methane reduction pathway assume: 135 larger dairies with a total of 162,080 milk cows and 28,986 heifers (WSDA data for 2006). For milk cows assume 5.49 metric tons of CO2E/milk cow/year and for heifers assume 1.92 metric tons of CO2E/heifer/year (source is Chicago Climate Exchange/Environmental Credit Corporation). 945,000 metric tons of CO2E/year. However, not all manure will make it from the cow to the digester, therefore a very caution 65 percent assumption is used yielding a methane reduction of 615,000 metric tons/year from 135 dairy digester lagoon shut downs;
- For power reduction offsets assuming 2 kWh/cow/day (low end of factsheet from Northwest CHP Application Center) yields 90,700 MWh per year. If this new power generation displaces combined-cycle combustion turbines emitting 0.5 metric tons CO2 per MWh (the assumption used in all other electricity offset measures considered by the CAT) roughly 45,400 metric tons are of CO2E are offset;
- Embedded GHG emissions reductions from nitrogen and phosphorous fertilizer offsets – Not calculated;
- Embedded GHG emissions reductions per ton of peat moss – Not calculated; and
- Reduction in nitrous oxide releases from the soil due to elimination of nitrogen overloading – Not calculated.

Costs or Cost Savings (net present value, cost-effectiveness)

The economics of anaerobic digestion are in a state of major change with strong cross currents. Capital cost increases have included the price of cement for the digester, the price of the power generation engines, and other system components. Interconnection costs can vary widely and permitting with related costs for co-digestion are

[4] Dave Sjoding, WSU Extension Energy Program, drafted this legislation per the direction of the Beyond Waste IWG.

part of a major review by the Departments of Ecology (solid waste and water quality), Agriculture, Community, Trade & Economic Development, WSU and the dairy industry. Counter balancing cost increases are capital cost decreases through the system redesign by WSU and development on new revenue streams. Current analysis shows that co-digestion flips system economics from negative to positive (more biogas is produced and tipping fees are charged). Anaerobic digestion is viewed as complementary to compost systems rather than competitive.

Distribution of Costs and Benefits

The costs and revenue streams are principally borne and received by the project developer/owner. Ten year bank loans are common. Utilities receive baseload renewable power to comply with Initiative-937 or green power needs. The nursery industry receives an ability to buy an alternative that is equal to or superior to peat moss.

Additional external benefits beyond the green power benefit include

- Preservation of local/in-state family dairies by improved economics
- Odor reduction
- Development of in-state green jobs (Andgar is an example)
- Elimination of nutrient ground water overloading through nutrient extraction (helps resolve co-digestion concerns)
- Development of an alternative to mined peat moss, and
- Digested material can be added to compost to improve the health of soils.

Implications/Engagement Opportunities for Individual Action

The dairy feedlot industry has been very cautious to adopt anaerobic digestion due to a nationally prominent example of a dairy in Prairie, MN relationship to a local utility. Utility power purchase agreements that are for the length of the dairies bank loan resolve the MN issue. Extension and outreach to dairies, feedlots, wastewater treatment facilities and compost facilities will need to be done with workshops, factsheets, tours of existing digesters, and one-on-one discussions.

Implications/Engagement Opportunities for Local and Regional Governments and the Private Sector

Permitting of proposed systems will move though the permit processes (see discussion above). The private sector dairies, feedlots, waste water treatment facilities, compost facilities and Washington based project developers that take advantage of the opportunity will benefit.

STAKEHOLDER INFORMATION

There are at least six pieces of related or neighboring legislation. One (second on the list) is very closely related to the organics legislation. The Beyond Waste Organics electricity legislation would fit as an insert into the broader bill. Coordination with the proponents (not Climate Action Team associated) is underway. The other proposed pieces of legislation are:

1. Changing the net metering law from 100 kW to a proposed 500 kW;
2. Renewable Rate Recovery and Control Act – This bill sets a floor and a ceiling on the prices paid for different renewable electricity sources, requires the utilities to accept the electricity at those established rates and allows the utilities to rate base the power. The Beyond Waste Organics electricity legislation would fit as an insert with those rates;
3. Clean Heat and Power (CHP) legislation – Part of the Energy Efficiency – Green Buildings Climate Action Team process;
4. Bioenergy Tax Credits extension to 2015 – Community, Trade and Economic Development request legislation;
5. Clean Power Equipment Tax Incentive – A different tax extension; and

6. Expedited permitting of renewable energy systems.

Likely supporters of the legislation are some utilities (drafters of bill #2 above), Puget Sound Energy (hunting for renewable power projects and requesting other utilities to wheel renewable power to them) Tribes such as the Tulalip, and the Washington Dairy Federation.

LEGISLATIVE PROPOSAL OVERVIEW

Green electricity – Bio-power/Anaerobic Digestion Legislation

For insert into the Renewable Rate Recovery and Control Act (Note: Like all the IWG's legislative proposals this is a draft and a work in progress.)

The Renewable Rate Recovery and Control Act is being developed outside the CAT process by a number of utilities with the Northwest Solar Center are leading this other effort. Per discussion at the Beyond Waste IWG meeting on 8/26/08, this draft legislative language is being designed to fit within the larger legislative effort. Further stakeholder discussion is necessary to address concerns raised regarding current concepts and additional language adjustments may be necessary to ensure a better fit. The broader language is intended to serve as both a cap and a floor on renewable energy prices from various renewable energy sources. Prices vary by source. This will avoid Finance Committee issues. Utilities will be required to buy the power as the established rates. They will also be enabled to recover the cost of the renewable energy in their rate base. This draft is developed with a verbal understanding of the larger bill. (Note: The bio-power wheeling section of the bill may not be necessary depending on the drafting of the requirement of the utilities to purchase the renewable electricity.)

Proposed legislative language can be found in Appendix F

ACTION 1C) 2: DIVERSION OF PUTRESCIBLE ORGANICS FROM THE MUNICIPAL SOLID WASTE STREAM FOR CREATION OF GREEN ENERGY AND ORGANIC SOIL AMENDMENTS

2009 ACTION DESCRIPTION

Subsidize use of compost/organic amendments on agricultural lands by providing a per ton subsidy to farmers Statewide using the existing State Conservation District infrastructure. The subsidy would be available annually for a fixed time period. The subsidy would cover use of compost/organics at agronomic loading rates with a fixed amount of funding available per county. The rate of funding available per county would be determined based on farm acreage.

BASIS FOR SELECTION

Diversion of putrescible organics (examples include yard waste, food waste, and other high moisture content wastes) from the MSW stream offers the potential to generate GHG credits through methane avoidance. In addition, these materials have value for green energy re anaerobic digestion and as soil amendments. Anaerobic digestion and land application of digestates post energy extraction are complimentary processes. Use of organic soil amendments can generate GHG credits by substituting for synthetic fertilizers, reducing irrigation requirements by increasing soil water holding capacity and increasing total soil carbon. This 'grave to soil' approach offers the potential to generate GHG credits in three ways:

- Methane avoidance through landfill diversion
- Green energy through anaerobic digestion
- Ag credits through use of organic soil amendments

It is a low cost option with technology and limited capacity for anaerobic digestion in hand and with pre-existing infrastructure and facilities for composting residuals (in lieu of digestion or post digestion).

IMPLEMENTATION APPROACH AND MECHANISMS

Budget Request

Funding for statewide subsidy for agricultural use of compost/organics on farmlands, financial support for this would be derived from a increase in the solid waste tax or State and Local Toxics, Centennial Clean Water Fund, Carbon credits, Tipping fees or Renewable energy credits

- Example for Yakima, Kittitas, Chelan/Douglas, Spokane and Grant Counties: Each of these counties has a permitted operating or soon to be operating compost facility. There is high value agriculture in many of these counties including high tree fruit production. Providing subsidies for farm purchase of compost up to 25,000 dry tons per county to be used at an agronomic loading rate of 5 dry tons per acre at a subsidy rate of $8 per dry ton. Total cost for 5 counties would be $1.5 million. Total acreage covered would be 5,000 acres per county. Total feedstocks used to produce compost per county would be approximately 75,000 dry tons.

Define Statewide Subsidy Level/ Integrate into State Conservation District Funding

Requires identification of a revenue source to fund.

SUPPORTING INFORMATION

- Decomposition methane avoidance of approximately 1.15 $MMTCO_2e$ per year
- Upstream GHG benefits of approximately 0.16 $MMTCO_2e$ per year
- Cost per ton of CO2 saved is very low- added benefits of increased soil tilth and productivity
- Benefits to be seen by agricultural sector across the State-
    - improved soil productivity
    - improved water quality
    - improved crop yields and quality
- Creation of jobs re anaerobic digestion, compost production will be distributed between public and private sectors

ACTION 1C) 3: COMPOST MADE FROM RECOVERED ORGANIC MATERIALS PROCUREMENT BY THE DEPARTMENT OF TRANSPORTATION AND OTHER STATE AGENCIES

SUMMARY

Update language within RCW 43.19A to refer to the EPA Comprehensive Procurement Guidelines V (CPG V) regarding the Landscaping Products category to allow for use and purchase of a wider range of organics that comply with WA DOE regulations for compost and fertilizers land application of recovered organic materials.

This action will increase the markets for recovered organic wastes throughout the State and increase the variety and volumes available of recovered organic materials to Department of Transportation, as well as influence local and county purchasing specifications.

HIGHLIGHTS

This action will enhance the procurement goals for recycled content materials by state and local agencies by coming in line with the most recent federal procurement guidance for recycled products as previously codified by Washington State within RCW 43.19A and specifically define recovered organic materials that meet WA DOE requirements for land application.

The state is one of the biggest single purchasers of composted products, and the Standard Specifications for WSDOT for Compost, Fertilizer, Topsoil and Mulch products influence counties and cities purchasing actions and specifications state wide.

Updating the reference in 43.19A to include the EPA Comprehensive Procurement Guidelines V (CPG V) would result in the WSDOT modifying the 2008 Standard Specification Section 9-14.4(8)8. Requirements for purchasing compost, mulches, erosion control products, fertilizers and manufactured topsoil so that they are not limited to a certain feedstock or percentage of "composted plant materials" as they are now. This will allow a wider variety of composted products to be sourced locally to development projects. The current language used in WSDOT Standard Specifications for erosion control and roadside planting was intended to meet the 1991 goals as originally codified under RCW 43.19A Section, of increasing the use of composted yard debris. The markets for composted yard debris is well established in regions that produce these products, however areas outside of these production centers show little use of composted organic wastes due to transportation costs. It is important to note that Federal procurement laws have already been changed to accomplish this task and became effective September 14th, 2008. This proposed update would facilitate state transportation projects that receive federal funding to be in compliance with current federal purchasing rules for these materials.

The primary goal is to provide a change in all state recycled product procurement vendor lists and material sources to be inclusive of the other recycled organic waste feedstocks that are being extracted from the waste stream, that are processed by facilities that meet their applicable waste management and environmental regulations; and are processed to meet the applicable physical and performance standards set by the procuring agency for mulch, erosion control, compost applications, fertilizers and manufactured topsoil.

The secondary goal is to have state agencies purchase these designated items with the highest percentage of recovered organic materials practicable so that market demand increases as supplies of recovered organic

materials increase as their collection expands from 50 to 90 percent of the total available organics in the waste stream.

IMPLEMENTATION DATES

The Amendment to 43.19A would be submitted to the 2009 legislature with a targeted date for compliance/implementation by late 2009

MECHANISM

Put the attached legislative language to the Legislature , and if passed, have state agencies WSDOT, GA, Ports, Colleges and all other state purchasing departments that develop the land or install or maintain landscapes for state properties, to put in place procedures to purchase designated items with the highest percentage of recoverable materials content practicable, by using the following mechanisms to assure preferential purchasing of compost or fertilizers made from recovered organic materials.

1. Revise state procurement specifications to comply with the September 14, 2007 Federal Register Notice of the EPA Comprehensive Procurement Guidelines V (CPG V) to change the description of "compost" by consolidating all compost designations under one item designation: "compost made from recovered organic materials"
2. Add a designated recoverable material landscaping item of "fertilizer made from recovered materials"
3. Adopt the current companion guidance of the product specifications in the Recovered Materials Advisory Notice V (RMAN V) see the following web link for more information
4. Develop and make available a list of recovered organic materials product vendors and/or manufacturers and update it annually.
5. Assure through processor documentation, that purchased compost and fertilizer from recovered organic materials have met the applicable state health, fertilizer and solid waste regulations.

SYNERGY WITH OTHER PROPOSALS

This action could be combined with updating of overall procurement guidelines of recycled products for state and local agencies, as well as improve the information data base of available recycled products.

Resources:
http://www.epa.gov/fedrgstr/EPA-WASTE/2007/September/Day-14/f18150.pdf
http://www.epa.gov/epawaste/conserve/tools/cpg/rman5.htm
http://www.epa.gov/fedrgstr/EPA-WASTE/2007/September/Day-14/f18149.pdf
http://www.epa.gov/epawaste/conserve/tools/cpg/products/compost.htm
http://www.ga.wa.gov/PCA/Forms/Washington-Purchasing-Manual.doc#_Toc162333231
http://www.wsdot.wa.gov/Publications/Manuals/M41-10.htm

Legislative language can be found in Appendix G.

ACTION 1C) 4: IN CONJUNCTION WITH ANY OR ALL OF THE ORGANICS PROPOSALS, IT IS RECOMMENDED THAT THE STATE CHAMPION EXISTING MECHANISMS AND PROGRAMS FOR LANDFILL DIVERSION OF PUTRESCIBLE ORGANICS

Even without the adoption of the tax-related recommendations, the emergence of cap-and-trade markets provides an existing financial incentive for organics diversion from landfills. The State is encouraged to maintain and strengthen these market-based mechanisms as additional policies are developed and to provide guidance to private and public entities as to how to take advantage of these incentives. This guidance could take the form of support staff to work with public and private entities to provide necessary documentation to officially register projects or entities on currently trading carbon markets. It could also take the form of web-based guidance and educational materials for those seeking more information on these existing markets. This could also serve to showcase individual projects. It is possible that the individuals that have participated in these projects could cooperate with State agencies to offer guidance to other interested parties.

Participation in currently operating carbon markets does not preclude participation in the Western Climate Initiative. It also offers the opportunity to quantify carbon balances and receive credits for carbon offset projects using existing protocols while the WCI protocols are being formulated.

The Chicago Climate Exchange is the only established carbon market in the US where carbon credits are currently bought and sold. It is open for membership to a wide range of public and private entities. Washington State is currently represented on the Exchange by a number of projects and municipalities. For example, King County became a member of the Exchange in 2006. The VanderHaak Dairy, Lynden, WA, registered it's anaerobic digestion facility on the Exchange as a carbon offset project and receives annual payments for reducing methane emissions from its farm.

There are currently several protocols either in place or under development at the Exchange that are relevant to the organic component of the waste stream. A protocol is near completion for credits for methane avoidance for diversion of putrescible waste (food scraps, municipal biosolids, and yard trimmings) from landfills to compost facilities. Credits under this protocol derive from the methane release that is avoided by having these wastes decompose aerobically. There is also an existing protocol for anaerobic digestion of manures. The protocol can credit both methane avoidance for methane capture as well as green energy produced through controlled anaerobic digestion.

Several examples are detailed below to illustrate how these protocols could be used to generate revenue to support organics diversion projects. In each case, the diversion process results in the production of a material that has value as a soil amendment. Land application of these materials, either directly or after composting, could be encouraged and potentially subsidized through revenues gained from trading carbon credits.

FOOD SCRAP COMPOSTING

Several municipalities and their service providers within the State including King (http://www.metrokc.gov/dnrp/swd/garbage-recycling/recycle-food.asp), Snohomish (http://www.wmnorthwest.com/ssnohomishcounty/index.html and http://www.rabanco.com/collection/Lynnwood/residential/residential_organic_debris.aspx) Thurston (http://www.co.thurston.wa.us/wwm/Recycling_and_Disposal/Recycle/Composting/Compost_home.htm) , and Whatcom (http://www.ssc-inc.com/recycling_multifamily.php#foodplus) counties have begun programs that offer

joint collection of food scraps with yard trimmings. The mixed organics are then composted. Similar programs exist in Alameda County, CA and in Europe. (http://www.stopwaste.org/home/index.asp). Including food scraps in compost increases the nutrient value of the final product. In Washington State, food scrap composting operations are required to meet certain criteria for pathogen reduction (http://www.ecy.wa.gov/programs/swfa/compost/). On line resources already exist that showcase composting operations that comply with State regulations, such as Cedar Grove Compost (http://www.cedar-grove.com/) , Pierce County (http://www.co.pierce.wa.us/pc/services/home/environ/waste/recycle/compost/compost2.htm) and their service provider Pierce County Recycling Composting and Disposal (www.lrilandfill.com) .

Each of these programs are potentially eligible for carbon credits. These credits are only available through the Chicago Climate Exchange if food scrap recycling is encouraged by municipalities. They are not eligible if food scraps are banned from the MSW stream. Tip fees at compost facilities are likely to be comparable or less than to tip fees at landfills. If yard waste collection programs are currently in place, adding food scraps to the existing programs may not result in additional collection requirements or costs. However, it is essential that the compost facility comply with Department of Ecology regulations for pathogen destruction. No compost programs are currently listed on the Chicago Exchange. However, negotiations are ongoing to list programs for carbon credits. Each of these programs can be used as a model for other municipalities that are considering landfill diversion of food scraps. Carbon credits for these programs can help to defray additional costs and may also provide revenue to subsidize compost use within participating municipalities.

ANAEROBIC DIGESTION - ON FARM

Anaerobic digestion of animal manure is currently a recognized and functioning protocol on the Chicago Climate Exchange. Credits are provided both for methane avoidance as well as energy production. On farm anaerobic digestion operations that are currently listed on the Chicago Climate Exchange include the Vander Haak Dairy,in Lynden (http://www.envcc.com/index.php?option=com_content&task=view&id=20&Itemid=38). Projects are also underway or in development in the state. See for example: Qualco Energy Corporation's Monroe anaerobic digester facility. Qualco is a non-profit organization that includes representatives from the Sno/Sky Agricultural Alliance, a dairy farmers' group; Quilceda Power, a subsidiary of the Tulalip Tribes; and Northwest Chinook Recovery, a nonprofit organization founded in 1997 to preserve, restore, and enhance salmon habitat in the Puget Sound region. (http://www.quilcedapower.com/Biomass_Final_Report.pdf)

Revenue from carbon credits is important for the economic viability of these projects. These projects qualify for credits under existing protocols on the Chicago Climate Exchange (http://www.chicagoclimatex.com/content.jsf?id=103).

The methane generation potential of manures is generally significantly lower than that of food scraps and other food processing wastes. This is due to the fact that manures have already been through a digestion process within the animal and so have lost a significant portion of their energy. Alternate waste streams can be accepted into these digesters to provide both revenue from tip fees as well as additional gas production. It is likely that controlled anaerobic digestion of alternate feedstocks would also qualify for credits under the methane avoidance from composting protocol.

Examples of additional feedstocks that are currently being accepted into operating on farm digesters include cheese processing wastes and food scraps. In each case, these feedstocks provide revenue both from tip fees as well as high methane generation potential.

ANAEROBIC DIGESTION - WASTEWATER TREATMENT FACILITIES

Municipal wastewater treatment facilities (WWTP) often use anaerobic digestion to reduce volume of wastewater solids, as well as to meet regulatory requirements for pathogen reduction and vector attraction reduction. Municipalities can flare gas or capture gas for energy recovery. In many cases, these digesters have excess capacity. Using this excess capacity for digestion of targeted organics also has the potential to qualify for GHG credits through the Chicago Exchange. It can also provide additional revenues to WWTPs through tip fees for accepting these wastes and added energy production from increased gas production. Examples of feedstocks that are suitable for digestion include fats oils and grease, food scraps and animal processing wastes. A limited number of wastewater treatment facilities outside of WA state are currently accepting alternate feedstocks including grease, chicken blood and commercial food scraps (http://www.epa.gov/region09/waste//organics/ad/index.html; http://www.environmentalleader.com/2006/11/20/city-of-millbrae-powers-wastewater-treatment-plant-on-kitchen-grease/). Both King County and the City of Tacoma have or are currently conducting research on co-digestion of alternate feedstocks with standard wastewater solids. Initial results from other municipalities have shown an increase in gas production and volatile solids reduction when alternate feedstocks are introduced into digesters.

Accepting residuals that are covered under the CCX protocol on methane avoidance through landfill diversion of putrescibles suggests that this practice would be eligible for carbon credits through the Exchange. These credits would provide revenue in addition to revenue generated from tip fees and increased energy production.

ACTION 2 A: INDUSTRY COLLABORATION - RETAIL

2009 ACTION DESCRIPTION - COLLABORATE WITH RETAILERS TO ACHIEVE CONSUMER WASTE REDUCTION

At least 50 percent of household wastes come through retailers. Retailers could be asked to help the state meet an overall 15 percent reduction goal, as described in AW-3. This would take the form of a memorandum of agreement with retailers and the governor to achieve GHG emissions reduction goals through packaging and product reduction strategies. Two specific area for waste reduction are packaging and food waste.

Packaging Reduction

An example a collaboration with retailers is the “Glassrite Bottle Initiative” in the United Kingdom. Retailers worked with wine producers to lightweight wine bottles. For products that were imported, bulk wine was shipped and bottled in the UK.

The result was reduced materials and energy use, equating to 788,229 metric tons of CO2 equivalent reduction per year.

Pursuing a strategy like this could expand to other products and packages as well as pallet and other shipping materials reduction strategies. It could also include working with retailers to donate returned products to reuse organizations instead of disposing of them, and other waste reduction and education measures. Also, Washington could work with California and Oregon on regional efforts.

Food Waste Reduction

Nearly one-third of the food that is purchased is thrown away. Food waste is a major factor in methane generation in landfills and a major portion of household budgets. “Love Food, Hate Waste” is a food waste reduction strategy

developed in the United Kingdom. While it focuses information to consumers about food waste reduction strategies, it also engages retailers and producers in developing packaging for longer safe food storage and information about how to store food properly.

Up to 866,000 MTCO2E could be eliminated if we reduced our in-state generated food wastes by half.

BASIS FOR SELECTION

- Consumer products and food account for nearly half of the total global GHG emissions generation from the United State (EPA).
- Retailers have direct contact with consumers and can provide not only products, but information as well.
- Retailers have enormous influence on the products and packaging offered to consumers. Their control in the product supply chain can have significant impacts on GHG emissions generation – increases and decreases.

IMPLEMENTATION APPROACH AND MECHANISMS

A memorandum of agreement would be written between the governor and major retailers and retail associations in the state of Washington.

SUPPORTING INFORMATION

Costs or Cost Savings

Costs to state government would be minimal. It would primarily be staff time to negotiate and write the memorandum of understanding and would with the retail industry to track results. Implementation costs would be borne by retails, voluntarily.

External Benefits

A non-regulatory partnership with one of the state's major industry groups to reduce GHG emissions. This has not been vetted with the retail industry.

Engagement Opportunities for Individual Action

This proposal targets individual behavior. Retailers would work to provide consumers low carbon footprint products and information on safe storage of food. The provision of products and information alone will not be effective without consumer participation.

Economic Implications

Reduction in food waste should benefit consumers saving them money. Other economic implications are unknown.

Engagement Opportunities for Local and Regional Governments and Private Sector

This could provide an opportunity for local governments to partner with retailers within their jurisdiction.

ACTION 2 B: ENVIRONMENTALLY RESPONSIBLE PURCHASING

2009 ACTION DESCRIPTION

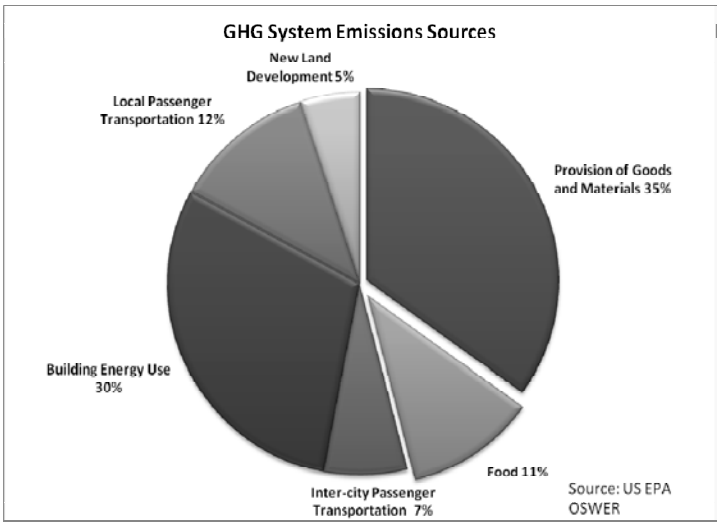
Establish, through a Governor's Executive Order, an intergovernmental work group to evaluate the need for and recommend if necessary revisions to state purchasing laws, regulations and practices to ensure that products and services used by government have the lowest possible environmental and carbon footprint.

There are existing efforts related to environmentally responsible/preferable purchasing (ERP). There are at least three state statutes, four executive orders and a variety of agency level policies. The degree of effectiveness of these various mandates is unclear. Also unclear is what barriers exist in other statutes and regulations that prevent effective environmental purchasing practices.

For the workgroup to be effective, the responsible state agencies will report the implementation status of existing state statutes, executive orders and agency level policies and barriers to full and effective implementation by March 1, 2009.

This action is about identifying barriers to environmentally responsible purchasing within current legislation and regulations and creating the legislated authorizing environment within which ERP can be achieved.

While the focus of the proposal is to reduce the carbon footprint of governmental purchasing, it is anticipated that proposed legislation will require that all purchases made with Washington state funds meet environmental performance characteristics, such as lowest possible GHG emissions and no toxicity. Currently, state purchasing contracts are awarded on price, availability and physical performance. This measure will add a fourth criterion, environmental performance, to the list.



BASIS FOR SELECTION

A soon to be released EPA study demonstrates that at least 46 percent of the United State GHG emissions are attributable to the provision of good and materials and food.

The opportunity to leverage a significant portion of the state's buying power to achieve noticeable GHG reductions by the state as a consumer, and to influence other consumers, was the rationale for selecting this action. Although this proposal will not be ready to implement in the 2009 legislative session, it is an important action to take as soon as possible, likely the 2010 legislative session.

Environmentally preferred purchasing as a concept has been around since the 1980's. Initially, recycled content paper products were targeted. In the early 1990's procurement of other recycled content products were added to the RCW. Eliminating the use of products that contain persistent, bio-accumulative and toxic substances was the focus of an executive order under Governor Locke, as was increasing the practice of environmentally preferred purchasing under his administration.

Those directives remain in place, but their effectiveness is unknown.

According to the Director of the Department of General Administration, Washington state government (including members of the Washington State Purchasing Cooperative) spends billions of dollars each year buying products and services through a "maze of purchasing authorizations." It appears that a very small amount of this total is intentionally directed to goods and services that reduce GHG emissions or that incorporate other environmentally responsible attributes. Many products with smaller climate impacts are available now.

IMPLEMENTATION APPROACH AND MECHANISMS

This action should be implemented through an executive order. The first item in the executive order should be to require an assessment of the progress and barriers related to environmental purchasing practices as reported by state agencies. This should be done by March 1, 2009 in order to provide the workgroup, described below, basic background information about ERP practices within government.

The second item in the executive order should be to require the Washington Departments of Ecology and General Administration to convene and facilitate a work group to develop an ERP program by June 2009, which will include an integrated set of revisions to the myriad laws and regulations that govern state purchasing and may also include additional elements. The working group should include representatives from:

- State government
- County government
- City government
- Special service districts
- Other members of the Washington State Purchasing Cooperative
- Colleges and universities
- K-12
- Vendors
- Department of Printing
- Department of Information Services

Proposed legislation will require that all purchases made with Washington state funds meet environmental performance characteristics, such as lowest possible GHG emissions and lowest possible toxicity. Currently, General Administration purchasing contracts are awarded on price, availability and physical performance. This measure will add a fourth criterion, environmental performance, to the list.

Additional actions that should be included in the Executive Order are:

- Adoption of the EPEAT standards for all computers purchased by government
- Adoption of a policy to require the use of 100 percent recycled content, process chlorine free office paper
- Establishment of standards for motor vehicles used by government related to environmental performance.

SUPPORTING INFORMATION

Costs or Cost Savings

Actual costs of desired products and services may or may not be higher than more traditional products have been. However, when product comparisons include life cycle costs throughout the supply chain along with environmental costs, it is likely that products meeting environmental performance standards will be price competitive.

External Benefits

Potential for more green collar jobs and green businesses within Washington.

Engagement Opportunities for Individual Action

This proposal focuses on changing the way government goes about its business in acquiring goods and services. When implemented, it will affect all suppliers and vendors and their customers.

Economic Implications

This proposal will put the $8 billion buying power of the state to work to reduce GHG generation. Approximately 7 to 10 percent of the state's spending is purchased through approximately 300 GA contracts. The proposed purchasing requirements and processes that result from this effort should also apply to the other 90 percent of purchases that are made outside the state contracts, whether through delegation authority from GA, or through other sources, including the Dept of Information Services, the Department of Printing, Department of Transportation, Department of Social and Health Services, Department of Health and possibly others.

Engagement Opportunities for Local and Regional Governments and Private Sector

Local government will be affected by the statutory changes as well. Embedding environmentally responsible purchasing in state law will influence local governments by providing them the tools and authorities needed to integrate ERP into their own purchasing practices. Both from amendments to their purchasing authorities and by their customer relationship to the Department of General Administration.

ACTION 3 A: ESTABLISH STRONG GOVERNMENT ENVIRONMENTAL PROCUREMENT AND RESPONSIBLE PURCHASING PRACTICES IN STATUTE

2010 ACTION DESCRIPTIONS

See Action 2 B. above. The anticipated outcomes of 2 B. include legislative recommendations. This is a placeholder for the 2010 session.

ACTION 3 B: ESTABLISH A RESEARCH AND EDUCATIONAL INSTITUTE TO ADDRESS SUSTAINABLE PRODUCT DESIGN AND MANUFACTURING

See Action 4, below.

The Beyond Waste IWG identified this as a very important next step but did not have the time to develop a specific proposal. Others outside the CAT process may develop similar proposals and the Beyond Waste IWG advises that such proposals be supported.

Also, the Beyond Waste IWG suggests that related proposals to establish research, educational and/or training institutes related to toxics reduction, clean energy, or environmental technologies should be expanded in scope to include sustainable product design and manufacturing.

ACTION 4: STIMULATING RECYCLED MATERIALS USE

Strong markets for recycled materials use are one of the keystones to a successful closed-loop economy. The Beyond Waste IWG recognizes the need to assure market availability. The IWG also believes that it is important to take the time to determine the strategic policies necessary to achieve the closed-loop economy.

Below are many of the ideas that the IWG explored. We recommend that work continue on these ideas, and others, in order to put the strongest market development strategy forward. This will take time. Therefore we ask the CAT to endorse the need to further develop and refine this action area.

EXPAND, RECRUIT OR DEVELOP IN-STATE BUSINESSES THAT USE RECYCLABLE MATERIALS IN THEIR MANUFACTURING PROCESSES

Ideas Considered

- B&O tax break for manufacturers who use recycled goods.
- If there is a cap and trade system, provide a credit for businesses already achieving a world-class standard for efficiency or who get to a world-class standard as an incentive to achieve these efficiencies
- Streamlined and consistent regulations to facilitate permitting facilities and processes
- Provide information and technical assistance to highlight that many of the best strategies for GHG emissions reductions benefits also have other benefits, e.g., lean manufacturing

Recommendations

1. A B&O tax incentive for manufacturers that use recycled materials in the mfg process paper, metals, glass, plastics, urban wood, and yard waste (similar to proposed House Bill 1950).

2. Work with Washington Manufacturing Services (WMS) to identify existing services that can assist businesses looking to reduce GHG emission impacts, and also to identify additional services that could be offered, in conjunction with a CTED business recruitment focus on businesses using recycled materials.

3. Create an Industrial Design Center for Sustainable Products, in conjunction with Western Washington University Industrial Design Program and Huxley College, for example, to invest state and private resources in designing products that are designed for the environment (e.g. carbon neutral, recyclable, etc.). The center would be a public/private partnership with industry users.

4. Send message to the CAT: If there is a carbon cap and trade system, then provide a credit for businesses already achieving a world-class standard for efficiency or who get to a world-class standard as an incentive to achieve these efficiencies.

DETERMINE ACTIONS TO EXPAND BYPRODUCT SYNERGY, ZERO WASTE BUSINESS PRACTICES, DESIGN FOR THE ENVIRONMENT AND OTHER EMERGING COMMERCIAL ACTIVITIES AND ENCOURAGE CONSUMER DEMAND FOR THESE ACTIVITIES

Ideas Considered

- Create compelling reasons for businesses to create Zero Waste Plans and Goals.

- Identify a combination of financial incentives, price signals, regulatory policies, product bans, and/or disposal bans will accomplish this goal.
    - Address basic incentives.
    - Create state-wide contest/price for best new zero waste achievements by businesses.
- Create a Beyond Waste or Zero Waste Business Circle.
- Create incentives to encourage three types of activity:
    - Businesses to achieve zero-waste themselves.
    - Manufacturers to produce zero waste products / carbon neutral products; and for
    - Companies that use other companies waste in their manufacturing
- Provide assistance to help companies specifically with waste
    - Help companies meet carbon emission goals.
    - Develop and executing WRR plans.
- Information exchange
    - Create a reporting and information-sharing platform. A lot of information is out there to be shared.

Appendix A:

Overview of Beyond Waste Implementation Work Group Recommendations Related to 2007 Climate Advisory Team and Technical Work Group Recommendations

The purpose of this document is to review the status of and provide additional recommendations for actions found in AW-3; explain how the Beyond Waste IWG recommendations relate to and assist in implementing additional strategies; and establish the context within the work of the 2007 Climate Advisory Team and its recommendations.

On February 1, 2008, the 2007 Climate Advisory Team provided its recommendations to the Governor in its report titled *Leading the Way: A Comprehensive Approach to Reducing Greenhouse Gases in Washington State* (available at www.ecy.wa.gov/climatechange/CATdocs/020708_InterimCATreport_final.pdf).

The CAT's recommendations were presented through twelve "*powerful directional recommendations.*" The directional recommendation that includes the work undertaken by the Beyond Waste IWG is *Recommendation 11: Reduce waste and Washington's emissions of GHGs through improved product choices and resource stewardship*.

The 2008 Beyond Waste IWG scope of work specifically addressed certain implementation elements outlined in the adopted strategy identified as *AW-3: Significant Expansion of Source Reduction, Reuse, Recycling, and Composting.* However, the proposals resulting from the Beyond Waste IWG's work also relate to and help implement other strategies included in Recommendation 11. These include RCI-8 and RCI- 10. In addition, some of our recommendations could assist in addressing a strategy developed by the RCI TWG identified as *RCI – 11: Policies and/or Programs Specifically Targeting Non-energy GHG Emissions.*

AW-3 identified ten actions to achieve the overall strategy. The Beyond Waste IWG did not include in its scope of work or did not have time to address in detail all ten actions. All ten actions are included in this document with a status comment and brief next step recommendations where appropriate. Those actions that have been worked on more extensively with detailed recommendations.

Below is the text related to Recommendation 11 in the CAT's February 1, 2008 report.

Recommendation 11: Reduce waste and Washington's emissions of GHGs through improved product choices and resource stewardship

Greatly expanding source reduction, reuse, recycling and composting will result in a low cost/ton for GHG reductions and many co-benefits. The CAT strongly supports **Significant Expansion of Source Reduction, Reuse, Recycling, and Composting** (AW-3) because most communities and many businesses in Washington now have strong recycling programs that can be enhanced, there is a low cost/ton for the resulting GHG reductions and the many co-benefits, and this also represents significant opportunity to engage the public in combating global warming at the household and local business levels.[5] This strategy sets targets to reduce the total amount of household and business waste by 15 percent, recycle at least 50 percent of the waste remaining, and compost over 90 percent of compostable organics through expanded source reduction, reuse, recycling, and composting of household, business, industrial, agricultural, and construction-related waste streams. In addition to traditional recycling programs, this strategy encourages 'cradle-to-cradle' design and manufacturing, and proposes to take advantage of market and business-based activities.[6]

The 'most promising' strategies under this recommendation are:

- Significant Expansion of Source Reduction, Reuse, Recycling and Composting (AW-3)
- In-State Production of Biofuels and Biofuels Feedstocks (AW-2)
- Consumer Education Programs, Including Labeling of Embodied Life-cycle Energy and Carbon Content of Products and Buildings (RCI-8)
- More Stringent Appliance/Equipment/ Lighting Efficiency Standards, and Appliance and Lighting Product Recycling and Design (RCI-10)
- Expanded Use of Wood Products for Building Materials (F-5)

In order to provide consumers with a better understanding of the impacts of their choices and empower them to make better choices, enhanced public education and outreach to support the long-term success of Washington's mitigation actions should be provided through **Consumer Education Programs, Including Labeling of Embodied Life-Cycle Energy and Carbon Content of Products and Buildings** (RCI-8). Education and certification programs for professionals involved in delivering services in support of RCI and other policy strategies considered by the CAT should also be developed and implemented. 'Carbon labeling' of products and buildings should be considered and evaluated for potential effectiveness and how this might be done in a consistent and verifiable manner, possibly on a regional or federal level.

Another way to support improved product choices is **More Stringent Appliance/Equipment/Lighting Efficiency Standards, and Appliance and Lighting Product Recycling and Design** (RCI-10), which increases energy efficiency through strengthened standards for new lighting, equipment, appliances and consumer electronic products and encourages product recycling and reuse, thus avoiding the generation of solid waste and the production and

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[5] This strategy incorporates and builds upon the State's recently developed Beyond Waste Plan.

[6] A partial list of the approaches in this strategy includes: source reduction (waste prevention) initiatives; expanding existing and encouraging more reuse, recycling, composting, and processing in businesses; establishing product stewardship programs; using environmentally preferable procurement practices; facilitating safe byproduct "synergy" strategies; achieving a reduction of toxics in packaging and products to make them safer to manufacture, use and recycle while increasing their value and use in the market place; increasing closed-loop recycling and the percentage of recycled-content in products, and expansion of disposal bans. Additional detail on this and all strategies is available in Appendices F–J.

emissions of toxic materials. Reduction of GHG emissions through improved product choices is also supported by the **Expanded Use of Wood Products for Building Materials** (F-5), which promotes substitution of wood products in place of other energy intensive materials (e.g., steel and concrete) to store carbon and avoid production emissions. Increased utilization of waste is accomplished through **In-State Production of Biofuels and Biofuels Feedstocks** (AW-2), which targets waste biomass for biofuels.

AW-3: Significant Expansion of Source Reduction, Reuse, Recycling, and Composting

AW-3 identified ten actions to achieve the overall strategy of significant expansion of source reduction, reuse, recycling, and composting. These ten actions are repeated below with a status update and suggested next steps, where appropriate. The complete text of AW-3 can be found on pages 31-52 at www.ecy.wa.gov/climatechange/interimreport/122107_TWG_agr.pdf.

1) *Local waste audits*
   - *Development of statewide system model*
   - *Development of statewide funding*
   - *Implement audit*
   - *Use results to influence local GHG reduction programs*

Status: Department of Ecology convened an advisory group to assist in developing a methodology for a statewide waste characterization study, including regional waste audits that would be relevant to and utilized by local jurisdictions. An RFP is ready to be released if and when Ecology is granted permission to proceed with the contract as an exception to the freeze on personal services contracts or when the freeze is lifted. The is to conduct sampling throughout the state, which will determine waste composition for about 100 categories of disposed materials in 8 waste generation areas. The contract period is about 15 months. Local audits are currently underway or planned in Clark, King, Pierce and Snohomish Counties and City of Seattle.

2) *Evaluate use of a model and index to measure and monitor GHG reductions*
   - *The EPA's WARM model was used for policy development*
   - *WARM model has some gaps, notably in failing to calculate source reduction potential for yard waste and food waste and it doesn't consider all the materials that are being recycled.*
   - *Investigate applicability or tweaks necessary to account for the actual types and location of disposal facilities in Washington State.[1]*
   - *Implement and evaluate use of the Washington State Consumer Environmental Index (CEI). CEI tracks changes over time in the environmental emissions and their impacts caused by the production, use and disposal of items purchased each year by Washington's consumers.*

Status: The EPA WARM model can only calculate emission reductions for a limited number of primary recyclable materials. There are many other materials from the household, business, industrial, agricultural, and construction-related waste streams that have GHG emission implications – and are disposed as well as reduced, reused, recycled and composted/digested – that cannot be addressed through the WARM model at this time. The model does not adequately address all types of organics management options, such as anaerobic digestion. In addition, , several of the underlying assumptions and algorithms in WARM are based on limited or incomplete data. There are problems with addressing other materials due to incompatibility between state definitions and WARM categories.

Examples of such materials include in part: asphalt, composites, construction and demolition debris, electronic products, fluorescent light bulbs, furniture, gypsum, hazardous materials, land clearing debris, manure and other agricultural wastes, multi-material packaging and products, milk cartons/drink boxes, rubber materials, single use and rechargeable batteries, solvents, textiles, tires, used oil, various industrial wastes, vehicle batteries, etc.

EPA continues to expand the materials covered in the WARM model and refine calculations. It also continues to work with experts regarding issues around modeling organics. The limitations of WARM continue to limit the ability to model GHG reductions resulting from many product stewardship and recycling activities, but it is the best available to our knowledge. It is unlikely the State could afford to create a superior model.

The Washington State Consumer Environmental Index (CEI) has been created. One of the indices tracks purchases made in Washington and the related output of GHG emissions tied to product life cycles. These emissions are generated both in Washington and elsewhere, but are a result of the purchase of goods and services made in Washington. Between 2000 and 2005, there was approximately a 17 percent increase in GHG emissions, or 18.3 million tons of carbon dioxide equivalent emissions, due to consumer activities in Washington. The CEI provides an opportunity to track the GHG emissions associated with consumption of materials – and, in theory, changes in emissions resulting from waste reduction and changes in the carbon-intensity of goods purchased in Washington. However, refinements to the CEI would likely be needed. Resources to update the CEI have not yet been identified.

3) *Build on existing source reduction and recycling programs, targeting commodities with the largest GHG reduction potential.*

Status and Recommendation: This area has been addressed by the Beyond Waste IWG.

4) *Fully implement and update Washington's Beyond Waste Plan. The current 5-year milestones and action items include key initiatives to increase recycling of industrial waste and organic materials, expand green building, reduce toxics and increase the ability to recycle products, and more. The next update and related funding priorities should further incorporate GHG emissions analysis and GHG reduction actions.*

Status and Recommendation: The Beyond Waste update process is scheduled to begin in 2009 with the update completed in 2010. Ecology should incorporate all related work for the 2007 TWGs, 2008 IWGs, and CAT into that update process.

5) *Fully implement and expand Environmentally Preferable Procurement policies and programs by the State and local governments.*

Status: This area has been addressed by the Beyond Waste IWG. In addition, an internal staff team is working with General Administration to add ERP products to state contracts and working state and local agencies to expand their EPP programs.

6) *Encourage manufacturers to provide – and consumers to use – end of life management and upstream design solutions that reduce the green house gas and other environmental impacts of product waste. Develop a framework policy for establishing product stewardship programs.*

Status and Recommendation: This area has been addressed by the Beyond Waste IWG.

7) *Encourage large retailers (e.g. Wal-Mart) to leverage buying power to encourage manufacturers to make the design solutions that reduce GHG and environmental impacts of product waste.*

Status and Recommendation: This area has been addressed by the Beyond Waste IWG.

8) *Establish a research and educational institute to address sustainable product design and manufacturing.*

Status and Recommendation: The Beyond Waste IWG identified this an very important next step but did not have the time to develop a specific detailed proposal. Others outside the CAT process may develop similar proposals and the Beyond Waste IWG advises that such proposals be supported. Also, Beyond Waste IWG suggests that related proposals to establish research, educational and/or training institutes related to toxics reduction, clean energy, or environmental technologies should be expanded in scope to include sustainable product design and manufacturing.

9) *Ecology, CTED, Health and other appropriate agencies should coordinate reporting to the appropriate committees of the legislature, on an annual basis, progress made in reaching the goals and recommendations for legislation or other actions by the state.*

Status: This is outside the scope of the Beyond Waste IWG to address.

10) *Form an on-going technical work group of experts on reduction, reuse, recycling, composting, product stewardship and green business development to advise Ecology, CTED, Health and other appropriate agencies on actions needed to implement this action item and attain the policy goals.*

    This could be accomplished by restructuring the Washington Solid Waste Advisory Committee (SWAC), creating a sub-committee of SWAC, or by creating an entirely new group. The technical work group's recommendations will be considered when reporting progress, next steps and recommendations to the legislature.

Status and Recommendation: If the Beyond Waste Implementation Work Group is not continued through the CAT process past 2008, then the additional necessary work should be passed on to ensure on-going policy development and implementation. The State Solid Waste Advisory Committee is an established committee with diverse stakeholder membership. Membership should be reviewed and enhanced to ensure that stakeholder representation includes expertise in upstream waste prevention, business product stewardship, zero waste business practices, and climate implications. If the CAT does not continue the Beyond Waste IWG under its umbrella, then SWAC should be asked to form a Beyond Waste or Climate Impacts subcommittee to absorb and continue the work of the Beyond Waste Implementation Work Group, including its membership. This would include completing work in 2009 and identifying and advocating significant next steps related to materials management and green house gas emission reductions, including legislation for 2010 and beyond. This possibility was addressed at the September 2008 SWAC meeting and SWAC members confirmed their willingness to serve this role if requested.

RCI-8 Consumer Education Programs, Including Labeling of Embodied Life-Cycle Energy and Carbon Content of Products and Buildings

RCI-8 contains a number of recommendations related to the work of the Beyond Waste IWG. For the complete text see pages 55-62 at www.ecy.wa.gov/climatechange/interimreport/122107_TWG_rci.pdf.

These elements include:

- *Carbon labeling of products.* Please see extensive text at link above.

- *Implementing requirements for retail education (on packaging or on a handout at the time of purchase), that will inform customers about the energy consumption of the products and materials (including building materials) they buy, and how to operate and use products in the most energy-efficient manner. These requirements should take advantage of and build upon existing Energy Star initiatives and certification programs, and be implemented with retail sales organizations where applicable.*

Relevance of Beyond Waste IWG proposals:

The Beyond Waste Implementation Work Group's recommendations address these elements in part. The Collaboration with Retailers proposal does not envision requirements on retailers, but instead a collaborative yet rigorous effort that could include carbon labeling and retail education as described in RCI-8. The Environmentally Preferable Purchasing proposal could be a means of providing incentive for retailers to participate in use of labels, certifications and retail education. Product categories covered under a future Product Stewardship Framework law, as proposed, could have carbon labeling or certification requirements applied, if through the described process carbon labeling or certification was determined to be warranted and beneficial.

RCI-10 More Stringent Appliance/Equipment/Lighting Efficiency Standards, and Appliance and Lighting Product Recycling and Design

RCI-10 contains a number of recommendations related to the work of the Beyond Waste IWG. For the complete text see pages 55-62 at www.ecy.wa.gov/climatechange/interimreport/122107_TWG_rci.pdf.

These elements include:

- *Require (through state legislation) manufacturers to have an effective system in place for collecting and recycling end-of-life bulbs that contain hazardous materials that is easy and convenient for the consumer. (footnote included this text: For example, transitioning from incandescent lighting to CFLs in the residential sector offers enormous energy savings potential, but the fact that there is no comprehensive and effective system in place for recycling or disposing of old CFLs to avoid mercury contamination creates a barrier to achieving the full potential of CFLs.)*
- *Provide incentives for manufacturers to improve the energy efficiency of products, the efficiency with which products can be produced, and the degree to which products can be recycled.*
- *Consideration of potential shifts in the use of toxic materials (such as mercury in fluorescent lamps) that could inhibit consumer demand for the efficient appliances and create costly disposal issues. For example, efficiency standards could be linked to manufacturer "takeback" requirements, toxic reduction standards, aor incentives for development and use of non-toxic technologies.*
- *Require (through state legislation) the preferential procurement of EnergyStar products if available (equipment, appliance, or technology) if state funds are involved (e.g., state purchasing contracts, state grants or loans, etc.)*
- *Substantially increase the use of green electronic products and reduce solid waste by promoting EPEAT through a consortium of state, local government and business procurement entities, and require the use of EPEAT in state and local procurement.*

Relevance of Beyond Waste IWG proposals:

The Beyond Waste Implementation Work Group's recommendations address these issues in part. The proposed Product Stewardship Framework legislation would establish a means to achieve a number of elements and

mechanisms above. Fluorescent lighting could be named as an initial product category in the legislation. Or fluorescent lighting recycling could be run as a separate bill, using text from the Framework legislation as that basis of the text. A sample of that approach is included in the Beyond Waste IWG report.

The Environmentally Preferable Purchasing proposal can be a means of addressing the other elements above.

RCI-11 Policies and/or Programs Specifically Targeting Non-energy GHG Emissions

RCI-11 contains a number of recommendations related to the work of the Beyond Waste IWG. These elements pertain to the use of Ozone Depleting Substitutes (ODS) such as Hydrofluorocarbon (HFCs) and Perfluorocompounds (PFCs) that are potent GHG emissions. A number of consumer products contain these gases, including novelty aerosols, aerosol Mobile Air Conditioning products sold to non-professionals, and aerosol keyboard cleaners.

Text throughout RCI-11 calls for consumer and retailer education, labeling, procurement policies, and restrictions. The text can be seen on pages 63-71 at www.ecy.wa.gov/climatechange/interimreport/122107_TWG_rci.pdf.

Relevance of Beyond Waste IWG proposals:

Recommendations from the Beyond Waste IWG will assist in addressing some elements described in RCI-11. The proposed Product Stewardship Framework legislation would establish a means to achieve a number of approaches named in the text. For instance, consumer aerosol products with ODS could be named as an initial product category in the legislation. Or ODS containing consumer aerosol products could be run as a separate bill, using text from the Framework legislation as that basis of the text.

The Environmentally Preferable Purchasing proposal and work with retailers can be a means of addressing the other elements discussed.

Appendix B: Funding Needs Matrix

Proposal	Funding Needed For:	Government Fiscal Impact	Funding Options
Optimize the Collection System	State and local responsibilities related to planning, tracking and enforcement	State: Minor Local: Moderate	1. Solid Waste Collection Tax 2. State and Local Toxics
	Capitalization of private infrastructure	None	1. Increase the amount of revenue generated from the sales of recycled materials the solid waste collection company may retain from 30% to 50%. 2. Develop incentives within the UTC regulatory framework 3. Increase revenue from increased customer base and commodity sales.
Product Stewardship Framework	State responsibilities for program development, tracking and enforcement	Moderate	1. State and Local Toxics to cover Ecology startup costs. 2. On-going agency cost covered by fee for services placed on regulated producers of covered products.. (Producers cover implementation costs of their stewardship programs as cost of doing business.)
Wheeling		None	None
Tariff		None	None
Subsidy	Level the playing field between the cost of chemical fertilizers and compost by subsidizing the use of compost on farm lands.	Moderate	1. Solid Waste Collection Tax 2. State and Local Toxics 3. Centennial Clean Water Fund 4. Carbon credits 5. Tipping fees 6. Renewable energy credits
Compost use/ procurement	Policy development by DOT	Minor	
EO -Environmentally Responsible Purchasing	Staff time – Ecology, DIS, GA	Minor	1. Existing resources
Retailer Collaboration	Staff time	Minor	1. Absorb 2. State/local toxics 3. General fund
ERP Legislation	Staff time	Minor	1. Absorb 2. State/local toxics 3. General fund
Market Development and Industry Incentives	Staff time	Significant	1. Absorb 2. State/local toxics 3. General fund

Category of Fiscal Impact Rating Scale

None = zero
Minor = less than $50,000 per year (fiscal)
Moderate = $50,000 to $1 million per year
Significant = $1 million to $100 million per year
Major = Greater than $100 million per year
Indeterminate = key variable cannot be estimated at this time

PLEASE NOTE: Work in Progress

APPENDIX C: Collection Draft Language

-_____

BILL REQUEST - CODE REVISER'S OFFICE
_____

BILL REQ. #: P/AL-5/09

ATTY/TYPIST: AL:seg

BRIEF DESCRIPTION:

AN ACT Relating to source separation and collection of source separated recyclable materials and products, organic materials, and wastes in order to reduce greenhouse gases, amending chapter 70.95 RCW, chapter 81.77 RCW and adding new sections to chapter 70.95 RCW.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:

Sec. RCW 70.95.010 and 2002 c 299 s 3 are each amended to read as follows:

RCW Caption: Legislative finding--Priorities--Goals.

The legislature finds:

(1) Continuing technological changes in methods of manufacture, packaging, and marketing of consumer products, together with the economic and population growth of this state, the rising affluence of its citizens, and its expanding industrial activity have created new and ever-mounting problems involving disposal of garbage, refuse, and solid waste materials resulting from domestic, agricultural, and industrial activities.

(2) Traditional methods of disposing of solid wastes in this state are no longer adequate to meet the ever-increasing

problem. Improper methods and practices of handling and disposal of solid wastes pollute our land, air and water resources, blight our countryside, adversely affect land values, and damage the overall quality of our environment.

(3) Considerations of natural resource limitations, energy shortages, economics and the environment make necessary the development and implementation of solid waste recovery and/or recycling plans and programs.

(4) Waste reduction must become a fundamental strategy of solid waste management. It is therefore necessary to change manufacturing and purchasing practices and waste generation behaviors to reduce the amount of waste that becomes a governmental responsibility.

(5) ~~Source separation of waste must become a fundamental strategy of solid waste management. Collection and handling strategies should have, as an ultimate goal, the s~~Source separation of all materials with resource value or environmental hazard is necessary to protect human health and the environment.

NEW SECTION 70.95.013– Responsibilities assigned

(1)(a) It is the responsibility of every person and business to minimize their production of wastes, to separate recyclable or hazardous materials from mixed waste and participate in available materials collection programs.

(b) It is the responsibility of state, county, and city governments to provide for a waste management infrastructure to fully implement waste reduction and source separation strategies and to process and dispose of remaining wastes in a manner that is environmentally safe and economically sound. It is further the responsibility of state, county, and city governments to monitor the cost-effectiveness and environmental safety of combusting separated waste, processing mixed municipal solid waste, and recycling programs.

(c) It is the responsibility of county and city governments to assume primary responsibility for solid waste management and to develop and implement aggressive and effective waste reduction and source separation strategies.

(d) It is the responsibility of state government to ensure that local governments are providing adequate source reduction and separation opportunities and incentives to all, including persons in both rural and urban areas, and nonresidential waste generators such as commercial, industrial, and institutional entities, recognizing the need to provide flexibility to accommodate differing population densities, distances to and availability of recycling markets, and collection and disposal

costs in each community; and to provide county and city governments with adequate technical resources to accomplish this responsibility.

(e) Environmental and economic considerations in solving the state's solid waste management problems requires strong consideration by local governments of regional solutions and intergovernmental cooperation.

NEW SECTION – 70.95.015 Solid waste management priorities

(8) The following priorities are established for the collection, handling, and management of solid waste to be followed in descending order as applicable:

(a) Waste reduction;

(b) Recycling, with source separation of recyclable materials as the preferred method;

(c) Energy recovery, incineration, or landfill of separated waste;

(d) Energy recovery, incineration, or landfill of mixed municipal solid wastes.

NEW SECTION RCW 70.95.017 – goals, strategies, requirements

(1) It is the state's goal to achieve an eighty percent recycling rate by 2020.

(2) To accomplish this goal, it is the overall solid waste management strategy of the state that source separation of recyclable materials and products, organic material, and wastes shall be practiced by all persons and collection services shall be provided to all residents to eliminate disposal of recyclable, compostable and digestible materials and assure their reutilization.

(3) It is the state's goal that programs be established to eliminate residential or commercial yard debris in landfills by 2012 in those areas where alternatives to disposal are readily available and effective.

(4) Steps should be taken to make recycling at least as affordable and convenient to the ratepayer as mixed waste disposal.

(5) It is necessary to compile and maintain adequate data on the types and quantities of solid waste that are being generated and to monitor the effectiveness of these goals and strategies. (6) Vehicle batteries shall be recycled and the disposal of vehicle batteries into landfills or incinerators shall be discontinued.

(7) Excessive and nonrecyclable packaging of products should be avoided.

(8) Comprehensive education shall be conducted throughout the state so that people are informed of the requirements to reduce, source separate, and recycle solid waste.

(9) Governmental entities in the state shall participate in source reduction, source separation and recycling programs in the various communities where they are located, unless they have already established waste reduction and recycling programs that achieve equal or greater rates of material diversion.

(10) All governmental entities shall purchase products that are made from recycled materials and are recyclable.

(11) To ensure the safe and efficient operations of solid waste disposal facilities, it is necessary for operators and regulators of landfills and incinerators to receive training and certification.

(12) It is necessary to provide adequate funding to all levels of government so that successful waste reduction and recycling programs can be implemented.

(13) The development of stable and expanding markets for recyclable materials is critical to the long-term success of the state's recycling goals. Market development must be encouraged on a state, regional, and national basis to maximize its effectiveness. The state shall assume primary responsibility for the development of a multifaceted market development program to carry out the purposes of this act.

(14) There is an imperative need to anticipate, plan for, and accomplish effective storage, control, recovery, and recycling of discarded tires and other problem wastes with the subsequent conservation of resources and energy.

[2002 c 299 § 3; 1989 c 431 § 1; 1985 c 345 § 1; 1984 c 123 § 1; 1975-'76 2nd ex.s. c 41 § 1; 1969 ex.s. c 134 § 1.]

Sec. RCW 70.95.020 and 2005 c 394 s 2 are each amended to read as follows:

RCW Caption: Purpose.

The purpose of this chapter is to establish a comprehensive statewide program ~~for~~ to manage solid waste ~~handling~~, ~~and solid waste recovery and/or recycling~~ which will prevent land, air, and water pollution and conserve the natural, economic, and energy resources of this state. To this end it is the purpose of this chapter to:

(1) ~~To a~~Assign primary responsibility for adequate solid waste handling to local government, reserving to the state, however, those functions necessary to assure effective programs throughout the state;

PLEASE NOTE: Work in Progress

(2) ~~To p~~Provide for adequate planning for solid waste handling by local government;

(3) ~~To p~~Provide for the adoption and enforcement of basic minimum performance standards for solid waste handling, including that all sites where recyclable materials are generated and transported from shall provide a separate container for solid waste;

(4) ~~To e~~Encourage the development and operation of waste recycling facilities needed to accomplish the management priority of waste recycling, to promote consistency in the requirements for such facilities throughout the state, and to ensure that recyclable materials ~~diverted from the waste stream for recycling~~are routed to facilities in which recycling occurs;

(5) ~~To p~~Provide technical and financial assistance to local governments in the planning, development, and conduct of solid waste handling programs;

(6) ~~To e~~Encourage storage, proper disposal, and recycling of discarded vehicle tires and to stimulate private recycling programs throughout the state; and

(7) ~~To e~~Encourage the development and operation of waste recycling facilities and activities needed to accomplish the management priority of waste recycling and to promote consistency in the permitting requirements for such facilities and activities throughout the state.

(8) Encourage ~~it is the intent of the legislature that~~ local governments ~~be encouraged~~to use the expertise of private industry and to contract with private industry to the fullest extent possible to carry out solid waste recovery and/or recycling programs.

[2005 c 394 § 2. Prior: 1998 c 156 § 1; 1998 c 90 § 1; 1985 c 345 § 2; 1975-'76 2nd ex.s. c 41 § 2; 1969 ex.s. c 134 § 2.]

NOTES:

Intent--Severability--2005 c 394: See notes following RCW 70.95.400.

Sec. RCW 70.95.030 and 2004 c 101 s 1 are each amended to read as follows:

RCW Caption: Definitions.

As used in this chapter, unless the context indicates otherwise:

(1) “Anaerobic digestion” means processes in which microorganisms break down biodegradable material in the absence

of oxygen, resulting in the production of methane and carbon dioxide rich biogas suitable for energy production or use as fuel, and nutrients in the effluent that can be used as fertilizer.

(~~1~~2) "City" means every incorporated city and town.

(~~2~~3) "Commission" means the utilities and transportation commission.

(~~3~~4) "Committee" means the state solid waste advisory committee.

(~~4~~5) "Composted material" means organic solid waste that has been subjected to controlled aerobic degradation at a solid waste facility in compliance with the requirements of this chapter. Natural decay of organic solid waste under uncontrolled conditions does not result in composted material.

(~~5~~6) "Department" means the department of ecology.

(~~6~~7) "Director" means the director of the department of ecology.

(~~7~~8) "Disposal site" means the location where any final treatment, utilization, processing, or deposit of solid waste occurs.

(~~8~~9) "Energy recovery" means a process operating under federal and state environmental laws and regulations for converting solid waste into usable energy and for reducing the volume of solid waste.

(~~9~~10) "Functional standards" means criteria for solid waste handling expressed in terms of expected performance or solid waste handling functions.

(~~10~~11) "Incineration" means a process of reducing the volume of solid waste operating under federal and state environmental laws and regulations by use of an enclosed device using controlled flame combustion.

(~~11~~12) "Inert waste landfill" means a landfill that receives only inert waste, as determined under RCW 70.95.065, and includes facilities that use inert wastes as a component of fill.

(~~12~~13) "Jurisdictional health department" means city, county, city-county, or district public health department.

(~~13~~14) "Landfill" means a disposal facility or part of a facility at which solid waste is placed in or on land and which is not a land treatment facility.

(~~14~~15) "Local government" means a city, town, or county.

(16) “Material recovery facility” means any facility that collects, compacts, repackages, sorts or processes in preparation for transport source separated materials for the purpose of recycling. (~~15~~17) "Modify" means to substantially

change the design or operational plans including, but not limited to, removal of a design element previously set forth in a permit application or the addition of a disposal or processing activity that is not approved in the permit.

(~~16~~19) "Multiple family residence" means any structure housing two or more dwelling units.

(~~17~~20) "Person" means individual, firm, association, copartnership, political subdivision, government agency, municipality, industry, public or private corporation, or any other entity whatsoever.

(~~18~~21) "Recyclable materials" means those solid wastes that are separated for recycling or reuse~~, such as papers, metals, and glass,~~ that are identified as recyclable material pursuant to section 70.95.080 (2) of this chapter as adopted within a local comprehensive solid waste plan. Prior to the adoption of the local comprehensive solid waste plan, adopted pursuant to RCW 70.95.110(2), local governments may identify additional recyclable materials by ordinance.~~from July 23, 1989.~~

(~~19~~22) "Recycling" means transforming or remanufacturing waste materials into usable or marketable materials for use other than landfill disposal or incineration.

(~~20~~23) "Residence" means the regular dwelling place of an individual or individuals.

(~~21~~24) "Sewage sludge" means a semisolid substance consisting of settled sewage solids combined with varying amounts of water and dissolved materials, generated from a wastewater treatment system, that does not meet the requirements of chapter 70.95J RCW.

(~~22~~25) "Soil amendment" means any substance that is intended to improve the physical characteristics of the soil, except composted material, commercial fertilizers, agricultural liming agents, unmanipulated animal manures, unmanipulated vegetable manures, food wastes, food processing wastes, and materials exempted by rule of the department, such as biosolids as defined in chapter 70.95J RCW and wastewater as regulated in chapter 90.48 RCW.

(~~23~~26) "Solid waste" or "wastes" means all putrescible and nonputrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, and recyclable materials.

(~~24~~27) "Solid waste handling" means the management, storage, collection, transportation, treatment, utilization, processing, and final disposal of solid wastes, including the recovery and recycling of materials from solid wastes, the

recovery of energy resources from solid wastes or the conversion of the energy in solid wastes to more useful forms or combinations thereof.

(~~25~~28) "Source separation" means the separation of ~~different kinds of~~ recyclable materials and products, and organic materials from mixed solid waste at the place where ~~the wastes are generated~~those materials are generated.

(29) “Collection services” means services provided as universal residential collection and comprehensive commercial collection.

(30) “Universal residential collection” means the services required to be provided throughout the state to collect source separated recyclable materials and products, organic materials, and wastes separately. These services shall be provided at all single family and multi-family dwellings through collection companies as required under RCW 81.77 and municipal collection services provided under rcw 35.21.152 and rcw 35.67 except in those areas of the state which are excluded in section 70.95.110.(3).

(31) “Comprehensive commercial collection” means the services provided to commercial generators in the state to collect source separated recyclable materials and products, organic materials, and wastes separately. Commercial generators may transport recyclable materials or organic materials themselves, or may secure recycling services from any transporter of recyclable materials or recycling business in the state registered under this chapter.

(~~26~~32) "Vehicle" includes every device physically capable of being moved upon a public or private highway, road, street, or watercourse and in, upon, or by which any person or property is or may be transported or drawn upon a public or private highway, road, street, or watercourse, except devices moved by human or animal power or used exclusively upon stationary rails or tracks.

(~~27~~33) "Waste-derived soil amendment" means any soil amendment as defined in this chapter that is derived from solid waste as defined in RCW 70.95.030, but does not include biosolids or biosolids products regulated under chapter 70.95J RCW or wastewaters regulated under chapter 90.48 RCW.

(~~28~~34) "Waste reduction" means reducing the amount or toxicity of waste generated or reusing materials or products without processing.

(~~29~~35) "Yard debris" means plant material commonly created in the course of maintaining yards and gardens, and through horticulture, gardening, landscaping, or similar activities.

Yard debris includes but is not limited to grass clippings, leaves, branches, brush, weeds, flowers, roots, windfall fruit, vegetable garden debris, holiday trees, and tree prunings ~~four~~six inches or less in diameter.
[2004 c 101 § 1; 2002 c 299 § 4; 1998 c 36 § 17; 1997 c 213 § 1; 1992 c 174 § 16; 1991 c 298 § 2; 1989 c 431 § 2; 1985 c 345 § 3; 1984 c 123 § 2; 1975-'76 2nd ex.s. c 41 § 3; 1970 ex.s. c 62 § 60; 1969 ex.s. c 134 § 3.]

NOTES:

Intent--1998 c 36: See RCW 15.54.265.
Short title--1998 c 36: See note following RCW 15.54.265.
Finding--1991 c 298: "The legislature finds that curbside recycling services should be provided in multiple family residences. The county and city comprehensive solid waste management plans should include provisions for such service." [1991 c 298 § 1.]

Solid waste disposal--Powers and duties of state board of health as to environmental contaminants: RCW 43.20.050.

~~8.~~3. **Sec.** RCW 70.95.070 and 1975-'76 2nd ex.s. c 41 s 4 are each amended to read as follows:
RCW Caption: Review of standards prior to adoption--Revisions, additions and modifications--Factors.

The solid waste advisory committee shall review prior to adoption and shall recommend revisions, additions, and modifications to the minimum functional standards governing solid waste handling relating, but not limited to, the following:

(1) Vector production and sustenance.

(2) Air pollution (coordinated with regulations of the department of ecology).

(3) Pollution of surface and ground waters (coordinated with the regulations of the department of ecology).

(4) Hazards to service or disposal workers or to the public.

(5) Prevention of littering.

(6) Adequacy and adaptability of disposal sites to population served.

(7) Design and operation of disposal sites.

(8) Recovery and/or recycling of solid waste.
[1975-'76 2nd ex.s. c 41 § 4; 1969 ex.s. c 134 § 7.]

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~~10.~~4. **Sec.** RCW 70.95.080 and 1985 c 448 s 17 are each amended to read as follows:

RCW Caption: County comprehensive solid waste management plan--Joint plans--Duties of cities.

Each county within the state, in cooperation with the various cities located within such county, shall prepare a coordinated, comprehensive solid waste management plan. Such plan may cover two or more counties. The purpose is to plan for solid waste and materials reduction, collection, handling and management services and programs throughout the state, as designed to meet the unique needs of each county and city in the state. The objective of local comprehensive plans is to ensure the following required handling methods or services occur:

Source separation of recyclable materials and products, organic materials and wastes by generators;

Collection of source separated materials as defined as collection service;

Handling and proper preparation of materials for reuse or recycling;

Handling and proper preparation of organic materials for composting or anaerobic digestions;

Handling and proper disposal of non-recyclable wastes.

At a minimum, each plan shall identify methods that will be used to address the following:

Construction and demolition waste for recycling or reuse;

Organic material including yard debris, food waste, and food contaminated paper products for composting or anaerobic digestion;

Recoverable paper products for recycling;

Container metals, container glass and plastics for recycling;

Waste reduction strategies.

Each city shall:

(a~~1~~) Prepare and deliver to the county auditor of the county in which it is located its plan for its own solid waste management for integration into the comprehensive county plan; or

(b~~2~~) Enter into an agreement with the county pursuant to which the city shall participate in preparing a joint city-county plan for solid waste management; or

(c~~3~~) Authorize the county to prepare a plan for the city's solid waste management for inclusion in the comprehensive county plan.

(5) Two or more cities may prepare a plan for inclusion in the county plan. With prior notification of its home county of its

intent, a city in one county may enter into an agreement with a city in an adjoining county, or with an adjoining county, or both, to prepare a joint plan for solid waste management to become part of the comprehensive plan of both counties.

(6) After consultation with representatives of the cities and counties, the department shall establish a schedule for the development of the comprehensive plans for solid waste management. In preparing such a schedule, the department shall take into account the probable cost of such plans to the cities and counties.

(7) Local governments shall not be required to include a hazardous waste element in their solid waste management plans. [1985 c 448 § 17; 1969 ex.s. c 134 § 8.]

NOTES:

Severability--1985 c 448: See note following RCW 70.105.005.

Sec. RCW 70.95.090 and 1991 c 298 s 3 are each amended to read as follows:

RCW Caption: County and city comprehensive solid waste management plans--Contents.

Each county and city comprehensive solid waste management plan shall include the following:

(1) A detailed inventory and description of all existing solid waste handling facilities including an inventory of any deficiencies in meeting current solid waste handling needs.

(2) The estimated long-range needs for solid waste handling facilities projected twenty years into the future.

(3) A program for the orderly development of solid waste handling facilities in a manner consistent with the plans for the entire county which shall:

(a) Meet the minimum functional standards for solid waste handling adopted by the department and all laws and regulations relating to air and water pollution, fire prevention, flood control, and protection of public health;

(b) Take into account the comprehensive land use plan of each jurisdiction;

(c) Contain a six year construction and capital acquisition program for solid waste handling facilities; and

(d) Contain a plan for financing both capital costs and operational expenditures of the proposed solid waste management system.

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(4) A program for surveillance and control.

(5) A current inventory and description of solid waste collection needs and operations within each respective jurisdiction which shall include:

(a) Any franchise for solid waste collection granted by the utilities and transportation commission in the respective jurisdictions including the name of the holder of the franchise and the address of his or her place of business and the area covered by the franchise;

(b) Any city solid waste operation within the county and the boundaries of such operation;

(c) The population density of each area serviced by a city operation or by a franchised operation within the respective jurisdictions;

(d) The projected solid waste collection needs for the respective jurisdictions for the next six years.

(6) A comprehensive waste reduction and recycling element that, in accordance with the priorities established in RCW 70.95.~~010~~015, provides programs that (a) reduce the amount of waste generated, (b) ~~provide economic incentives and mechanisms for~~require source separation, and (c) establish reuse and recycling opportunities for the source separated recyclable materials and products, and organic materials.

(7) The waste reduction and recycling element shall include the following:

(a) Waste reduction strategies;

(b) Source separation strategies, including:

(i) In counties identified under section 70.95.110 (2) ~~P~~programs for the collection of source separated materials from residences in urban and rural areas. In urban areas, these programs shall include collection of source separated recyclable materials and products, organic materials, and wastes ~~recyclable materials~~from single and multiple family residences. ~~, unless the department approves an alternative program, according to the criteria in the planning guidelines. Such criteria shall include: Anticipated recovery rates and levels of public participation, availability of environmentally sound disposal capacity, access to markets for recyclable materials, unreasonable cost impacts on the ratepayer over the six-year planning period, utilization of environmentally sound waste reduction and recycling technologies, and other factors as appropriate.~~ In rural areas, these programs shall include but not be limited to drop-off boxes, buy-back centers, or a combination of both, at each solid waste transfer, processing, or disposal site, or at locations convenient to the residents of

the county. The drop-off boxes and buy-back centers may be owned or operated by public, nonprofit, or private persons;

(ii) Programs to monitor the collection of source separated recyclable materials and products, organic materials, and wastes~~ waste at nonresidential sites where there is sufficient density to sustain a program~~;

~~(iii) Programs to collect yard waste, if the county or city submitting the plan finds that there are adequate markets or capacity for composted yard waste within or near the service area to consume the majority of the material collected; and~~

(iii) Programs to educate rate payers and other generators about and to promote the ~~concepts of~~waste reduction and recycling and the collection programs available within the jurisdiction;

~~(c) Recycling strategies, including a description of markets for recyclables,~~

(c) A~~a~~ review of waste generation trends and a description of waste composition;

(d) Aa discussion and description of existing programs and any additional programs needed to assist public and private sector participation in source separation and collection programs and services;~~recycling, and~~

(e) A description of the comprehensive commercial collection services available to commercial generators and new services that will be needed in order to provide those services to those without services available;

(f) A plan to direct construction and demolition recyclable materials to recycling facilities for materials recovery to the extent achievable; and

(g~~h~~) an implementation schedule for the provision of ~~designation of specific materials to be collected for recycling, and for provision of recycling~~collection services;

(i~~d~~) Other information the county or city submitting the plan determines is necessary.

~~(8) An assessment of the plan's impact on the costs of solid waste collection. The assessment shall be prepared in conformance with guidelines established by the utilities and transportation commission. The commission shall cooperate with the Washington state association of counties and the association of Washington cities in establishing such guidelines.~~

(~~9~~8) A review of potential areas that meet the criteria as outlined in RCW 70.95.165.

[1991 c 298 § 3; 1989 c 431 § 3; 1984 c 123 § 5; 1971 ex.s. c 293 § 1; 1969 ex.s. c 134 § 9.]

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NOTES:

Finding--1991 c 298: See note following RCW 70.95.030.

Certain provisions not to detract from utilities and transportation commission powers, duties, and functions: RCW 80.01.300.

~~12.~~6. **Sec.** RCW 70.95.092 and 1989 c 431 s 4 are each amended to read as follows:

RCW Caption: County and city comprehensive solid waste management plans--Levels of service, reduction and recycling.

Levels of collection service shall be defined in the waste reduction and recycling element of each local comprehensive solid waste management plan and shall include the services set forth in RCW 70.95.090 and service areas as required in 70.95.110. ~~In determining which service level is provided to residential and nonresidential waste generators in each community, counties and cities shall develop clear criteria for designating areas as urban or rural. In designating urban areas, local governments shall consider the planning guidelines adopted by the department, total population, population density, and any applicable land use or utility service plans.~~

[1989 c 431 § 4.]

~~15.~~7. **Sec.** RCW 70.95.100 and 1989 c 431 s 6 are each amended to read as follows:

RCW Caption: Technical assistance for plan preparation--Guidelines--Informational materials and programs.

(1) The department or the commission, as appropriate, shall provide to counties and cities technical assistance including, but not limited to, planning guidelines, in the preparation, review, and revision of local comprehensive solid waste management plans required by this chapter. Guidelines prepared under this section shall be consistent with the provisions of this chapter. Guidelines for the preparation of the waste reduction and recycling element of the comprehensive solid waste management plan shall be completed by the department by ~~March 15, 1990~~July 1, 2010. ~~These guidelines shall provide recommendations to local government on materials to be considered for designation as recyclable materials.~~ The state

solid waste management plan prepared pursuant to RCW 70.95.260 shall be consistent with these guidelines.

(2) The department shall be responsible for development and implementation of a comprehensive statewide public information program designed to ~~encourage~~inform the public about the waste reduction, source separation, ~~and~~recycling and universal collection requirements of this chapter ~~by the public~~. The department shall operate a toll free hot line to provide the public information on waste reduction and recycling.

(3) The department shall provide technical assistance to local governments in the development and dissemination of informational materials and related activities to assure recognition of unique local waste reduction and recycling programs.

(4) Local governments shall make all materials and information developed with the assistance grants provided under RCW 70.95.130 available to the department for potential use in other areas of the state.

(5) The department shall provide model ordinances to local governments to consider addressing construction and demolition waste and recyclable materials.

[1989 c 431 § 6; 1984 c 123 § 6; 1969 ex.s. c 134 § 10.]

~~16.~~8. **Sec.** RCW 70.95.110 and 1991 c 298 s 4 are each amended to read as follows:

RCW Caption: Maintenance of plans--Review, revisions--Implementation of source separation programs.

(1) The local comprehensive ~~county~~solid waste management plans ~~and any comprehensive city solid waste management plans~~prepared in accordance with RCW 70.95.080 shall be maintained in a current condition and reviewed and revised periodically by counties and cities as may be required by the department. Upon each review such plans shall be extended to show long-range needs for solid waste handling facilities for twenty years in the future, and a revised construction and capital acquisition program for six years in the future. Each revised solid waste management plan shall be submitted to the department.

Each plan shall be reviewed and revised within five years of July 1, 2010~~1984~~, and thereafter shall be reviewed every five years, and revised if necessary according to the schedule provided in subsection (2) of this section.

~~(2) Cities and counties preparing solid waste management plans shall submit the waste reduction and recycling element~~

~~required in RCW 70.95.090 and any revisions to other elements of its comprehensive solid waste management plan to the department no later than:~~

~~(a) July 1, 1991, for class one areas: PROVIDED, That portions relating to multiple family residences shall be submitted no later than July 1, 1992;~~

~~(b) July 1, 1992, for class two areas; and~~

~~(c) July 1, 1994, for class three areas.~~

~~Thereafter, each plan shall be reviewed and revised, if necessary, at least every five years. Nothing in chapter 431, Laws of 1989 shall prohibit local governments from submitting a plan prior to the dates listed in this subsection.~~

~~(3) The classes of areas are defined as follows:~~

~~(a) Class one areas are the counties of Spokane, Snohomish, King, Pierce, and Kitsap and all the cities therein.~~

~~(b) Class two areas are all other counties located west of the crest of the Cascade mountains and all the cities therein.~~

~~(c) Class three areas are the counties east of the crest of the Cascade mountains and all the cities therein, except for Spokane county.~~

(2) The updated plans will be due according to the planning schedule below and will include a description of collection services for all contiguous incorporated and unincorporated areas with a population density of 333 persons per square mile:

July 1, 2011 for the counties of Clark, King, Kitsap, Pierce, Snohomish, and Spokane and all the cities therein;

July1, 2012 for the counties of Benton, Franklin, Walla Walla and Yakima and all the cities therein;

July 1, 2013 for the counties of Cowlitz, Grays Harbor, Island, Lewis, Mason, Skagit, Thurston and Whatcom and all the cities therein; and

July 1, 2014 for the counties of Chelan, Clallam, and Grant and all the cities therein.

(3) Participation in source separation and collection services as required by this chapter is optional for:

The counties of Adams, Asotin, Douglas, Ferry, Garfield, Jefferson, Kittitas, Klickitat, Whitman Lincoln, Pacific, Pend Oreille, Okanogan, Columbia, San Juan, Skamania, Stevens and Wahkiakum. This does not exempt these planning jurisdictions from reviewing and updating as necessary their plans at least every five year; and

Any city with a population of 1,500 or less that is only bordered by an unincorporated area of a county within the counties required to write plan updates.

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If these jurisdictional areas do choose to participate, their plans would be due no later than July 1, 2016.

(4) Cities and counties shall begin implementing the programs to collect source separated materials no later than one year following the adoption and approval of the waste reduction and recycling element and these programs shall be fully implemented within two years of approval.
[1991 c 298 § 4; 1989 c 431 § 5; 1984 c 123 § 7; 1969 ex.s. c 134 § 11.]

NOTES:
Finding--1991 c 298: See note following RCW 70.95.030.

~~17.~~9. **Sec.** RCW 70.95.130 and 1969 ex.s. c 134 s 13 are each amended to read as follows:
RCW Caption: Financial aid to counties and cities.
Any county may apply to the department on a form prescribed thereby for financial aid for the preparation of the comprehensive county plan for solid waste management required by RCW 70.95.080. Any city electing to prepare an independent city plan, a joint city plan, or a joint county-city plan for solid waste management for inclusion in the county comprehensive plan may apply for financial aid for such purpose through the county. Every city application for financial aid for planning shall be filed with the county auditor and shall be included as a part of the county's application for financial aid. Any city preparing an independent plan shall provide for disposal sites wholly within its jurisdiction.
The department shall allocate to the counties and cities applying for financial aid for planning, such funds as may be available pursuant to legislative appropriations or from any federal grants for such purpose.
The department shall determine priorities and allocate available funds among the counties and cities applying for aid according to criteria established by regulations of the department considering population, urban development, environmental effects of waste disposal, existing waste handling practices, and the local justification of their proposed expenditures.
[1969 ex.s. c 134 § 13.]

~~23.~~10. **Sec.** RCW 70.95.167 and 1991 c 319 s 402 are each amended to read as follows:

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RCW Caption: Private businesses involvement in source separated materials--Local solid waste advisory committee to examine.

(1) Each local solid waste advisory committee shall conduct one or more meetings for the purpose of determining how local private recycling and solid waste collection businesses may participate in the development and implementation of programs to collect source separated materials from residences, and to process and market materials collected for recycling. The meetings shall include local private recycling businesses, private solid waste collection companies operating within the jurisdiction, and the local solid waste planning agencies. The meetings shall be held during the development of the waste reduction and recycling element or no later than one year prior to the date that a jurisdiction is required to submit the element under RCW 70.95.110(2).

(2) The meeting requirement under subsection (1) of this section shall apply whenever a city or county develops or amends the waste reduction and recycling element required under this chapter. Jurisdictions having approved waste reduction and recycling elements or having initiated a process for the selection of a service provider as of May 21, 1991, do not have to comply with the requirements of subsection (1) of this section until the next revisions to the waste reduction and recycling element are made or required.

(3) After the waste reduction and recycling element is approved by the local legislative authority but before it is submitted to the department for approval, the local solid waste advisory committee shall hold at least one additional meeting to review the element.

(4) For the purpose of this section, "private recycling business" means any private for-profit or private not-for-profit business that engages in the processing and marketing of recyclable materials <u>or reclaiming materials and usable products for reuse.</u>

[1991 c 319 § 402.]

NOTES:

Severability--Part headings not law--1991 c 319: See RCW 70.95F.900 and 70.95F.901.

~~31.~~<u>11.</u> **Sec.** RCW 70.95.212 and 1993 c 300 s 3 are each amended to read as follows:

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RCW Caption: Solid waste collection companies--Notice of changes in tipping fees and disposal rate schedules.

To provide solid waste collection companies with sufficient time to prepare and submit tariffs and rate filings for public comment and commission approval, the owner or operator of a materials recovery facility, transfer station, landfill, or facility used to burn solid waste shall provide seventy-five days' notice to solid waste collection companies of any change in tipping fees and disposal rate schedules. The notice period shall begin on the date individual notice to a collection company is delivered to the company or is postmarked.

A collection company may agree to a shorter notice period: PROVIDED, That such agreement by a company shall not affect the notice requirements for rate filings under RCW 81.28.050.

The owner of a materials recovery facility, transfer station, landfill or facility used to burn solid waste may agree to provide companies with a longer notice period.

"Solid waste collection companies" as used in this section means the companies regulated by the commission pursuant to chapter 81.77 RCW.

[1993 c 300 § 3.]

~~41.~~12. **Sec.** RCW 70.95.260 and 1995 c 399 s 189 are each amended to read as follows:

RCW Caption: Duties of department--State solid waste management plan--Assistance--Coordination--Tire recycling.

The department shall in addition to its other powers and duties:

(1) Cooperate with the appropriate federal, state, interstate and local units of government and with appropriate private organizations in carrying out the provisions of this chapter.

(2) Coordinate the development of a solid waste management plan for all areas of the state in cooperation with local government, the department of community, trade, and economic development, and other appropriate state and regional agencies. The plan shall relate to solid waste management for twenty years in the future and shall be reviewed biennially, revised as necessary, and extended so that perpetually the plan shall look to the future for twenty years as a guide in carrying out a state coordinated solid waste management program. The plan shall be developed into a single integrated document and shall be adopted no later than ~~October 1990~~July 1, 2010. The plan shall be revised ~~regularly~~at least every five years after its initial completion so that local governments revising local

comprehensive solid waste management plans can take advantage of the data and analysis in the state plan.

(3) Provide technical assistance to any person as well as to cities, counties, and industries.

(4) Initiate, conduct, and support research, demonstration projects, and investigations, and coordinate research programs pertaining to solid waste management systems.

(5) Develop statewide programs to increase public awareness of and participation in tire recycling, and to stimulate and encourage local private tire recycling centers and public participation in tire recycling.

(6) May, under the provisions of the Administrative Procedure Act, chapter 34.05 RCW, as now or hereafter amended, from time to time promulgate such rules and regulations as are necessary to carry out the purposes of this chapter.
[1995 c 399 § 189; 1989 c 431 § 9. Prior: 1985 c 345 § 8; 1985 c 6 § 23; 1969 ex.s. c 134 § 26.]

NOTES:

Study--1989 c 431: "The institute for urban and local studies at Eastern Washington State University shall conduct a study of enforcement of solid waste management laws and regulations as a component of the 1990 state solid waste management plan. This study shall include, but shall not be limited to:

(1) A review of current state and local solid waste rules, requirements, policies, and resources devoted to state and local solid waste enforcement, and of the effectiveness of these programs in promoting environmental health and public safety;

(2) An examination of federal regulations and the latest proposed amendments to the Resource Conservation and Recovery Act, in subtitle D of the code of federal regulations;

(3) A review of regulatory approaches used by other states;

(4) A review and evaluation of educational and technical assistance programs related to enforcement;

(5) An inventory of regulatory compliance for all processing and disposal facilities handling mixed solid waste;

(6) A review of the role and effectiveness of other enforcement jurisdictions;

(7) An evaluation of the need for redefining institutional roles and responsibilities for enforcement of solid waste management laws and regulations in order to establish public confidence in solid waste management systems and ensure public protection; and

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(8) An evaluation of possible benefits in separating the solid waste planning and technical assistance responsibilities from the enforcement responsibilities within the department." [1989 c 431 § 96.]

~~42.~~13. **Sec.** RCW 70.95.263 and 1998 c 245 s 131 are each amended to read as follows:

RCW Caption: Additional powers and duties of department.

The department shall in addition to its other duties and powers under this chapter:

(1) Prepare the following:

~~(a) A management system for recycling waste paper generated by state offices and institutions in cooperation with such offices and institutions;~~

(a) An evaluation of existing and potential systems for recovery of energy and materials from solid waste with recommendations to affected governmental agencies as to those systems which would be the most appropriate for implementation;

(b~~c~~) A data management system to evaluate and assist the progress of state and local jurisdictions and private industry in ~~resource recovery~~meeting the goals and objectives set in section 70.95.017 of this chapter;

(c~~d~~) Identification of potential markets, in cooperation with private industry, for recovered resources and the impact of the distribution of such resources on existing markets;

(d~~e~~) Studies on methods of transportation, collection, reduction, separation, and packaging which will encourage more efficient utilization of existing management and materials reuse and recycling~~waste recovery~~ facilities;

(e~~f~~) Recommendations on incentives, including state grants, loans, and other assistance, to local governments which will ~~encourage the~~increase reduction, ~~recovery~~reuse and recycling of solid wastes.

(2) Provide technical information and assistance to state and local jurisdictions, the public, and private industry on source separation, solid waste ~~recovery and/or~~ reduction, management and materials recycling.

(3) Procure and expend funds available from federal agencies and other sources to assist the implementation by local governments of solid waste recovery and/or recycling programs, and projects.

(4) Conduct necessary research and studies to carry out the purposes of this chapter.

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~~(5) Encourage and assist local governments and private industry to develop pilot solid waste recovery and/or recycling projects.~~

(5~~6~~) Monitor, assist with research, and collect data for use in assessing feasibility for others to develop solid waste reduction, management, reuse and ~~recovery and/or~~ recycling projects.

[1998 c 245 § 131; 1975-'76 2nd ex.s. c 41 § 5.]

14. **Sec.** RCW 70.95.280 and 1989 c 431 s 13 are each amended to read as follows:

RCW Caption: Determination of best solid waste management practices--Department to develop method to monitor waste stream--Collectors to report quantity and quality of waste--Confidentiality of proprietary information.

The department of ecology shall determine the best management practices for categories of solid waste in accordance with the priority solid waste management methods established in RCW 70.95.010. In order to make this determination, the department shall conduct a comprehensive solid waste stream analysis and evaluation. Following establishment of baseline data resulting from an initial in-depth analysis of the waste stream, the department shall develop a less intensive method of monitoring the disposed waste stream including, but not limited to, changes in the amount of waste generated and waste type. The department shall monitor curbside collection programs and other waste segregation and disposal technologies to determine, to the extent possible, the effectiveness of these programs in terms of cost and participation, their applicability to other locations, and their implications regarding rules adopted under this chapter. Persons who collect solid waste shall annually report to the department the types and quantities of solid waste that are collected and where it is delivered. The department shall adopt guidelines for reporting and for keeping proprietary information confidential.

[1989 c 431 § 13; 1988 c 184 § 1.]

~~48.~~15. **Sec.** RCW 70.95.285 and 1988 c 184 s 2 are each amended to read as follows:

RCW Caption: Solid waste stream analysis.

The comprehensive, statewide solid waste stream analysis under RCW 70.95.280 shall be based on representative solid waste generation areas and solid waste generation sources within the

state. The following information and evaluations shall be included:

(1) Solid waste generation rates for each category;

(2) The rate of recycling being achieved within the state for each category of solid waste;

(3) The current and potential rates of solid waste reduction within the state;

(4) Greenhouse gas reduction potentially available and greenhouse gas reductions realized through reduction, reuse and recycling of solid wastes;

(~~4~~5) A technological assessment of current solid waste reduction and recycling methods and systems, including cost/benefit analyses;

(~~5) An assessment of the feasibility of segregating solid waste at: (a) The original source, (b) transfer stations, and (c) the point of final disposal;~~

(6) A review of methods that will increase the rate of solid waste reduction; and

(7) An assessment of new and existing technologies that are available for solid waste management including an analysis of the associated environmental risks and costs.

The data required by the analysis under this section shall be ~~kept current~~updated at least every four years and shall be available to local governments and the waste management industry.

[1988 c 184 § 2.]

RCW 81.77.185 and XXXX are each amended to read as follows
Recyclable materials collection — Revenue sharing.

(1) The commission shall allow solid waste collection companies collecting recyclable materials to retain up to thirtyfifty percent of the revenue paid to the companies for the material if the companies submit a plan to the commission that is certified by the appropriate local government authority as being consistent with the local government solid waste plan and that demonstrates how the revenues will be used to increase recycling. The remaining revenue shall be passed to residential customers.

(2) By December 2, ~~2005~~2013, the commission shall provide a report to the legislature that evaluates:

(a) The effectiveness of revenue sharing as an incentive to

increase recycling in the state; and

(b) The effect of revenue sharing on costs to customers. [2002 c 299 § 6.]

Nothing in this act shall deter the authorities of the solid waste collection companies regulated under this chapter.

--- END ---

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APPENDIX D: Draft Product Stewardship Bill

AN ACT Relating to product stewardship programs, financed and provided by product producers, that include reuse or recycling of unwanted products; and adding a new chapter to Title 70 RCW.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:

NEW SECTION. **Sec. 1)** SHORT TITLE. This act may be known and cited as the Washington product stewardship act.

NEW SECTION. **Sec. 2)** INTENT. The legislature finds that:
(1) Convenient and environmentally sound product stewardship programs that include collecting, transporting and recycling unwanted products will help protect Washington's environment and the health of state residents;
(2) Product producers should finance and provide these programs, which are intended to encourage producers to design products that have a lower carbon footprint, are less toxic and energy and material intensive, and are more reusable or recyclable than other products; and
(3) It is appropriate to designate **[reserved--specified in section 17]** as covered products **[or covered product categories]** that are subject to product stewardship programs.

NEW SECTION. **Sec. 3)** DEFINITIONS. The definitions in this section apply throughout this act unless the context clearly requires otherwise.
(1) Brand means a name, symbol, word, or mark that identifies a product, rather than its components, and attributes the covered product to the owner of the brand as the producer.
(2) Covered entity means an entity, such as a residentor small business, that can use a product stewardship program to discard an unwanted product.
(3) Covered product means a product **[covered by this act pursuant to section 17 of this act or]** designated by the department as covered by this act pursuant to section 18 of this act, either individually or as an item within a covered product category. "Covered product" includes all materials that make up a covered product.
(4) Covered product category means a group of similar products **[covered by this act pursuant to section 17 of this act or]**

designated by the department as covered by this act pursuant to section 18 of this act.
(5) Department means the department of ecology.
(6) Final disposition means the point beyond which no further takes place and materials from an unwanted product are either in a form capable of direct use as a feedstock in producing new products or disposed of or managed in permitted facilities.
(7) "Hazardous substances" or "hazardous materials" means those substances or materials identified under regulations and rules adopted pursuant to the state hazardous waste management act, chapter 70.105 RCW.
(8) Organization means a sole proprietorship, partnership, corporation, nonprofit corporation or organization, limited liability company, firm, association, cooperative, or other legal entity located within or outside Washington state.
(9) Orphan product means a covered product that lacks a producer's brand, or for which the producer is no longer in business and has no successor in interest, or that bears a brand for which the department cannot identify an owner.
(10) Processing means recovering materials from unwanted products for use as feedstock in new products .
(11) Producer means a person that:
(a) Has legal ownership of the brand, brand-name or cobrand of a covered product sold in or into Washington state;
(b) Imports a covered product branded by a producer that meets (a) of this subsection and where that producer has no physical presence in the United States; or
(c) If subsections a and b do not apply, a person who makes an unbranded product that is sold in or into Washington state; or
(d) Sells at wholesale or retail a covered product, does not have legal ownership of the brand, and elects to fulfill the responsibilities of the producer for that product.
(12) Product stewardship means a requirement for a producer of a covered product to manage and reduce adverse safety, health and environmental impacts of the covered product throughout its life cycle
(13) Product stewardship plan or plan means a detailed plan describing the manner in which a product stewardship program will be implemented.
(14) Product stewardship program or program means a program financed and provided by producers of covered products that addresses product stewardship and includes collecting, transporting, reuse processing, and final disposition of unwanted products, including a fair share of orphan products.

PLEASE NOTE: Work in Progress

(15) Recycling means transforming or remanufacturing unwanted products into usable or marketable materials for use other than landfill disposal or incineration. Recycling does not include energy recovery or energy generation by means of combusting unwanted products with or without other waste.
(16) Reporting period means the period commencing January 1 and ending December 31 in the same calendar year.
(17) Residuals mean non-recyclable materials left over from processing an unwanted product.
(18) Reuse means a change in ownership of a covered product or its components and parts for use in the same manner and purpose for which it was originally purchased.
(19) Stakeholder means a person who may have an interest in or be affected by a product stewardship program.
(20) Stewardship organization means an organization designated by a producer to act as an agent on behalf of the producer to operate a product stewardship program.
(21) Unwanted product means a covered product no longer wanted by its owner or that has been abandoned, discarded, or is intended to be discarded by its owner.

NEW SECTION. **Sec. 4)** PARTICIPATION IN PRODUCT STEWARDSHIP PROGRAM REQUIRED--TERMS. (1) Every producer of a covered product sold in or into Washington state must participate in a product stewardship program for that product. Every such producer must:
(a) Operate, either individually or collectively with other producers, a product stewardship program approved by the department; or
(b) Enter into an agreement with a stewardship organization to operate, on the producer’s behalf, a product stewardship program approved by the department.
(2) Product stewardship programs shall collect, free of charge, unwanted products from covered entities for reuse or final disposition.
(3) A producer, group of producers, or stewardship organization operating a product stewardship program shall:
(a) Comply with a product stewardship plan approved by the department and this act, any rules adopted by the department to implement this act, and all other applicable laws and rules; and
(b) Pay all administrative and operational costs associated with their program.
(4) No product stewardship program required under this act may use federal or state prison labor for processing unwanted products.

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NEW SECTION. **Sec. 5)** REUSE OR RECYCLING OF UNWANTED PRODUCTS REQUIRED--EXCEPTIONS. (1) Except as provided in this section, all unwanted products that have been collected by a product stewardship program must be reused or recycled.
(2) [The department shall determine whether covered products specified in section 17 of this act are reusable or recyclable pursuant to the procedure specified in that section.] The department shall determine whether covered products designated by the department pursuant to the process specified in section 18 of this act are reusable or recyclable pursuant to the procedure specified in that section. In either case, if the department determines that an unwanted product is not reusable or recyclable, the product stewardship program must include a waste reduction strategy pertaining to that product. If reuse or recycling options for an unwanted product thereafter change, the department will adopt rules requiring reuse or recycling of the unwanted product.
(3) Unwanted products that cannot be reused or recycled and residuals must be disposed of or managed in permitted facilities, including disposal or management of hazardous substances and hazardous materials in permitted hazardous waste facilities.

NEW SECTION. Sec. 6) RESTRICTION ON SALE OF COVERED PRODUCTS. As of the [implementation date with respect to the covered products specified in section 17 of this act and the] implementation date established for a covered product designated pursuant to section 18 of this act, no producer, wholesaler, retailer or other person may sell or offer for sale that product to any person in this state unless the producer is participating in a product stewardship program approved by the department. A person selling or offering for sale a covered product in the state shall consult the department's website for a list of producers of that product participating in approved programs prior to selling the product in or into the state. A person is considered to have complied with this section if, on the date the person ordered a covered product from a producer or its agent, the producer was listed as having an approved program on the department's website.

NEW SECTION. **Sec. 7)** REQUIREMENTS OF PRODUCT STEWARDSHIP PLAN. (1) A producer, group of producers, or stewardship organization operating or intending to operate a product stewardship program must, at least 60 days prior to submitting a product stewardship

plan to the department pursuant to subsection (2) of this section, provide public notice of the plan it is considering for submittal. The producer, group of producers, or stewardship organization must consult with stakeholders during development of the plan, solicit stakeholder comments, and attempt to address any stakeholder concerns regarding the plan prior to submittal.

(2) A producer, group of producers, or stewardship organization operating or intending to operate a product stewardship program must submit a product stewardship plan to the department specifying:

(a) Information, including contact information, regarding:

(i) The organization submitting the plan;

(ii) A list of all participating producers; and

(iii) If the program is to be operated by a stewardship organization, a description of management, administration and tasks to be performed by the stewardship organization;

(b) Recovery goals, including:

(i) Recovery goals for the first, second, and third years of the program, expressed as pounds per capita, and an explanation of how these goals reflect a significant percentage of an unwanted product relative to the quantity of the unwanted product that may be available for reuse or recycling; and

(NOTE: other performance measures to consider include: awareness (% of population aware of the program); participation and accessibility (participation rate, travel distance); collection (% collected, % recycled); quality of service (target community and partner satisfaction, number and nature of complaints); management performance (progress against product stewardship plan goals and targets, awards and recognition).)

(ii) Plans to maximize recycling of packaging that may be collected;

(c) A collection system, including:

(i) Location of collection sites and other collection services to be used by the program;

(ii) A description of the consideration given as to whether the existing curbside collection infrastructure is an appropriate collection mechanism. If the curbside collection infrastructure is not utilized by the plan, a written explanation shall be provided citing the reasons that curbside collection services are not included in the plan.

(iii) How unwanted products from all covered entities will be collected for all cities in the state with populations greater than 10,000 and in all counties of the state;
(iv) How the collection system will be convenient and adequate to serve the needs of all covered entities in both urban and rural areas; and
(v) How collected unwanted products will be transported to processing facilities;
(d) A processing and disposal system, including:
(i) Locations, permit status, and records of any penalties, violations, or regulatory orders received in the previous five years by processing and disposal facilities proposed to be used by the program;
(ii) A third-party audit of each processing and disposal facility proposed to be used by the program for any unwanted product or residuals containing hazardous substances or hazardous materials, documenting compliance with all applicable laws, regulations and rules;
(iii) Policies and procedures to be followed by persons collecting, transporting, processing and disposing unwanted products, including how the program will ensure compliance with all applicable laws, regulations and rules;
(iv) A description of how unwanted products will be processed at each processing facility;
(v) How, if the department determines that an unwanted product is not reusable or recyclable, the unwanted product will be disposed of or managed in appropriate, properly permitted facilities, including disposal or management of hazardous substances and hazardous materials in appropriate, properly permitted hazardous waste facilities;
(vi) How all residuals will be disposed of or managed in appropriate, properly permitted facilities, including disposal or management of all hazardous substances and hazardous materials in appropriate, properly permitted hazardous waste facilities;
(vii) How hazardous substances and hazardous materials will be safely and securely tracked and handled from collection to final disposition in compliance with this act, any rules adopted by the department to implement this act, and all other applicable laws and rules;
(viii) Best management practices that will be used by first processors and their downstream vendors to assure that hazardous substances and hazardous materials are not released into the environment and will not adversely impact human health;

(e) How the program will seek to use businesses within the state, including transportation services, retailers, collection sites and services, existing curbside collection services, and processing facilities, and

(f) Greenhouse gas reductions anticipated from implementing the collection, transportation and recycling system;

(g) A financing system, including:

(i) How the product stewardship program will be financed, including how costs will be apportioned among and assessed upon producers participating in the program;

(ii) Where feasible, financial incentives to reward product design that result in improved reuse or recycling and less toxicity; and

(iii) A plan to withhold a percentage of funds to be managed by the product stewardship program to increase markets for recyclable materials or other financial incentives to encourage market development for recyclable materials contained in covered products.

(iv) How those providing services for the collection, transportation and processing systems will be fairly compensated for their services.

(h) Strategies to manage and reduce life-cycle impacts of products and packaging, from product design to end-of-life management, including ways to improve designing, packaging and distributing products to:

(i) Reduce waste, energy, toxicity, carbon footprints and other environmental and health impacts;

(ii) Increase recycled content and product longevity; and

(iii) Make products more easily reusable or recyclable;

(iv) How the producers participating in the program will communicate with processors used by the program to encourage sustainable design of products and packaging;

(j) Education and outreach activities, including:

(i) an educational campaign promoting the use of the program to covered entities that includes a toll free telephone number and website and that is sufficient to meet required recovery rates.

(ii) a plan for working with and providing information about the program to retailers, wholesalers, collectors and other interested parties to disseminate to covered entities; and

(iii)the methodology for determining how the effectiveness of the outreach activities will be measured.

(k) Pursuant to subsection (1) of this section, the consultation process, including:

(i) a description of the process used to consult with stakeholders during development of the plan; and

(ii) a summary of stakeholder comments, and how any stakeholder concerns were addressed.
(3) The product stewardship plan shall be approved by the department when all requirements have been met in compliance with this act and any rules adopted by the department to implement this act.
(4) All plans submitted to the department must be made available to the public on the department's website. Proprietary information submitted to the department under this chapter is exempt from public disclosure under RCW 42.56.270.

NEW SECTION. **Sec. 8)** REVIEW OF PRODUCT STEWARDSHIP PLAN. (1) A producer of a covered product, a group of producers, or a stewardship organization must submit a proposed product stewardship plan to the department at least one year prior to a covered product's implementation date.
(2) Within ninety days after receiving a proposed product stewardship plan, the department shall determine whether the plan complies with this act and any rules adopted to implement this act. If it approves a plan, the department shall notify the applicant of its approval. If it rejects a plan, the department shall notify the applicant of its decision and its reasons for rejecting the plan. An applicant whose plan has been rejected by the department may submit a revised plan to the department within sixty days after receiving notice of the rejection.
(3) At least once every four years, a producer, group of producers or stewardship organization operating a product stewardship program must update its product stewardship plan and submit the updated plan to the department for review. The department must determine the status of an updated plan within 90 days of its submittal. If the department rejects an updated plan, the producer of a covered product participating in the product stewardship program described in the plan will be deemed to be out of compliance with this act.

NEW SECTION. **Sec. 9)** CHANGES TO PRODUCT STEWARDSHIP PLAN. (1) Except as provided in subsections (2) and (3) of this section, the department must grant prior approval, in writing, to any proposed change to a product stewardship plan.
(2) Additions or changes to collection locations for unwanted products may be made without the department's prior written approval. The product stewardship program must inform the department of such additions or changes within fifteen days of the occurrence.

(3) Additional producers may join a product stewardship program approved by the department without the department's prior written approval. The product stewardship program must inform the department of such additions within fifteen days of the occurrence.

NEW SECTION. **Sec. 10)** SUSPENSION OR CANCELLATION OF APPROVAL. (1) If the department determines that a product stewardship program is not being operated in compliance with the requirements of this act, any rules adopted by the department to implement this act, or any other applicable laws, regulations, or rules, or if the department determines that there is an imminent danger to the public, the department may:
(a) Amend its approval of the program's product stewardship plan by clarifying terms or conditions to ensure full implementation of the plan; or
(b) Suspend or cancel its approval of the plan.
(2) At least 30 days prior to amending, suspending or canceling its approval of a product stewardship plan, the department shall inform the producer, group of producers, or stewardship organization operating the product stewardship program of its intended action and provide them an opportunity to respond. The department may extend this period for good cause.
(3) Notwithstanding subsection (2) of this section, if the department determines that it is necessary to protect the public from imminent danger, it may immediately amend, suspend or cancel approval of a product stewardship program's product stewardship plan without giving the producer, group of producers, or stewardship organization operating the program an opportunity to be heard, but the department shall give the operator an opportunity to be heard through proceedings consistent with the administrative procedure act, chapter 34.05 RCW, within fifteen days after the date on which the department takes any of those actions.

NEW SECTION. **Sec. 11)** REPORTING. (1) On or before June 30 of each year, every producer, group or producers, or stewardship organization operating a product stewardship program must prepare and submit to the department an annual report describing the program's activities during the previous reporting period, specifying:
(a) Information, including contact information, regarding:
(i) the organization submitting the report; and
(ii) a list of all participating producers;
(b) Recovery rates, including:

(i) the amount, by weight, of unwanted products collected from covered entities in each county in the state, including documented collection and reuse, recycling or disposal of that material;
(ii) how the program attained recovery rates established in the product stewardship plan or set by the department, and, if the program did not attain those recovery rates, what actions it will take during the next reporting period to do so, including how it will increase and improve effective, measurable outreach and education efforts;
(c) The collection system, including collection locations and services provided for all cities in the state with populations greater than 10,000 and in all counties in the state;
(d) The processing and disposal system, including:
(i) a list of processing and disposal facilities used and locations, the weight of unwanted products processed at each processing facility and disposed at each disposal facility, and a description of the methods used at each processing facility;
(ii) a list of subcontractors used through final disposition that processed or disposed of unwanted products containing hazardous substances or hazardous materials, and subcontractor facility locations;
(iii) documentation and summary results of annual third-party audits conducted on each processing facility and disposal facility as required in section 7 of this act;
(iv) if an unwanted product is exempted from the reuse or recycling requirement in section 5 of this act, how the unwanted product was disposed of or managed in appropriate, properly permitted facilities, including disposal or management of hazardous substances or hazardous materials in appropriate, properly permitted hazardous waste facilities;
(v) final disposition of residuals;
(vi) any penalties, violations, or regulatory orders received during the reporting period by each processing facility or disposal facility that was used;
(vii) whether policies and procedures in the product stewardship plan for collecting, transporting, processing and final disposition of unwanted products were followed during the reporting period, and a description of any noncompliance;
(e) The financing system, including a description of how the system met the requirements in section 7 of this act;
(f) The education and outreach activities implemented during the reporting period, including the effectiveness of the education and outreach activities;

(g) Results of any actions taken to manage and reduce life cycle impacts of products and package, as described in subsection (2)(f) of section 7 of this act;
(h) How the product stewardship program complied with any other elements in the plan approved by the department; and
(i) Any other information that the department may reasonably require.
(2) A producer, group of producers, or stewardship organization operating a product stewardship program meeting the following conditions is only required to report to the department information specified in subsections (1)(a), (b), (c), (g) and (i) of this section:
(a) All unwanted products collected by the product stewardship program neither contained hazardous substances or hazardous materials nor used hazardous substances or hazardous materials in the production process;
(b) The product stewardship program attained a ninety percent recovery rate of all unwanted products that were produced by producers participating in the program and a reuse or recycling rate of eighty percent of materials contained in such products; and
(c) All unwanted products collected by the product stewardship program were carbon neutral in production and use.
(3) All reports submitted to the department must be made available to the public on the department's website. Proprietary information submitted to the department under this act is exempt from public disclosure under RCW 42.56.270.

NEW SECTION. **Sec. 12)** ENFORCEMENT. (1) The department shall provide, on its website, a list of all producers participating in product stewardship programs it has approved and a list of all producers it has identified as noncompliant with this act and any rules adopted to implement this act.
(2) Wholesalers, retailers, and other persons shall check the department's website to determine if producers of covered products they are selling in or into the state are compliant with this act and any rules adopted to implement this act. If a wholesaler, retailer, or other person is unsure of the status of a producer or believes that a producer is not compliant, they shall contact the department to determine the producer's status.
(3) The department shall send a written warning and copies of this act and any rules adopted to implement this act to a producer who is not participating in a product stewardship program approved by the department and whose covered product is being sold in or into the state. The department shall also send

a written warning and a copy of this act and any rules adopted to implement this act to a wholesaler, retailer or other person known to be selling the covered product in or into the state.

(4) A producer not participating in a product stewardship program approved by the department whose covered product continues to be sold in or into the state sixty days after receiving a written warning from the department, and a wholesaler, retailer, or other person who continues to sell a covered product from a producer not participating in an approved product stewardship program sixty days after receiving a written warning from the department, will be assessed a ten thousand dollar penalty. The department may waive or reduce the penalty if the producer, wholesaler, retailer, or other person complies with this act and any rules adopted to implement this act, or for any other reason the department determines to be justified.

(5) The department shall send a written warning to a producer, group of producers, or stewardship organization operating a product stewardship program that fails to submit a product stewardship plan, updated plan, proposed change to a plan, or annual report as required in this act. The written warning must include compliance requirements and notification that the requirements must be met within sixty days. If compliance requirements are not met within sixty days, the producer, group of producers, or stewardship organization will be assessed a ten thousand dollar penalty. The department may waive or reduce the penalty if the producer, group of producers, or stewardship organization complies with this act and any rules adopted to implement this act, or for any other reason the department determines to be justified.

(6) Each calendar day of a violation is a separate and distinct offense.

NEW SECTION. **Sec. 13)** RECOVERY RATES AND EVALUATION. (1) By June of the third program year for each product or product category, the department shall establish required recovery rates for the fourth and subsequent program operating years, and must establish a system of penalties for producers and product stewardship programs that do not attain the required recovery rates.

(2) By December 31, 2014, the department shall report to appropriate committees of the legislature concerning status of the program administered under this act and, if necessary, recommend legislation.

(3) The department, or its designee, may inspect, audit, or review audits of processing and disposal facilities used to fulfill the requirements of a product stewardship program.
(4) The department shall annually invite comments from local governments, communities, and citizens to report their satisfaction with services provided by product stewardship programs. This information must be used by the department in reviewing proposed updates or changes to product stewardship plans.

NEW SECTION. **Sec. 14)** ADMINISTRATIVE COSTS AND FEES. The department may establish fees for administering this act. Fees may be charged to the producers and must be paid annually by January 1 of each year. Fees may be established in amounts to fully recover and not to exceed expenses incurred by the department in administering this act.

NEW SECTION. **Sec. 15)** PRODUCT STEWARDSHIP PROGRAMS ACCOUNT. The product stewardship programs account is created in the custody of the state treasurer. All receipts from fees and penalties collected pursuant to this act must be deposited in the account. Expenditures from the account may be used only for administering this act. Only the director of the department or the director's designee may authorize expenditures from the account. The account is subject to the allotment procedures under chapter 43.88 RCW, but an appropriation is not required for expenditures.

NEW SECTION. **Sec. 16)** RULEMAKING AUTHORITY. (1) The department shall adopt rules under the administrative procedure act, chapter 34.05 RCW, to implement this act, including, at a minimum:
(a) Program operating rules;
(b) A process for designating covered products and covered product categories and for determining whether such products or product categories are reusable or recyclable;
(c) A process for determining whether reduced reporting requirements in section 11 of this act apply;
(d) A process for setting recovery rates for the fourth and subsequent operating years of a program and for adjusting recovery rates; and
(e) An enforcement process.
(2) The department shall designate covered products and covered product categories under section 18 of this act by rule. The department must provide notice to appropriate standing

committees of the legislature prior to designating a covered product or covered product category.

(Note: Section 17 is for initial product categories that would be expedited through the process by being initially named in legislation. The products listed as examples are provided because they: a. have significant GHG implications through their full life-cycle or end-of-life management and inclusion would benefit GHG reduction efforts; b. have existing programs that could be improved and be more effective through inclusion, but would require little effort by the State or the affected producers; and c. have been engaged in extensive stakeholder processes and as a result it is recognized that a legislated product stewardship approach is necessary to attain an effective program and related benefits. It would be up to the legislature which and if any of these products would be named in Section 17 In addition, a number of the products listed as examples contain mercury or other toxic materials, and have significant implications for human health and water quality (including Puget Sound) if not handled appropriately at end-of-life.)

NEW SECTION. **Sec. 17** INITIAL (PRIORITY?) COVERED PRODUCTS AND COVERED PRODUCT CATEGORIES. (1) Covered product and product categories designated under this act as initial priority products include:
(a)Carpet and related padding.
(i)“carpet” means fabric or textile floor covering and padding beneath the fabric and textile floor covering.
(ii) covered entities shall be all sources of post-consumer carpet including residents, businesses, governments, charities and institutions.
(iii) carpet and related padding that has been collected by product stewardship programs shall be reused or recycled, unless otherwise determined through agency rulemaking.
(iv) product stewardship programs for carpet and related padding must be fully implemented by July 1, 2011.
(b) Mercury-containing lights.
(i) “Mercury-containing lights” means lamps, bulbs, tubes, or other devices that contain mercury and provide functional illumination in homes, offices, and outdoors.
(ii) covered entities shall be residents and small businesses.
(iii) mercury-containing lights that have been collected by product stewardship programs shall be recycled unless otherwise determined through agency rulemaking. Mercury and mercury bearing residuals from recycling of general purpose lights must

be retorted in properly permitted facilities. Mercury recovered from retorting must be recycled or placed in a properly permitted, monitored hazardous waste landfill, storage or disposal repository to avoid reintroduction into the marketplace. When available, mercury recovered from retorting must be placed in a properly permitted, monitored permanent mercury repository to avoid reintroduction into the marketplace and it shall not be recycled.

(iv) product stewardship programs for mercury-containing lights must be fully implemented by January 1, 2011.

(c) Out-of-service mercury-added thermostats

(i) "mercury-added thermostat" means a product or device that uses a mercury switch to sense and control room temperature through communication with heating, ventilating, or air-conditioning equipment. A mercury-added thermostat includes thermostats used to sense and control room temperature in residential, commercial, industrial, and other buildings but does not include a thermostat used to sense and control temperature as part of a manufacturing process. “Out-of-service mercury-added thermostat” means a mercury-added thermostat that is removed from a building or facility in this state and is intended to be discarded.

(ii)covered entities shall be all sources of out-of-service mercury-added thermostats including residents, businesses, governments, charities and institutions.

(iii) out-of-service mercury-added thermostats that have been collected by product stewardship programs shall be reused or recycled, unless otherwise determined through agency rulemaking. Mercury and mercury bearing residuals from recycling of mercury-added thermostats must be retorted in properly permitted facilities. Mercury recovered from retorting must be recycled or placed in a properly permitted, monitored hazardous waste landfill, storage or disposal repository to avoid reintroduction into the marketplace. When available, mercury recovered from retorting must be placed in a properly permitted, monitored permanent mercury repository to avoid reintroduction into the marketplace and it shall not be recycled.

(iv) product stewardship programs for out-of-service mercury-added thermostats must be fully implemented by January 1, 2011.

(d)Paint, including the plastic and metal containers containing the paint that is collected.

(i) “paint” means interior and exterior architectural coatings including: paints, enamels, clear finishes, sealers, undercoatings, primers, tinting bases, and stains purchased for commercial and homeowner use, but not including coatings

purchased for industrial and original equipment manufacturer use.
(ii)covered entities shall be residents, small governments, small businesses, and charities.
(iii) paint, including the related plastic and metal containers, that has been collected by product stewardship programs shall be reused or recycled, unless otherwise determined through agency rulemaking.
(iv) product stewardship programs for Paint, including the plastic and metal containers containing the paint, must be fully implemented by January 1, 2011.
(e) Rechargeable batteries
(i) “rechargeable battery” means
(A) 1 or more nickel cadmium, nickel metal hydride, sealed lead acid, lithium ion, lithium polymer or nickel zinc voltaic or galvanic cells electrically connected to produce electric energy, that weighs less than 1 kilogram, is easily removable and is designed to be recharged for repeated uses; and
(B) includes any type of enclosed device or sealed container weighing less than 1 kilogram consisting of 1 or more such cells, including what is commonly called a battery pack ; but
(C) does not include –
(i) a battery used as the principal electric power source for a vehicle such as, but not limited to, an automobile, boat, truck, tractor, golf cart or wheelchair;
(ii) a lead-acid battery weighing more than two pounds;
(iii) a battery used for load leveling or for storage of electricity generated by an alternative energy source, such as a solar cell or wind-driven generator that weighs more than 1 kilogram consisting of 1 or more such cells; or
(iv) a battery used as a backup power source for memory or program instruction storage, timekeeping, or any similar purpose that requires uninterrupted electrical power in order to function if the primary energy supply fails or fluctuates momentarily.

(ii)covered entities shall be all sources of rechargeable batteries including residents, businesses, governments, charities and institutions.

(iii)rechargeable batteries that have been collected by product stewardship programs shall be reused or recycled. Mercury and mercury bearing residuals from recycling of rechargeable batteries must be retorted in properly permitted facilities. Mercury recovered from retorting must be recycled or placed in a properly permitted, monitored hazardous waste landfill, storage or disposal repository to avoid reintroduction

into the marketplace. When available, mercury recovered from retorting must be placed in a properly permitted, monitored permanent mercury repository to avoid reintroduction into the marketplace and it shall not be recycled.

(iv) product stewardship programs for rechargeable batteries must be fully implemented by January 1, 2011.

(2) The department may adopt rules to implement this section and to determine:

(a) Any unique management requirements, including, without limitation, special collection, processing and final disposition requirements for an unwanted product containing hazardous substances or hazardous materials;

(b) Labeling requirements for producers, if any, such as brand, toxicity, or carbon footprint.

(c) Any other issues the Department deems necessary for implementing this section.

NEW SECTION. **Sec. 18** DESIGNATION BY DEPARTMENT. (1) At least every two years, commencing on the effective date of this act, the department will consider and evaluate products and product categories to designate as covered products or covered product categories under this act.

(2) The public, including producers, may petition the department to consider products and product categories to designate as covered products or covered product categories under this act. The department shall establish a procedure for review of these petitions during the process specified in subsection (3) of this section.

(3) In designating covered products or covered product categories, the department will consider:

(a) Environmental and health impacts, including:

(i) climate change impacts and benefits;

(ii) potential energy conservation;

(iii) public and environmental health and safety;

(iv) potential resource recovery and material conservation;

(v) product toxicity;

(vi) opportunities for reducing waste and toxicity;

(vii) opportunities for increasing reuse or recycling, recycled-content, and design for reuse or recycling;

(viii) a product's potential to act as a contaminant in recycling programs;

(ix) concerns about disposing of a product in the waste stream;

(x) success in addressing similar products and product categories in other product stewardship programs in the United States and internationally.

(b) Public and business benefits and interest, including:
(i) management costs to local governments, taxpayers, and solid waste ratepayers in the absence of product stewardship programs;
(ii) difficulty managing in traditional curbside collection and other standard government solid waste management systems;
(iii) opportunities for existing and new businesses and infrastructure to manage products or product categories proposed for designation and to use or increase markets for materials recovered from such products or product categories with a preference for in-state opportunities;
(iv) public demand;
(v) recommendations of the product stewardship advisory committee established in section 19 of this act.
(4) Through the designation process the department will determine:
(a) Covered entities for a product or product category;
(b) Implementation dates;
(c) Whether a product or product category is reusable or recyclable;
(d) Any unique management requirements, including, without limitation, special collection, processing and final disposition requirements for an unwanted product containing hazardous substances or hazardous materials;
(e) Labeling requirements for producers, if any, such as brand, toxicity, or carbon footprint; and
(f) Whether a covered product or covered product category's packaging should also be designated as a covered product.

NEW SECTION. **Sec. 19** PRODUCT STEWARDSHIP ADVISORY COMMITTEE.
(1) The department will appoint a product stewardship advisory committee consisting of up to fifteen members that will include representatives of local governments, consumer advocacy groups, environmental groups, businesses, and four legislative members, one from each major caucus of the house and senate. House members shall be designated by the speaker of the house and senate members shall be designated by the president of the senate.
(2) The department will consult the advisory committee regarding designation of new covered products and covered product categories, covered entities, implementation dates, reusability or recyclability of the product, management requirements, labeling requirements, and other matters requested by the department.

(3) The advisory committee shall review and provide comments on the department's recommendations regarding designation of new covered products and covered product categories.

NEW SECTION. **Sec. 20** NO LIMITATION ON AUTHORITY. Nothing in this act changes or limits the authority of the Washington utilities and transportation commission to regulate collection of solid waste, including curbside collection of residential recyclable materials, nor does this act change or limit the authority of a city or town to provide such service itself or by contract under RCW 81.77.020.

NEW SECTION. **Sec. 21** ANTICOMPETITIVE CONDUCT. A producer, group of producers or stewardship organization and its officers, members, employees, and agents that organize a product stewardship program required under this act are authorized to engage in anticompetitive conduct to the extent necessary to plan and implement a program, and are immune from liability under state laws regarding antitrust, restraint of trade, unfair trade practices, and other regulation of trade and commerce.

NEW SECTION. **Sec. 22** LIBERAL CONSTRUCTION. This chapter must be liberally construed to carry out its purposes and objectives.

NEW SECTION. **Sec. 23** As used in this act, captions constitute no part of the law.

NEW SECTION. **Sec. 24** Sections 1 through 22 of this act constitute a new chapter in Title 70 RCW.

NEW SECTION. **Sec. 25** If any provision of this act or its application to any person or circumstance is held invalid, the remainder of the act or the application of the provision to other persons or circumstances is not affected.

NEW SECTION. **Sec. 26** This act is necessary for the immediate preservation of the public peace, health, or safety, or support of the state government and its existing institutions, and takes effect July 1, 2009.

PLEASE NOTE: Work in Progress

APPENDIX E: Draft Product Stewardship Legislation for Mercury-Containing Lights (based on Draft Model Product Stewardship Framework Legislation)

AN ACT Relating to product stewardship programs, financed and provided by product producers that include reuse or recycling of unwanted products; addressing mercury-containing lights, and adding a new chapter to Title 70 RCW.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:

NEW SECTION. **Sec. 17)** SHORT TITLE. This act may be known and cited as the product stewardship act for mercury-containing lights.

NEW SECTION. **Sec. 18)** INTENT. The legislature finds that:
(1) Convenient and environmentally sound product stewardship programs that include collecting, transporting and reusing or recycling unwanted products will help protect Washington's environment and the health of state residents;
(2) Product producers should finance and provide these programs which are intended to encourage producers to design products that have a lower carbon footprint, are less toxic and energy and material intensive, and are easier to recycle.

NEW SECTION. **Sec. 19)** DEFINITIONS. The definitions in this section apply throughout this act unless the context clearly requires otherwise.
(1) Brand means a name, symbol, word, or mark that identifies a product, rather than its components, and attributes the product to the owner of the brand as the producer.
(2) Covered entity means an entity, such as a resident or small business, that can use a product stewardship program to discard an unwanted product.
(3) Covered product means a product designated by this act, either individually or as an item within a covered product category. "Covered product" includes all materials that make up a covered product.
(4) Covered product category means a group of similar products covered by this act.

PLEASE NOTE: Work in Progress

(5) Department means the department of ecology.
(6) Final disposition means the point beyond which no further processing takes place and materials from an unwanted product are either in a form capable of direct use as a feedstock in producing new products or disposed of or managed in permitted facilities.
(7) Mercury-containing lights means lamps, bulbs, tubes, or other devices that contain mercury that provide functional illumination in homes, offices, and outdoors.
(8) "Hazardous substances" or "hazardous materials" means those substances or materials identified under regulations and rules adopted pursuant to the state hazardous waste management act, chapter 70.105 RCW.
(8) Organization means a sole proprietorship, partnership, corporation, nonprofit corporation or organization, limited liability company, firm, association, cooperative, or other legal entity located within or outside Washington state.
(9) Orphan product means a covered product that lacks a producer’s brand, or for which the producer is no longer in business and has no successor in interest, or that bears a brand for which the department cannot identify an owner.
(10) Processing means recovering materials from unwanted products for use as feedstock in new products.
(11) Producer means a person that:
(a) Has legal ownership of the brand, brand-name or cobrand of a covered product sold in or into Washington state;
(b) Imports a covered product branded by a producer that meets (a) of this subsection and where that producer has no physical presence in the United States; or
(c) If subsections a and b do not apply, a person who makes an unbranded product that is sold in or into Washington state; or
(d) Sells at wholesale or retail a covered product, does not have legal ownership of the brand, and elects to fulfill the responsibilities of the producer for that product.
(12) Product stewardship means a requirement for a producer of a covered product to manage and reduce adverse safety, health and environmental impacts of the covered product throughout its life cycle.
(13) Product stewardship plan or plan means a detailed plan describing the manner in which a product stewardship program will be implemented.
(14) Product stewardship program or program means a program financed and provided by producers of covered products that addresses product stewardship and includes collecting,

transporting, reuse, processing, and final disposition of unwanted products, including a fair share of orphan products.
(15) Recycling means transforming or remanufacturing unwanted products into usable or marketable materials for use other than landfill disposal or incineration. Recycling does not include energy recovery or energy generation by means of combusting unwanted products with or without other waste.(16) Reporting period means the period commencing January 1 and ending December 31 in the same calendar year.
(17) Residuals mean non-recyclable materials left over from processing an unwanted product.
(18) Reuse means a change in ownership of a covered product or its components and parts for use in the same manner and purpose for which it was originally purchased.
(19) Stakeholder means a person who may have an interest in or be affected by a product stewardship program.
(20) Stewardship organization means an organization designated by a producer to act as an agent on behalf of the producer to operate a product stewardship program.
(21) Unwanted product means a covered product no longer wanted by its owner or that has been abandoned, discarded, or is intended to be discarded by its owner.

NEW SECTION. **Sec. 20)** COVERED PRODUCTS AND COVERED PRODUCT CATEGORIES. (1) Covered product and product categories designated under this act include:

(a) Mercury-containing lights.

(i) “mercury-containing lights” means lamps, bulbs, tubes, or other devices that contain mercury and that provide functional illumination in homes, offices, and outdoors.

(ii) covered entities shall be residents and small businesses.

(iii) mercury-containing lights that have been collected by product stewardship programs shall be recycled. Mercury and mercury bearing residuals from recycling of mercury-containing lights must be retorted in properly permitted facilities. Mercury recovered from retorting must be recycled or placed in a properly permitted, monitored hazardous waste landfill, storage or disposal repository to avoid reintroduction into the marketplace. When available, mercury recovered from retorting must be placed in a properly permitted, monitored permanent mercury repository to avoid reintroduction into the marketplace and it shall not be recycled.

(iv) product stewardship programs for mercury-containing lights must be fully implemented by January 1, 2011.

(3) The department may adopt rules to implement this section and to determine:
(a) Any unique management requirements, including, without limitation, special collection, processing and final disposition requirements for general purpose lights containing hazardous materials.;
(b) Labeling requirements for producers, if any, such as brand, toxicity, or carbon footprint;
(c) Any other issues the Department deems necessary for implementing this section.

NEW SECTION. **Sec. 5** PARTICIPATION IN PRODUCT STEWARDSHIP PROGRAM REQUIRED--TERMS. (1) Every producer of a covered product sold in or into Washington state must participate in a product stewardship program for that product. Every such producer must:
(a) Operate, either individually or collectively with other producers, a product stewardship program approved by the department; or
(b) Enter into an agreement with a stewardship organization to operate, on the producer's behalf, a product stewardship program approved by the department.
(2) Product stewardship programs shall collect, free of charge, unwanted products from covered entities for reuse or final disposition as appropriate.
(3) A producer, group of producers, or stewardship organization operating a product stewardship program shall:
(a) Comply with a product stewardship plan approved by the department and this act, any rules adopted by the department to implement this act, and all other applicable laws and rules; and
(b) Pay all administrative and operational costs associated with their program.

NEW SECTION. **Sec. 6.** RESTRICTION ON SALE OF COVERED PRODUCTS. As of the implementation date established for the covered product no producer, wholesaler, retailer or other person may sell or offer for sale that product to any person in this state unless the producer is participating in a product stewardship program approved by the department. A person selling or offering for sale a covered product in the state shall consult the department's website for a list of producers of that product participating in approved programs prior to selling the product in or into the state. A person is considered to have complied with this section if, on the date the person ordered a covered

product from a producer or its agent, the producer was listed as having an approved program on the department's website.

NEW SECTION. **Sec. 7** REQUIREMENTS OF PRODUCT STEWARDSHIP PLAN. • A producer, group of producers, or stewardship organization operating or intending to operate a product stewardship program must, at least 60 days prior to submitting a product stewardship plan to the department pursuant to subsection • of this section, provide public notice of the plan it is considering for submittal. The producer, group of producers, or stewardship organization must consult with stakeholders during development of the plan, solicit stakeholder comments, and attempt to address any stakeholder concerns regarding the plan prior to submittal.

(2) A producer, group of producers, or stewardship organization operating or intending to operate a product stewardship program must submit a product stewardship plan to the department specifying:

(a) Information, including contact information, regarding:

(i) the organization submitting the plan;

(ii) a list of all participating producers; and

(iii)if the program is to be operated by a stewardship organization, a description of management, administration and tasks to be performed by the stewardship organization;

(b) Recovery goals, including:

(i) recovery goals for the first, second, and third years of the program, expressed as pounds per capita, and an explanation of how these goals reflect a significant percentage of an unwanted product relative to the quantity of the unwanted product that may be available for reuse or recycling; and

(ii) plans to maximize recycling of packaging that may be collected;

(c) A collection system, including:

(i) location of collection sites and other collection services to be used by the program;

(ii) how unwanted products from all covered entities will be collected for all cities in the state with populations greater than 10,000 and in all counties of the state;

(iii) how the collection system will be convenient and adequate to serve the needs of all covered entities in both urban and rural areas; and

(iv) how collected unwanted products will be transported to processing facilities;

(d) A processing and disposal system, including:

(i) locations, permit status, and records of any penalties, violations, or regulatory orders received in the previous five years by processing and disposal facilities proposed to be used by the program;
(ii) a third-party audit of each processing and disposal facility proposed to be used by the program for any unwanted product or residuals containing hazardous substances or hazardous materials, documenting compliance with all applicable laws, regulations and rules;
(iii) policies and procedures to be followed by persons collecting, transporting, processing and disposing unwanted products, including how the program will ensure compliance with all applicable laws, regulations and rules;
(iv) a description of how unwanted products will be processed at each processing facility;
(vi) how all residuals will be disposed of or managed in permitted facilities, including disposal or management of all hazardous substances and hazardous materials in permitted hazardous waste facilities;
(vii) how hazardous substances and hazardous materials will be safely and securely tracked and handled from collection to final disposition in compliance with this act, any rules adopted by the department to implement this act, and all other applicable laws and rules;
(viii) best management practices that will be used by first processors and their downstream vendors to assure that hazardous substances and hazardous materials are not released into the environment and will not adversely impact human health;
(e) How the program will seek to use businesses within the state, including retailers, processing facilities, and collection and transportation services;
(f) Greenhouse gas reductions anticipated from implementing the collection, transportation and recycling system;
(g) A financing system, including:
(i) how the entire product stewardship program will be financed, including how costs will be apportioned among and assessed upon producers participating in the program;
(ii) financial incentives to reward product design that result in improved reuse or recycling and less toxicity where feasible;
(iii) a plan to withhold a percentage of funds to be managed by the product stewardship program to increase markets for recyclable materials or other financial incentives to encourage market development for recyclable materials contained in covered products;

(iv)how those providing services for the collection, transportation and processing systems will be fairly compensated for their services.
(h) Strategies to manage and reduce life-cycle impacts of products and packaging, from product design to end-of-life management, including ways to improve designing, packaging and distributing products to:
(i) reduce waste, energy, toxicity, carbon footprints and other environmental and health impacts;
(ii) increase recycled content and product longevity; and
(iii) make products more easily reusable or recyclable;
(i) How the producers participating in the program will communicate with processors used by the program to encourage sustainable design of products and packaging;
(j) Education and outreach activities, including:
(i) an educational campaign promoting the use of the program to covered entities that includes a toll free telephone number and website and that is sufficient to meet required recovery rates.
(ii) a plan for working with and providing information about the program to retailers, wholesalers, collectors and other interested parties to disseminate to covered entities; and
(iii) the methodology for determining how the effectiveness of the outreach activities will be measured.
(k) Pursuant to subsection (1) of this section, the consultation process, including:
(i) a description of the process used to consult with stakeholders during development of the plan; and
(ii) a summary of stakeholder comments, and how any stakeholder concerns were addressed.
(3) The product stewardship plan shall be approved by the department when all requirements have been met in compliance with this act and any rules adopted by the department to implement this act.
(4) All plans submitted to the department must be made available to the public on the department's website. Proprietary information submitted to the department under this chapter is exempt from public disclosure under RCW 42.56.270.

NEW SECTION. **Sec. 8** REVIEW OF PRODUCT STEWARDSHIP PLAN. (1) A producer of a covered product, a group of producers, or a stewardship organization must submit a proposed product stewardship plan to the department at least one year prior to a covered product's implementation date.
(2) Within ninety days after receiving a proposed product stewardship plan, the department shall determine whether the

plan complies with this act and any rules adopted to implement this act. If it approves a plan, the department shall notify the applicant of its approval. If it rejects a plan, the department shall notify the applicant of its decision and its reasons for rejecting the plan. An applicant whose plan has been rejected by the department may submit a revised plan to the department within sixty days after receiving notice of the rejection.

(3) At least once every four years, a producer, group of producers or stewardship organization operating a product stewardship program must update its product stewardship plan and submit the updated plan to the department for review. The department must determine the status of an updated plan within 90 days of its submittal. If the department rejects an updated plan, the producer of a covered product participating in the product stewardship program described in the plan will be deemed to be out of compliance with this act.

NEW SECTION. **Sec. 9** CHANGES TO PRODUCT STEWARDSHIP PLAN. (1) Except as provided in subsections (2) and (3) of this section, the department must grant prior approval, in writing, to any proposed change to a product stewardship plan.

(2) Additions or changes to collection locations for unwanted products may be made without the department's prior written approval. The product stewardship program must inform the department of such additions or changes within fifteen days of the occurrence.

(3) Additional producers may join a product stewardship program approved by the department without the department's prior written approval. The product stewardship program must inform the department of such additions within fifteen days of the occurrence.

NEW SECTION. **Sec. 10** SUSPENSION OR CANCELLATION OF APPROVAL. (1) If the department determines that a product stewardship program is not being operated in compliance with the requirements of this act, any rules adopted by the department to implement this act, or any other applicable laws, regulations, or rules, or if the department determines that there is an imminent danger to the public, the department may:

(a) Amend its approval of the program's product stewardship plan by clarifying terms or conditions to ensure full implementation of the plan; or

(b) Suspend or cancel its approval of the plan.

(2) At least 30 days prior to amending, suspending or canceling its approval of a product stewardship plan, the department shall inform the producer, group of producers, or stewardship organization operating the product stewardship program of its intended action and provide them an opportunity to respond. The department may extend this period for good cause.
(3) Notwithstanding subsection (2) of this section, if the department determines that it is necessary to protect the public from imminent danger, it may immediately amend, suspend or cancel approval of a product stewardship program's product stewardship plan without giving the producer, group of producers, or stewardship organization operating the program an opportunity to be heard, but the department shall give the operator an opportunity to be heard through proceedings consistent with the administrative procedure act, chapter 34.05 RCW, within fifteen days after the date on which the department takes any of those actions.

NEW SECTION. **Sec. 11** REPORTING. (1) On or before June 30 of each year, every producer, group or producers, or stewardship organization operating a product stewardship program must prepare and submit to the department an annual report describing:
(a) Information, including contact information, regarding:
(i) the organization submitting the report; and
(ii) a list of all participating producers;
(b) Recovery rates, including:
(i) the amount, by weight, of unwanted products collected from covered entities in each county in the state, including documented collection and recycling or disposal of that material;
(ii) how the program attained recovery rates established in the product stewardship plan or set by the department, and, if the program did not attain those recovery rates, what actions it will take during the next reporting period to do so, including how it will increase and improve effective, measurable outreach and education efforts;
(c) The collection system, including collection locations and services provided for all cities in the state with populations greater than 10,000 and in all counties in the state;
(d) The processing and disposal system, including:
(i) a list of processing and disposal facilities used and locations, the weight of unwanted products processed at each processing facility and disposed at each disposal facility, and a description of the methods used at each processing facility;

(ii) a list of subcontractors used through final disposition that processed or disposed of unwanted products containing hazardous substances or hazardous materials, and subcontractor facility locations;
(iii) documentation and summary results of annual third-party audits conducted on each processing facility and disposal facility as required in section 7 of this act;
(v) final disposition of residuals;
(vi) any penalties, violations, or regulatory orders received during the reporting period by each processing facility or disposal facility that was used;
(vii) whether policies and procedures in the product stewardship plan for collecting, transporting, processing and final disposition of unwanted products were followed during the reporting period, and a description of any noncompliance;
(e) The financing system, including a description of how the system met the requirements in section 7 of this act;
(f) The education and outreach activities implemented during the reporting period, including an analysis of the effectiveness of the education and outreach activities;
(g) Results of any actions taken to manage and reduce life cycle impacts of products and package, as described in subsection (2)(f) of section 7 of this act;
(h) How the product stewardship program complied with any other elements in the plan approved by the department; and
(i) any other information that the department may reasonably require.
(2) A producer, group of producers, or stewardship organization operating a product stewardship program meeting the following conditions is only required to report to the department information specified in subsections (1)(a), (b), (c), (g) and (i) of this section:
(a) The product stewardship program attained a ninety percent recovery rate of all unwanted products that were produced by producers participating in the program and a recycling rate of eighty percent of materials contained in such products; and
(b) All unwanted products collected by the product stewardship program were carbon neutral in production and use.
(3) All reports submitted to the department must be made available to the public on the department's website. Proprietary information submitted to the department under this act is exempt from public disclosure under RCW 42.56.270.

NEW SECTION. **Sec. 12** ENFORCEMENT. (1) The department shall provide, on its website, a list of all producers participating

in product stewardship programs it has approved and a list of all producers it has identified as noncompliant with this act and any rules adopted to implement this act.

(2) Wholesalers, retailers, and other persons shall check the department's website to determine if producers of covered products they are selling in or into the state are compliant with this act and any rules adopted to implement this act. If a wholesaler, retailer, or other person is unsure of the status of a producer or believes that a producer is not compliant, they shall contact the department to determine the producer's status.

(3) The department shall send a written warning and copies of this act and any rules adopted to implement this act to a producer who is not participating in a product stewardship program approved by the department and whose covered product is being sold in or into the state. The department shall also send a written warning and a copy of this act and any rules adopted to implement this act to a wholesaler, retailer or other person known to be selling the covered product in or into the state.

(4) A producer not participating in a product stewardship program approved by the department whose covered product continues to be sold in or into the state sixty days after receiving a written warning from the department, and a wholesaler, retailer, or other person who continues to sell a covered product from a producer not participating in an approved product stewardship program sixty days after receiving a written warning from the department, will be assessed a ten thousand dollar penalty. The department may waive or reduce the penalty if the producer, wholesaler, retailer, or other person complies with this act and any rules adopted to implement this act, or for any other reason the department determines to be justified.

(5) The department shall send a written warning to a producer, group of producers, or stewardship organization operating a product stewardship program that fails to submit a product stewardship plan, updated plan, proposed change to a plan, or annual report as required in this act. The written warning must include compliance requirements and notification that the requirements must be met within sixty days. If compliance requirements are not met within sixty days, the producer, group of producers, or stewardship organization will be assessed a ten thousand dollar penalty. The department may waive or reduce the penalty if the producer, group of producers, or stewardship organization complies with this act and any rules adopted to implement this act, or for any other reason the department determines to be justified.

(6) Each calendar day of a violation is a separate and distinct offense.

NEW SECTION. **Sec. 13** RECOVERY RATES AND EVALUATION. (1) By June of the third program year for each product or product category, the department shall establish required recovery rates for the fourth and subsequent program operating years, and must establish a system of penalties for producers and product stewardship programs that do not attain the required recovery rates.

(2) By December 31, 2014, the department shall report to appropriate committees of the legislature concerning status of the program administered under this act and, if necessary, recommend legislation.

(3) The department, or its designee, may inspect, audit, or review audits of processing and disposal facilities used to fulfill the requirements of a product stewardship program.

(4) No product stewardship program required under this act may use federal or state prison labor for processing unwanted products.

(5) The department shall annually invite comments from local governments, communities, and citizens to report their satisfaction with services provided by product stewardship programs. This information must be used by the department in reviewing proposed updates or changes to product stewardship plans.

NEW SECTION. **Sec. 14** ADMINISTRATIVE COSTS AND FEES. The department may establish fees for administering this act. Fees may be charged to the producers and must be paid annually by January 1 of each year. Fees may be established in amounts to fully recover and not to exceed expenses incurred by the department in administering this act.

NEW SECTION. **Sec. 15** PRODUCT STEWARDSHIP PROGRAMS ACCOUNT. The product stewardship programs account is created in the custody of the state treasurer. All receipts from fees and penalties collected pursuant to this act must be deposited in the account. Expenditures from the account may be used only for administering this act. Only the director of the department or the director's designee may authorize expenditures from the account. The account is subject to the allotment procedures under chapter 43.88 RCW, but an appropriation is not required for expenditures.

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NEW SECTION. **Sec. 16** RULEMAKING AUTHORITY. (1) The department shall adopt rules under the administrative procedure act, chapter 34.05 RCW, to implement this act, including, at a minimum:
(a) Program operating rules;
(b) A process for determining whether reduced reporting requirements in section 11 of this act apply;
(c) A process for setting recovery rates for the fourth and subsequent operating years of a program and for adjusting recovery rates; and
(d) An enforcement process.

NEW SECTION. **Sec. 17** NO LIMITATION ON AUTHORITY. Nothing in this act changes or limits the authority of the Washington utilities and transportation commission to regulate collection of solid waste, including curbside collection of residential recyclable materials, nor does this act change or limit the authority of a city or town to provide such service itself or by contract under RCW 81.77.020.

NEW SECTION. **Sec. 18** ANTICOMPETITIVE CONDUCT. A producer, group of producers or stewardship organization and its officers, members, employees, and agents that organize a product stewardship program required under this act are authorized to engage in anticompetitive conduct to the extent necessary to plan and implement a program, and are immune from liability under state laws regarding antitrust, restraint of trade, unfair trade practices, and other regulation of trade and commerce.

NEW SECTION. **Sec. 19** LIBERAL CONSTRUCTION. This chapter must be liberally construed to carry out its purposes and objectives.

NEW SECTION. **Sec. 20.** As used in this act, captions constitute no part of the law.

NEW SECTION. **Sec. 21** Sections 1 through 22 of this act constitute a new chapter in Title 70 RCW.

NEW SECTION. **Sec. 22** If any provision of this act or its application to any person or circumstance is held invalid, the remainder of the act or the application of the provision to other persons or circumstances is not affected.

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NEW SECTION. **Sec. 23** This act is necessary for the immediate preservation of the public peace, health, or safety, or support of the state government and its existing institutions, and takes effect July 1, 2009.

NEW SECTION. **Sec. 24** A new section is added to chapter 70.95M RCW to read as follows:

(1) The department shall participate in national and global mercury forums to advocate reduction of global emissions and permanent isolation of elemental mercury.

(2) By July 1, 2011, the department, in consultation with the United States environmental protection agency, shall study the feasibility of the development of a national permanent repository for mercury. The department shall develop recommendations and provide its findings to the appropriate committees of the legislature by December 1, 2011.

PLEASE NOTE: Work in Progress

Appendix F Green Electricity – Draft Bio-Power/Anaerobic Digestion Legislation

For insertion into the Renewable Rate Recovery and Control Act

New section. Definitions

“Anaerobic digester" means a facility that processes manure from livestock and/or other organic material into biogas based electricity and digested organic material using microorganisms in a decomposition process within a closed, oxygen-free container.

“Landfill gas system” means a facility that uses landfill gas to produce electricity.

“Organic waste clean heat and power system” means a facility that produces both electricity and used and useful heat for a combined energy efficiency of at least 65 percent. The feedstock can be any combination of wood waste, hog fuel, urban wood waste, logging slash and other organic material.

New section insert. Renewable rate recovery and control

The following rates are established for renewable power production and control

Anaerobic digester renewable electricity rate is set at twelve cents per kilowatt hour produced

Landfill gas system renewable electricity rate is set at eight cents per kilowatt hour produced.

Organic waste clean heat and power system renewable electricity rate is set at nine cents per kilowatt hour produced.

The environmental attributes of the renewable electricity system belong to the system owner, and do not transfer to the state or the light and power business upon receipt of renewable electricity rate payments.

New section: Wheeling of bio-power

PLEASE NOTE: Work in Progress

If a utility does not wish to purchase the renewable electricity produced from anaerobic digesters, landfill gas systems, and wood waste clean heat and power systems, and if it has met the requirements of Initiative 937 including all future requirements established in statute, then it will make the available the electricity produced to other in-state utilities for a modest transmission fee not to exceed its normal transmission rate or 5 percent of the value of the power produced whichever is lower.

PLEASE NOTE: Work in Progress

Appendix G: Compost Made From Recovered Organic Materials Procurement by the Department of Transportation and Other State Agencies

AN ACT Relating to product standards; amending RCW 43.19A.020; providing an effective date; and declaring an emergency.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:

Sec. 1. RCW 43.19A.020 and 1996 c 198 s 1 are each amended to read as follows:
(1) The (USEPA) federal product standards, (as now or hereafter amended) adopted under 42 U.S.C. Sec. 6962(e) as it exists on the effective date of this act, are adopted as the minimum standards for the state of Washington. These standards shall be implemented for at least the products listed in (a) and (b) of this subsection (by the dates indicated), unless the director finds that a different standard would significantly increase recycled product availability or competition.
(a)By July 1, 2009:
(i)Paper and paper products;
(ii)(b) Organic recovered materials; and
(iii)(c) Latex paint products;
(b) By July 1, 2010:
(i)(d) Products for lower value uses containing recycled plastics;
(ii)(e) Retread and remanufactured tires;
(iii)(f) Lubricating oils;
(iv)(g) Automotive batteries;
(v)(h) Building ((insulation)) products and materials;
(vi)(i) Panelboard; and
(vii)(j) Compost made from recovered organic materials; ~~products.~~
(viii)(k) Fertilizers made from recovered organic materials;
(2) By July 1, 2010, the director shall adopt product standards for strawboard manufactured using as an ingredient straw that is produced as a by-product in the production of cereal grain or turf or grass seed and product standards for products made from strawboard.
(3) The standards required by this section shall be applied to recycled product purchasing by the department ((and)), other state agencies, and state postsecondary educational

institutions. The standards may be adopted or applied by any other local government in product procurement. The standards shall provide for exceptions under appropriate circumstances to allow purchases of recycled products that do not meet the minimum content requirements of the standards.

~~NEW SECTION~~. **Sec. 2.** This act is necessary for the immediate preservation of the public peace, health, or safety, or support of the state government and its existing public institutions, and takes effect July 1, 2009.

http://www.epa.gov/epawaste/conserve/tools/cpg/products/compost.htm

Report to the Climate Action Team

1. INTRODUCTION

In accordance with the CAT's charge, the SEPA Implementation Working Group (IWG) has developed products and recommendations in order to provide guidance for local and state agencies on how to incorporate climate change considerations into SEPA analyses (see Appendix A for the SEPA IWG Scope of Work as set forth by the CAT). Our work focused on the directive to "ensure that climate change considerations are fully incorporated into governmental decision-making, resource and development planning, permitting and approval." This addresses the broader recommendation to "analyze greenhouse gas emissions and mitigation options early in decision-making, planning processes, and development projects."

In other states and on a federal level, we have witnessed climate change policy under SEPA-like statutes being made on an ad hoc basis through piecemeal litigation or through piecemeal precedent set by individual environmental reviews negotiated between individual applicants and individual lead agencies. In neither case has there been consistency or predictability. Our aim is to diminish the potential for litigation (and to provide consistency and predictability) by giving state and local agencies the tools and framework they need to fully incorporate climate change considerations into their decision-making. Through these recommendations, we seek to provide assurance to government decision makers and project proponents that proposals will be assessed under a predictable climate change framework which will help us meet our state's greenhouse gas reduction requirements.

The SEPA IWG recognizes that only part of the future greenhouse gas reductions mandated by Washington State law is likely to be implemented through SEPA-related mitigation. Much of the eventual future reductions will likely result from multi-state, national or international "cap and trade" provisions, carbon taxes, or other Washington State laws that may not be tied directly to the SEPA process. Until these programs are adopted and implemented, SEPA may play an important role in filling the gaps in existing regulations and enabling Washington State and its political subdivisions to address the threats that greenhouse gas emissions and the climate changes they are causing pose to our people, our property, our economy, and our environment.

2. IWG PURPOSE, GOALS, PROCESS, AND REPORT OVERVIEW

2.1 Purpose and Goals of the SEPA IWG

There is currently no specific guidance in Washington State on how to address climate change under SEPA. Thus, a key task of the SEPA IWG was to develop recommendations to ensure that consideration of climate change is specifically included in the SEPA processes and documents. The products and recommendations that were developed clarify how state agencies, local governments, and the private sector should analyze, disclose, and mitigate greenhouse gas emissions and the effects of global warming on actions under SEPA.

The IWG also considered the ways in which SEPA can be leveraged to provide incentives for "climate-friendly" plans, policies, and projects. Our recommendations here focus on the most promising actions for encouraging climate-friendly development.

2.2 SEPA IWG Process

The SEPA IWG met numerous times between late May and September, including four all-day meetings and four telephone conference calls. Several IWG members and technical support staff worked on subgroups that focused on discrete issues between meetings. The subgroups compiled a wealth of existing information and formed preliminary recommendations for decision by the entire IWG membership. Almost all IWG members contributed to the work of at least one subgroup and many members contributed to multiple groups. The tremendous energy that individual members put into this effort enabled thoughtful and well-informed discussion at IWG meetings.

The IWG strove to find solutions that could be broadly supported by members. The IWG was not, however, a consensus body, and it had written procedures for making decisions through formal voting and getting a "sense of the group" through straw polls to gauge the level of support for particular options. A number of votes taken at the SEPA IWG's September 30, 2008 meeting are reflected in this report. There are many issues that the SEPA IWG did not fully address or resolve because of the constraints of time, the complexity of the issues, and the many aspects of SEPA that are affected by considerations of climate change. For example, the SEPA IWG did not fully develop an approach for conducting SEPA threshold determinations and what the standard (or standards) of significance for projects and non-projects should be. The IWG did, however, focus this and other discussions on key sets of questions and options that provide direction for future work.

Nearly all members would have liked to have much more time to focus on the questions that we addressed, and some felt that the process was too rushed to fully consider all of the implications of our decisions. In a number of places throughout this document, including the recommendations section, the IWG identifies important areas for further work—mainly by Ecology and its stakeholders—as the effort to provide clarity on how to address climate change under SEPA continues.

The SEPA IWG recognizes the work undertaken by the other IWGs and related processes (Transportation, Land Use, Building Green, Beyond Waste, Forestry, and Agriculture) will overlap with the SEPA IWG's work and that there may be areas of crossover that will need to be addressed as each group's recommendations are put into action.

2.3 Overview of this Report

This report first describes the products that the IWG developed and how those products can be used by the private sector and government decision makers to help navigate through the SEPA process. The report then describes the recommendations that the IWG is presenting to the CAT for its consideration.

The next part of the report discusses four substantive focus areas:

Measurement and Disclosure:

- Developing guidance and tools for measurement, disclosure, threshold determination, and EIS, if required, from project and non-project actions.
- Analyzing approaches for making SEPA threshold determinations for greenhouse gas emissions.

Mitigation Strategies:

- Compiling information about possible approaches to mitigating impacts from greenhouse gas emissions and identifying knowledge gaps, including overall effectiveness and costs of the various potential means of mitigation.
- Determining which mitigation options are appropriate for which sources of emissions.

Leveraging SEPA to Promote Climate-Friendly Development:

- Identifying opportunities to promote climate-friendly development, rules, and regulations through SEPA-related incentives and disincentives and upfront planning.

Assessment of Project Vulnerabilities to Climate Change:

- Determining next steps for using the SEPA process to address adverse impacts of project and non-project actions resulting from the intersection of the proposed actions and changes in environmental conditions that are predicted to occur as a result of climate change.

In each of the areas, the report addresses what we learned, including our information gaps. Each area identifies key issues that generated discussion by the IWG but did not result in any recommendations made by the IWG either because of incomplete information, disagreement among members, or because of inadequate time to make a decision. Each area also includes comments made by IWG members when reviewing drafts of this report, which should be topics for further discussion by Ecology and its stakeholders.

The report concludes by describing the IWG's recommendations for future work.

3. PRODUCTS AND RECOMMENDATIONS OF THE IWG

Below is a list of key products and recommendations that the IWG developed through its process. The products listed are resources for further policy development by Ecology and its stakeholders. The actual products are included as Appendices C-I.

3.1 Products

- Descriptive list of emissions sources: This descriptive tool lists 16 different categories of emissions sources and describes what types of emissions fall into which categories. The list contains both direct and indirect sources of emissions. As described later in this report, as a future task, Ecology should develop clear guidance to indicate which emission source categories should be carried through the SEPA process (i.e., disclosure, quantification, threshold determination, and mitigation) for representative types of SEPA proposed actions.
- Initial list of criteria for making "pragmatic" decisions about what to measure: This initial list includes criteria for guiding the selection of which sources it makes sense to measure for various types of projects and non-projects. Ecology can use these types of criteria to develop clear guidance to indicate which emission categories should be measured through the SEPA process for typical types of actions.
- Compilation table of measurement tools: This comprehensive list identifies many of the tools that currently exist for measuring greenhouse gas emissions and preliminarily assesses some strengths and weaknesses of each tool. The list also contains information about where each tool can be accessed for use by decision makers. This table can be used by local and state agencies as a reference guide for the existing measurement tools and general guidance on which tools may be appropriate for what purposes.
- Mitigation Options Matrix: This product identifies a variety of mitigation options and links these options to the different categories of emissions sources. The matrix can be used by project proponents and government agencies to determine appropriate mitigation for specific proposals.
- Measurement Case Studies/Examples: Using hypothetical case studies, this product analyzes how SEPA's analysis of climate change impacts can apply to different types of project and non-project actions. The example cases can assist project proponents and government agencies in working through "real world" examples.

- Analysis of Threshold Determination Options: This set of products describes and assesses options for statewide consistency in setting a significance standard, and different options for the types of standards that could be used. It includes descriptive, graphical, and case study materials. This information will be useful for further developing an approach to threshold determination, whether that is done at the state level for a statewide standard or by individual state and local lead agencies.
- Incentives and Disincentives for Climate-Friendly Development: This product lists and describes ideas for using SEPA-related incentives and disincentives to encourage climate-friendly development. This list might be utilized by elected officials and other policy makers as potential ideas to help Washington meet its greenhouse gas reduction requirements.

3.2 Recommendations

As a preamble to the SEPA IWG's recommendations, the IWG notes three key shared principles:

- The SEPA IWG generally supports the concept of upfront non-project SEPA review of climate change planning, based upon adequate standards, to reduce greenhouse gas emissions and to eliminate duplicative project-level SEPA review.
- The SEPA IWG does not intend for any of its recommendations or ideas to unintentionally impact existing categorical exemptions under SEPA. Any desired changes to categorical exemptions put forward by the group or any of its members will be made explicit in the text of this report. The IWG did not address categorical exemptions in depth or focus on whether they should be expanded, reduced, or remain the same.
- The SEPA IWG acknowledges that it is equally important to provide clarity and predictability for treatment of both project and non-project actions or proposals under SEPA.

The IWG presents the recommendations below for consideration by the Climate Action Team. Except where explicitly referenced in a recommendation, the IWG did not make a decision about whether policy and materials should be set forth as resources, guidance, rules, or statute.

RECOMMENDATION 1—CLEAR GUIDANCE AND REVISED CHECKLIST

Ecology should revise the environmental (SEPA) checklist and provide guidance to assist in the evaluation of greenhouse gas emissions from both project and non-project proposals. Guidance would include:

- Clear guidance on which of the 16 categories listed in Appendix D should be included for typical types of projects and non-projects. The guidance would give lead agencies the discretion to apply any combination of the 16 source categories for exceptionally complex proposed actions outside the range of "typical" SEPA actions.
- Clear guidance on how each of the 16 source categories should be handled at different stages of the SEPA process (e.g., determination of any applicable exemptions, disclosure, quantification, threshold determination, mitigation, and future monitoring/reporting) for representative types of projects and non-projects.
- Incorporation of external resources for determining which of the categories to measure and potentially mitigate for projects and non-projects (e.g., current activity in California and Massachusetts; IPCC guidance, etc.).

A draft outline of Ecology guidance is included in Section 8 of this report.

RECOMMENDATION 2—REGULARLY UPDATED MATERIALS AND COORDINATION

Ecology should regularly update and distribute the reference materials developed through the IWG related to emission sources, assessment tools, and mitigation options. This is particularly important in the case of new emerging tools, which could be useful for greenhouse gas emissions assessment under SEPA. In updating the tools reference materials, Ecology should coordinate with other state and local lead agencies, SEPA proponents, and the public that are looking at tools for similar purposes to help achieve statewide consistency in tools used. A future task includes the review by practitioners of the tools matrix developed by the SEPA IWG.

RECOMMENDATION 3—EMISSIONS TOOL DEVELOPMENT

Ecology should work with other state and local lead agencies, SEPA proponents, and the public to develop and/or identify basic tools for recommended use within the SEPA process to make assessments predictable and not overly burdensome. Any tools developed should be effective, easy to use, and be useful for "typical" SEPA applications. These tools should be regularly updated as the state of knowledge in the field changes. In particular, the IWG recommends that easy-to-use tools, both qualitative and quantitative, be identified and/or developed in the following areas:

- Vehicle miles travelled (VMT) forecasting and greenhouse gas tailpipe emission factors for on-road traffic for large and small projects and plans.
- Embodied emissions.
- Loss of sinks and greenhouse gas reductions through the use of sinks.
- Reduction in space heating and electricity use for residential, commercial, and industrial buildings.
- Mitigation effectiveness.

RECOMMENDATION 4—USE OF QUALITATIVE ANALYSIS

The SEPA IWG recognizes that easy to use tools are not currently available for estimating future emissions from all sources, and it may be some time before adequate tools are available. We also recognize that quantitative evaluation may not be practical or warranted for some types of proposals (e.g., small, routine projects). Therefore, the IWG recommends that applicants be able to conduct a qualitative analysis of greenhouse gas emissions in cases where (a) adequate tools do not exist, (b) criteria outlined in SEPA guidance requiring a quantitative evaluation are not met, or (c) there is an established alternative to quantification (e.g., a "green list"[1] or programmatic analysis of the proposed action). Qualitative tools may include check lists, decision trees, streamlined assessments, or screening tools where assumptions and approximations dictate that the results are qualitative in nature. Ecology should provide guidance on (1) qualitative standards, (2) when qualitative analysis is acceptable, and (3) what constitutes an acceptable qualitative description of emissions.

RECOMMENDATION 5—GUIDANCE REGARDING MITIGATION

Ecology should develop guidance on the effectiveness of mitigation options. The guidance should also develop criteria for assessing newly identified mitigation strategies. In addition to information on the effectiveness of strategies, (i.e., how many tons are mitigated), guidance would ideally include the following information:

- Cost and cost-savings from each strategy, and
- Criteria/approach for assessing "new" strategies not already in the guidance.

[1] A "green list" could contain types of projects that are pre-determined not to have climate change impacts and may produce net benefits to climate. For projects contained on the list, project proponents may be relieved from some or all aspects of SEPA analysis for climate change or some or all mitigation requirements.

This guidance should be regularly updated.

RECOMMENDATION 6—DEVELOP APPROACH TO THRESHOLD DETERMINATION

Ecology should develop an approach to threshold determination under SEPA that has the following characteristics:

- A requirement that all lead agencies establish a significance standard.
- The development of a statewide standard of significance that is available to lead agencies should they choose to use it.
- The option for lead agencies to develop their own standard, subject to "sideboards"[2] set by the state in guidance, rule, or statute.
- The development of approaches for applicants to qualitatively obtain a Determination of Non-Significance (DNS) for climate impacts (note the relationship to qualitative analysis described in Recommendation 4).
- A linkage between the significance standards and the statewide greenhouse gas reduction requirements.

The above components of an approach to SEPA threshold determination are based on a plurality or majority of votes cast by IWG members (the outcomes of these votes are included in Appendix B). Even though the characteristics described above were favored by a plurality or majority of members, IWG members still held a range of views on some key points that would benefit from further discussion by Ecology and its stakeholders. These are:

- The degree to which threshold determination provisions should be set in guidance, rule, or statute (the term "sideboards" was used to encompass all three possibilities). The IWG did not decide on this issue.
- The degree to which the state should provide sideboards to constrain lead agency discretion in setting a significance standard other than a statewide standard. Although it was not an option that achieved a plurality of votes, many members felt that the state should not constrain lead agencies' efforts to set their own standards. Some felt that flexibility would allow lead agencies to innovate and experiment and inform a "learning by doing" approach statewide.
- Whether there should be a "phasing in" of state requirements and sideboards in threshold determination. The state could begin with a more flexible approach (possibly including no state requirement that lead agencies set a significance standard) and refining it into a more consistent statewide approach over time.
- The specific type of quantitative significance standard. The SEPA IWG analyzed a number of different types of quantitative significance standards, and the two types of standards that generated the most discussion were (1) a percentage below business as usual and (2) a strict volume approach (e.g., tons per unit). However, the majority of IWG members voted for something other than a strictly percentage-based or volume-based approach. Instead, the "sense of the group" was that a hybrid percentage-volume approach or a "menu" approach was promising.[3]
- How to link significance standards to statewide greenhouse gas requirements and whether to do this for both a statewide standard and as part of the sideboards for lead agencies that set their own standards. Although the SEPA IWG recommended a conceptual linkage between threshold determination and the state requirements, it did not address any questions about how to operationalize it. One key question is how much greenhouse gas reductions to expect from new development versus existing development.
- Similarities and differences in the approach to threshold determination for projects vs. non-projects.

RECOMMENDATION 7—CONCEPTUAL IDEAS FOR LEVERAGING SEPA

[2] The SEPA IWG struggled with the right word to describe limits or constraints placed on lead agency discretion without implying that these would be in the form of state guidance, rule, or statute. The IWG used "sideboards" as a working term for this concept. Members suggested other terms as well, including "constraints," "benchmarks," "criteria," and "parameters."

[3] Under a menu approach, the state would develop a menu of possible standards and lead agencies could adopt the menu or use it as source for selecting one or more standards. It is described in more detail in Section 4.1.2.

The SEPA IWG recommends four conceptual ideas to the CAT as promising approaches for using SEPA-related incentives or disincentives (i.e., "leveraging SEPA") to promote climate-friendly development. We also identify one additional idea to the CAT as an area for further analysis by Ecology and its stakeholders.

The IWG has not fully discussed or endorsed specific approaches for implementing the ideas presented in this recommendation—this is an area for future work. Some of the ideas may require legislation, but the IWG does not recommend legislation at this time. Rather, it asks the CAT to support these ideas in concept without asking the CAT to endorse any particular version of them.

The ideas are summarized below; more in-depth descriptions—along with additional comments from IWG members—are included in Appendix C. These ideas are put forth based on a majority vote of IWG members; the level of IWG member support for each is also summarized in Appendix C.

The IWG recommends the following four "leveraging SEPA" ideas:

- *Neighborhood, District-Level Exemptions*. SEPA would be amended to authorize jurisdictions to provide a "neighborhood, district-level exemption." This would be for municipally designated areas within UGA's, where property owners agree to comply with statutorily set minimum sustainable development standards. The standards could require compact, connected, walkable neighborhoods, with good jobs ratios, open space, a wide variety of uses, transit supportive residential densities, and high performance buildings and infrastructure. Any exemption should be clearly tied to achieving total greenhouse gas and VMT reductions to document or demonstrate effectiveness and ensure credibility. Also, the exemption language will need to be carefully drafted, and would include specific statutory criteria to address the full range of environmental impacts. This exemption could be a new statutory section, or RCW 43.21C.229 could be revised to incorporate this approach. Alternatively, RCW 43.21C.240 could be amended to accommodate this approach.

- *Upfront SEPA*. This idea would allow cities to elect to designate a subarea for more compact commercial, residential, mixed use or industrial development ("Subarea"). If the city: (1) designates the Subarea; (2) conducts thorough SEPA review (environmental impact statement (EIS)) of the Subarea which is a maximum build-out analysis that identifies mitigation steps to address significant environmental impacts (including climate change impacts); and (3) adopts as new Subarea development regulations that incorporate and require the climate change mitigation and any other mitigation identified in the Subarea SEPA review that is not already addressed in development regulations, then all subsequent development in the Subarea would be required to implement the climate change measures and would be exempt from any project-level SEPA or SEPA appeals. Ideally this approach would be an improved form of Planned Actions with an upfront funding mechanism. SEPA Planned Actions, RCW 43.21C.031, with an upfront funding mechanism, or RCW 43.21C.240 might be utilized to preclude project-level SEPA review.

- *Voluntary Mitigation List and "Green List" Projects*. This idea involves programs for greenhouse gas emission mitigation or mitigation measures which, if included in a project proposal, could provide certainty that greenhouse gas impacts are addressed, and thus fully or partially exempt the project from further greenhouse gas reduction requirements. For example, specific mitigation measure and programs could be included on a "Green List." "Green List" mitigation measures (or mitigation types) would be considered a positive contribution to the state's efforts to reduce greenhouse gas emissions, and as such would exempt projects from further mitigation measures. Additionally, aspects of projects or programs may have mitigating effects, and as such would be given a mitigation value that would reduce or eliminate the need to further address greenhouse gas emissions through mitigation.

- *Regional Planning*. This idea involves developing and adopting a regional or statewide Climate Change Plan (GHG Reduction Plan) that would identify the broad direction of the state's or region's approach to reducing emissions. As part of that plan process, a statewide EIS on greenhouse gas emissions, impacts, and mitigation would be prepared and could then be adopted into local plan-level EISs. The statewide EIS

would be prepared anticipating its use for regional and local planning SEPA analysis. The statewide/regional plan could identify regional targets and identify alternative ways that local agencies could translate the regional targets into local plan-level and project-level environmental analysis and significance thresholds.

The IWG recommends further analysis of the following "leveraging SEPA" idea:

- *Future Vulnerabilities/Adaption Measures in Environmental Impact Statements*. Over and above the SEPA IWG's Recommendation 8 to incorporate considerations of vulnerabilities and adaptation in the SEPA checklist (see below), the IWG suggests further analysis of the idea of incorporating these considerations into other aspects of the SEPA process. Specifically, the ideas to be analyzed are:
    - Amending the SEPA rules to require an analysis of the adverse impacts of global warming on the proposed action as part of an EIS.
    - Amending the SEPA rules to require that EISs must include and analyze an alternative that would be minimally affected by the adverse impacts of global warming.
    - Requiring reopeners or contingent mitigation for uncertain, but high cost impacts.

RECOMMENDATION 8—ANALYSIS OF FUTURE VULNERABILITIES IN CHECKLIST

Ecology should revise the environmental (SEPA) checklist to incorporate analysis of how predicted changes in the existing environment due to climate change, combined with proposed actions, may create additional impacts on the natural and built environment. Ecology should also provide accompanying guidance on how to conduct this analysis. The required analysis should be based on readily available tools and resources and not require applicants to conduct new studies. As components of this recommendation:

- The state and local governments should continue to fund and synthesize research into the anticipated regional effects of climate change.
- Ecology and other agencies should provide guidance on how to evaluate and mitigate the effects on the natural and built environment of predicted changes in the existing environment due to climate change, combined with proposed actions as part of SEPA review. Ecology and other agencies should clarify the responsibilities of lead agencies and applicants in this analysis.
- Ecology and other agencies should make tools and resources available to applicants to support the required analysis.
- Ecology should amend the SEPA checklist to require analysis of the vulnerability to climate changes of the proposed action, future adaptations that may be required to address those vulnerabilities, and the impacts of those adaptations. Key resources and sectors to be addressed are:[4]
    - Water Availability (changes in precipitation patterns)
    - Water Quality (particularly temperature)
    - Urban Infrastructure (including potential for increased stormwater runoff from increased flooding)
    - Energy Supply and Demand (due to decreased water supply and temperature rise)
    - Forests (health, productivity, fires, diversity)
    - Agriculture (particularly irrigated and dryland areas)
    - Air Quality (increased ozone, particulates, allergens)
    - Impacts due to Extreme Weather Events (flooding, windstorms, droughts, heat waves)
    - Coastlines (direct and indirect impacts from sea level rise)

[4] This list is drawn from Summary of Regional Impacts of 21st Century Climate Change (from February 2008 CAT Interim Report)

RECOMMENDATION 9—TAKING INTO ACCOUNT LEAD AGENCY RESOURCES, CAPACITY, AND CONSTRAINTS

As the CAT and Ecology develop SEPA and climate policy, they should take into account the implementation resources, capacity, and constraints of the range of jurisdictions implementing SEPA. The IWG has identified several related items in the "Future Work" section of its report that should be further addressed by the CAT, Ecology, and/or stakeholders.

RECOMMENDATION 10—TRAINING

The state should provide training and funding for training for lead agencies and applicants implementing SEPA and climate provisions. An estimated cost for training could be based on the cost of recent statewide stormwater training.

RECOMMENDATION 11—ADVISORY COMMITTEE

Ecology should address future work described in the recommendations above and the highest priority issues described at the end of this report in the "Future Work" section with the assistance of an advisory group and invite members of the IWG to participate. This committee may have subcommittees or working groups that focus on particular sectors (e.g., transportation) or issue areas (e.g., threshold determination).

4. FOUR FOCUS AREAS

4.1 Focus Area 1: Measurement and Disclosure

This area of the IWG's effort focused on SEPA's traditional processes for identifying, measuring, and reporting environmental impacts and how these processes will apply to the climate change impacts of a proposal. Elements of SEPA that fell into this category (not all of which were fully discussed by the IWG) include: categorical exemptions, the environmental checklist, SEPA threshold determinations, and the content of EISs.

Through our focus in this area, the IWG was able to categorize emissions sources, identify numerous quantification/calculation tools, and discuss options for agencies on what constitutes "significance" (for the threshold determination) in the context of climate change.

4.1.1 WHAT WE LEARNED

A. We expect that measuring and documenting climate change under SEPA will involve the following steps:

1. Identification of the proposals to be evaluated

- The types of proposals subject to climate change analysis could be the existing realm of non-exempt proposals under SEPA, a smaller subset of this list, or a broader list that includes some otherwise exempt proposals. The SEPA IWG did not make a decision or provide a recommendation on which proposals should be subject to climate change analysis. It may depend in large part on what constitutes "significant" environmental impacts in the context of climate change.

2. Identification of the types and sources of greenhouse gas emissions

    - Both project and non-project actions can affect greenhouse gas emissions. Therefore, effective use of SEPA to assess climate impacts may encompass both the "broad, enabling (top-down)" and the "sector-specific (bottom-up)" emission reduction strategies that the CAT finds equally necessary. Comprehensive planning is an example of a "top-down" approach whereas approval of an individual development project is an example of a "bottom-up" approach.
    - The sources of emissions that are most relevant to measure and disclose under SEPA vary widely across proposed actions. As a result, the IWG considered, but decided not to develop, a short list of "essential" sources that would be measured for every action. Instead, the IWG proposed the list of 16 emissions sources (see Appendix D) and an initial list of criteria for making pragmatic decisions about what to measure (see Appendix E).

    - Specific quantification of emissions may not always be necessary to consider the impacts of a specific source. For example, it is possible to know qualitatively that the production of certain building materials will result in greater emissions than production of other building materials (e.g., production of steel materials versus production of wood materials).

3. Quantification/consideration of emissions through use of calculation tools or assessment protocols

    - Technical resources, including a variety of computerized modeling tools and published emission calculation methods, are available to assist SEPA applicants and lead agencies to quantify greenhouse gas emissions.
    - However, the IWG recognizes that the required labor effort to calculate each of the 16 emission categories listed in Appendix D varies greatly, depending on the complexity of the proposed action. The IWG considered the level of effort that may be required to use existing tools and the potential burden on applicants and SEPA lead agencies. This concern is addressed in Recommendation 3, in which the IWG recommends that a new, simple set of greenhouse gas emissions tools should be developed to assist typical small-to-medium sized projects.
    - New emissions models for particular types of projects are continually being developed and the state-of-the-art quantification models are rapidly changing.

4. Consideration of different degrees of measurement rigor at different stages of the SEPA process

    - The IWG recognizes that measurement can occur at different stages in SEPA, such as at the point of determining eligibility for an exemption, during threshold determination, and during an EIS Study. The group discussed that each of these stages likely requires a different level of measurement rigor and that measurement at one stage may be carried forward to other stages. For example, if there is an extensive analysis of greenhouse gases emissions from a project conducted at an initial stage (e.g., threshold determination), then this analysis may not need to be repeated at a later stage (e.g., EIS).
    - The group also discussed that simpler methods of evaluating greenhouse gas emissions could be appropriate at earlier stages in the SEPA process (e.g., determining exemption status), with increased rigor for threshold determination, and an EIS evaluation requiring the most detailed evaluation.

B. What We Learned About Determining Significance of Environmental Impacts for Project and Non-Project Actions:

- A "threshold of significance" is a standard or set of criteria that represents the level at which a lead agency finds a particular environmental effect of a project to be significant. If the proposed action exceeds the significance threshold then the SEPA applicant has two general courses of action: (1) before the significance determination is made by the lead agency, offer voluntary mitigation to reduce emissions to below the threshold and thereby avoid the need for an EIS; or (2) prepare an EIS giving a detailed assessment of the impacts, after which the lead agency may use its SEPA substantive authority to require mitigation.
- Agencies in Washington are not currently required to adopt numeric thresholds of significance for specific environmental impacts nor does Ecology currently provide guidance on setting a standard numeric threshold. Having a consistent numeric significance standard for greenhouse gas emissions in the state would be ground-breaking.
- Although agencies in Washington are not currently required to adopt numeric thresholds, Washington State does have a common standard for significance set forth in WAC 197-11-794 that all agencies and jurisdictions use (and has been adopted by Washington courts):
    - "Significant" as used in SEPA means a reasonable likelihood of more than a moderate adverse impact on environmental quality.
    - Significance involves context and intensity (WAC 197-11-330) and does not lend itself to a formula or quantifiable test. The context may vary with the physical setting. Intensity depends on the magnitude and duration of an impact. The severity of an impact should be weighed along with the likelihood of its occurrence. An impact may be significant if its chance of occurrence is not great, but the resulting environmental impact will be severe if it occurred.
    - WAC 197-11-330 specifies a process, including criteria and procedures, for determining whether a proposal is likely to have a significant adverse environmental impact.
    - In WAC 197-11-330(3), the Department of Ecology has laid out further requirements for determining whether a proposed impact will be significant or not. See also WAC 197-11-060(4) which identifies criteria for evaluating impacts.

- A majority vote of the SEPA IWG endorsed a linkage between a SEPA significance standard and the state greenhouse gas emissions reduction requirements in RCW 70.235.020. This means that these state requirements should be considered in determining whether a proposed action meets the threshold of significance.

4.1.2 KEY DISCUSSION POINTS

What types of proposals must be reviewed for climate change impacts?

It was an operating assumption of the group (but not a decision) that all proposals that were not exempt under SEPA would be subject to review of climate change impacts.

Some IWG members expressed concern that a broad approach to climate analysis—that is, analyzing projects that would currently be exempt from SEPA analysis—would mean that current categorical exemptions and flexible thresholds would no longer apply. They advocated that proposals subject to climate change analysis should mirror those proposals subject to SEPA analysis for other environmental impacts. One member cautioned that a broader approach would not garner support from local government. Another noted that analyzing emissions from projects that would otherwise be exempt "could literally add hundreds of extra reviews a year" and that he did "not believe that the mitigation that would result from these reviews would outweigh the costs of implementation."

Other IWG members felt that all emissions being significant, all proposals, even those exempt, should at a minimum quantify their greenhouse gas emissions and present a plan for meeting the required reductions.

If there is a "green list" of projects that are not subject to the standard approach to SEPA measurement, what should be on the list?

In Recommendation 6, the SEPA IWG recommends the development of approaches for applicants to qualitatively obtain a DNS by, for example, being on a "green list." Some members raised concerns about this approach and others suggested projects that should qualify for the list.

One IWG member commented that a "green list" approach may inappropriately reward or penalize projects through the SEPA process. This member advocated that determination of what projects should be exempt should be completed through the normal process of determining statutory or regulatory exemptions.

Some members offered suggestions for green list items (e.g., long term forest management for lumber that is used for building houses), but the IWG did not generate a list of potential green list projects.

What sources of emissions should be measured? What aspects/characteristics of projects and non-projects need to be quantified or otherwise assessed for climate change impacts?

Sixteen direct and indirect sources of greenhouse gas emissions were identified and subsequently considered in a handful of "test cases" (see Appendices D and H). This exercise and subsequent discussion focused on the importance of considering the level of effort (cost, difficulty, etc.) of evaluating a specific type of emission from a specific proposal and comparing this to its contribution to climate change impacts.

The group discussed considerations and criteria for lead agencies to decide whether and how various sources of greenhouse gas emissions must be addressed for each proposal under review. The group also discussed that the list of emissions (for the purpose of SEPA review) may differ from those addressed for inventory and reporting requirements.

Some members of the IWG favored narrowing the list of emissions so that only certain emission sources need be considered for SEPA purposes (i.e., the "Scope 1" and "Scope 2" items under the WRI protocol). Other IWG members thought that the list should remain expansive but that not every project would require consideration of all sources on the list. The IWG was unable to reach consensus about how (or if) the list should be narrowed at some point in the future. As represented in Recommendation 1, as a future task Ecology will develop clear guidance about how each of the 16 emission categories should be considered at different phases of the SEPA process (i.e., disclosure, quantification, threshold determination, and mitigation) for representative types of SEPA proposed actions. This guidance would encourage the lead agency to use its discretion to select any of the categories for exceptional SEPA actions that are outside the range of typical projects.

There was disagreement among members on the adequacy of tools to measure certain sources of emissions described in Appendix D, including:

- Measuring construction emissions, at least with respect to linear transportation projects.
- Measuring loss of sinks.
- Measuring indirect and cumulative effects at the project level.

Members also raised questions about the value and feasibility of estimating embodied emissions. One member asked what the value of estimating these emissions is and said it would be better to develop a list of best management practices and energy conservation measures that can be implemented on projects to reduce emissions. Another member noted that the issue of disclosing and mitigating for embodied emissions will be very controversial. An additional member pointed out that embodied emissions for buildings are generally 13%-18% of the total embodied and operational carbon footprint.

IWG members strongly disagreed about whether it is appropriate to count indirect emissions for purposes of SEPA. Even among members that suggested counting indirect emissions, there was disagreement about which indirect emissions should be counted. One member raised the concern that VMT trips may be considered indirect and therefore not counted. She noted that, for some projects, VMT trips will be the largest source of greenhouse gas emissions. This member felt that any VMT trips created by a proposal should either: (1) not be considered an "indirect" impact, but a "direct" impact, or (2) no distinctions between considering direct or indirect impacts should be included in guidance or recommended by Ecology. An additional member noted that WAC 197-11-060(4)(d) requires consideration of direct and indirect impacts, thus indirect impacts of a proposal cannot be excluded under SEPA under current law. Another member noted that measuring indirect emissions from VMT is useful to measure at the regional scale, but is "not practical, useful (nor in some cases valid) at the project level."

Other opinions expressed by individual IWG members on the "what to measure" question included:

- Advocating that SEPA only address emissions not addressed through another mechanism; in this view, emissions that are managed through another regulatory or market system should not be analyzed under SEPA nor should they be added to the total emissions calculated against a project when making a threshold determination.
- Including consideration when doing measurement of whether there are any offsetting benefits as a result of a proposal, such as avoided or displaced emissions.

What criteria should be used to make "pragmatic" decisions about what to measure?

The initial list of criteria meant to inform agencies about what sources of emissions to measure (see Appendix E) were:

- Has the source of the emission for this proposal been addressed (analyzed and mitigated) in another SEPA document, or local, regional, or state plan?
- Can the source be credibly measured or assessed (quantified or otherwise) with the tools/information currently available?
- Can the boundary (scope or scale) of the emission be determined?
- What is relative importance (regionally, nationally, or globally) of the contribution of this emission source to climate change impacts?
- Can the proposal be modified to avoid, minimize, or otherwise mitigate its contribution of this emission source?

Some IWG members advocated striking the fourth criterion from the list ("What is the relative importance (regionally, nationally or globally) of the contribution of this emission source to climate change impacts.") One of these members said the criterion does not fit with how the term 'significantly' in SEPA has been defined.[5] The member said that if a showing of national or global impact was required, few EISs would be prepared. Other members thought that opposition to the criterion may come from confusion about what it means and said the criterion looks at the impact from the sources as a <u>category</u> rather than from emissions from an individual action. For example, if employee commute distances are a relatively large contributor to climate change impacts nationwide, then they may need to be measured as part of the SEPA process.

To what extent is double-counting a concern?

[5] The member said this definition includes the examination of at least two relevant factors: (1) the extent to which the action will cause adverse environmental effects in excess of those created by existing uses in the area, and (2) the absolute quantitative adverse environmental effects of the action itself, including the cumulative harm that results from its contribution to existing adverse conditions or uses in the affected area.

The SEPA IWG discussed the potential for double-counting on a number of occasions, but did not develop a specific approach for addressing it. The IWG discussed that some of the 16 emissions categories listed in Appendix D will cause "double counting," because the emissions would be generated by a separate upstream or downstream entity that might be subject to its own emissions reporting and emissions reduction requirements.

There were a range of views about the extent to which double counting should be of concern for the measurement aspects of SEPA. One member said that double-counting is an issue that would confound many of the steps in the SEPA process for greenhouse gas reductions (disclosure, quantification, threshold determination, and mitigation). For example, should a SEPA applicant be required to include double-counted emissions from a separate entity in its SEPA emission inventory used to compare to a quantitative significance threshold? Similarly, should a SEPA applicant be required to mitigate double-counted emissions for which the separate upstream entity is already required to mitigate its own emissions through a non-SEPA requirement such as the WCI cap and trade program? (Another member noted that SEPA specifically prohibits double mitigation.)

Other members felt the concern over "double counting" of emissions was more relevant to mitigation considerations rather than consideration of significant impacts under SEPA. This is because the impacts of a specific proposal (i.e., the contribution of emissions from the proposal) can be measured, evaluated, and disclosed regardless of whether the emissions have been "reported" or partially mitigated for in another project or planning document.

What technical resources–including calculation tools-can or should be used to assist lead agencies in quantifying greenhouse gas emissions?

A comparative list of available calculation tools was developed by the group. Characteristics of the tools included in the matrix include:

- Useful for greenhouse gas inventories
- Useful for greenhouse gas prediction and forecasting
- Measures greenhouse gas reductions from mitigation activities
- Measures greenhouse gas sinks
- Applicable for project level review
- Applicable for non-projects

Many of the tools encompass more than one characteristic and, therefore, may be more suitable for SEPA purposes.

Members also discussed other desirable characteristics of a tool and/or information that would be useful to have about a tool:

- Accuracy/effectiveness
- Ease of use
- Cost to obtain/use the tool and appropriateness of the costs to the jurisdiction using the tool
- Breadth of the coverage
- Standardization (E.g., does it use standard methods? Are users able to consistently apply it?)
- Level of effort to adapt the tool to Washington State
- Consistency with other state tools/methods (e.g., state inventory)
- Predictive ability to estimate prospective emissions

There was a "sense of the group" that simple but effective calculation tools need to be developed for use by lead agencies and/or applicants. This is a key recommendation of the IWG.
One member cautioned, however, that measurement is a complicated issue that requires sophistication, and often times the simpler the tool the more crude and inaccurate the measurement can be. The member said that

legitimate concerns about inadequate resources in some jurisdictions for handling new climate change requirements should not drive the IWG towards a simplistic approach.

Others felt that simpler calculations or more generic assessment options (e.g., generic tables of typical greenhouse gas emissions) might apply when (1) it is too costly or complex to generate more accurate calculations for particular greenhouse gas sources, (2) for smaller SEPA lead agency jurisdictions, or (3) to provide an optional default or safe harbor.

What is the role for qualitative (versus quantitative) analysis?

As reflected in Recommendation 4, the SEPA IWG recognized that quantitative tools may not always be available or appropriate, and that qualitative analysis may be necessary as an approach for assessing emissions and making a threshold determination. As stated in the recommendation, the IWG feels that Ecology should provide guidance on qualitative approaches as well as quantitative approaches. This recommendation was approved by a vote of 19 to 1 at the IWG's September 30 meeting.

The IWG member that voted against Recommendation 4 said that emissions from a project can be quantitatively measured and that a default to a qualitative analysis undermined the rigors of SEPA analysis. Qualitative analysis invited, he said, a wide disparity of treatment of similar projects by different jurisdictions and invited litigation over the sufficiency of the qualitative analysis and resulting mitigation. He cautioned that attempting to impose a "qualitative" standard may undermine the fairness of the system and lead to rewarding favored projects and project proponents while punishing disfavored projects or proponents.

Part of the discussion about quantitative versus qualitative approaches dealt with the adequacy of measurement tools. Some members felt that currently available tools could be used to quantify greenhouse gas emissions reductions—and to quantify increases or decreases in sequestration sinks—resulting from project or non-project proposals for the vast majority of future projects and non-project actions typically subject to SEPA. And, these tools could do so with a level of accuracy adequate to define significance and develop mitigation measures. In this view, the accuracy of these tools for greenhouse gas emissions is likely the same as the accuracy of similar models that have long been used for conventional air pollutants like ozone precursors; the accuracy of any given greenhouse gas emissions model depends largely on the quality of the input data.

Other members felt that measurement tools were inadequate, and that approaches for qualitative analysis were therefore necessary. These members held the view that there currently exists no perfect tool or set of tools to assess greenhouse gas for SEPA purposes. Some members identified particular areas that were more appropriate for qualitative analysis, such as embodied emissions and carbon sinks.

What level of statewide consistency for the threshold of significance can and should be established at the state level?

After considerable analysis and discussion over multiple meetings, the IWG identified and voted on six options for addressing the issue of statewide consistency in setting a significance threshold (or thresholds) for climate change impacts:

1. Implement statewide standard.
2. Use State Standard or Adopt Local Standard WITH State Sideboards.
3. Use State Standard or Adopt Local Standard WITHOUT State Sideboards.
4. Adopt Local Standard WITH State Sideboards.
5. Adopt Local Standard WITHOUT State Sideboards.
6. No Required Local Standard (in discussion, those that preferred this option said they favored developing state guidance and potentially a recommended standard even though a local standard would not be required).

The resulting recommendation on statewide consistency in threshold determination is contained in Recommendation 6, the outcome of the voting is described in Appendix B, and materials describing the advantages, disadvantages, implications, and other aspects of choices regarding threshold determination are included in Appendix I. Below is a non-exhaustive list of some of the issues raised by individual IWG members regarding the approach to statewide consistency:

- Concern that a statewide standard, while it may make sense from the perspective of achieving statewide greenhouse gas requirements, would not recognize regional differences in geography, existing policies and regulations, built and natural environments, transportation systems, economic engines, supporting infrastructure, funding, and political climates.
- Concern about not fully understanding the implications of each alternative to statewide consistency.
- Concern that a stringent threshold may eliminate existing categorical exemptions.
- Concern that the adoption of an emissions "standard" within statute or rule would be a fundamental change to SEPA. The member offering this view recommended that, while appropriate and targeted regulatory laws or rules are developed elsewhere to address greenhouse gas emissions, the state provide guidance that favors a flexible approach that allows lead agencies to develop a range of actions that establish greenhouse gas reduction goals, identify specific actions and best management practices for greenhouse gas reduction, and allow for qualitative analysis within SEPA of climate change impacts.

What type of significance standard (or standards) should be used?

The IWG discussed numerous types of significance standards—including quantitative and qualitative approaches (see Appendix I). However, the IWG did not select a particular type of standard (see outcomes of voting in Appendix B). Many members favored examining a combination of approaches or investigating additional types of quantitative or qualitative standards.

One of the approaches that attracted interest at the September 30 meeting was a "menu" option that was not fully described at the meeting. The member who suggested this alternative said that characteristics of a menu approach would include:

- A menu of standards adopted at the state level (e.g., through rule or guidance).
- The availability of the menu to be adopted in its totality or as a source from which one or more standard could be adopted or used by the local agencies in threshold determinations.
- The opportunity for the addition of standards as they are developed or the deletion of standards as appropriate.
- The opportunity to match the type of standard that is most appropriate for a given location or type of project.

The menu could include, but not be limited to, the qualitative and quantitative types of significance standards already identified by the IWG.

Below is a non-exhaustive list of opinions expressed by individual IWG members regarding the approach to significance standards:

- Significance standards based on a percent reduced from business as usual (BAU) comparison or a volume standard (e.g., tons per unit) are not well suited for linear projects (e.g., replacing a bridge on existing road) or linear infrastructure improvements.
- Because precise volume determination of greenhouse gas emissions is difficult, percent reductions based on a consistent set of assumptions will be more actionable than defining a total volume amount for a project, for a significance threshold, or for mitigation.
- A percentage reduction from BAU may not be legally defensible as a significance threshold under SEPA because two different enterprises that emit the same amount of greenhouse gases cannot be treated

differently in terms of their significance—if significance means the significance of their impact on the environment.

- SEPA lead agencies should retain current flexibility and discretion in deciding when an action may have "more than a moderate impact to the quality of the environment." The statewide guidance should encourage each lead agency to: (1) consider the context and intensity of the proposed action; (2) consider the wide range of proposed actions; (3) acknowledge areas of uncertainty in quantification of impacts and mitigation; and (4) respond to changes in regulation, science, and technology.
- The approach to significance standards could offer additional flexibility to go beyond a statewide minimum standard, targeting, for example Architecture 2030 or IPCC goals.
- The efficacy of incentives may be tied to the level of threshold. A very high threshold will not capture many projects and will not provide incentives to many opportunities to reduce.
- The approach to threshold determination and the recognition of categorical exemptions should be made by the Legislature and Governor through a specific change in the law, not left to agency guidance or rule.

How would a linkage between SEPA threshold determination and statewide greenhouse gas reduction requirements be implemented?

A majority of IWG members voted to link the threshold determination approach to state greenhouse gas emissions reduction requirements (see Recommendation 6). Many members advocated this approach as a way to tie SEPA closely to the state's overall strategy for greenhouse gas reductions. However, members also acknowledged there are a number of issues to implement this linkage, including how reduction responsibilities will be allocated. For example, one member raised questions about how this linkage would translate into responsibilities for individual jurisdictions, noting that the first step must be deciding who is responsible for reducing what amount of emissions.

What type of training should accompany new SEPA measurement and disclosure procedures?

The IWG felt that training in new procedures was important, and the IWG unanimously approved Recommendation 10 regarding provision of training and funding for training.

One member suggested that changes to SEPA procedures and requirements should not become effective without state-committed resources for training. Another member said that such a requirement would be problematic because current law probably already requires consideration of climate change impacts under SEPA. Suggesting that new SEPA procedures and requirements could be set aside pending training could lead some agencies to wrongly conclude that they are not required to incorporate climate change into SEPA analyses at this time.

4.2 Focus Area 2: Mitigation

4.2.1 WHAT WE LEARNED

- State and local agencies with jurisdiction over a proposal are authorized, but not required, to mitigate adverse impacts. Mitigation is voluntary at the threshold determination stage in the sense that, when mitigation is proposed by the lead agency, the project proponent has the option of not incorporating mitigation measures and instead receiving a determination of significance and preparing an EIS At the point of agency decisions on proposals, the agencies have authority to require mitigation but are not obligated to do so by SEPA.

- Several options that mitigate for climate change can also mitigate for other environmental impacts. For example, low impact development for stormwater protects water quality by decreasing the volume of stormwater runoff and also could decrease greenhouse gas emissions through energy conservation. Utilization of these types of strategies may offer the best potential for effective and cost-efficient mitigation of climate change impacts.

- There are a wide range of climate change strategies that are already being considered by other jurisdictions as possible mitigation for greenhouse gas emissions. Although a promising number of strategies exist, we currently have little information about the effectiveness of the individual strategies. We also have little information about the costs versus the cost savings of various strategies. These information gaps lead the IWG to recommend that Ecology publish the entire list of mitigation options without recommending specific options at this time. Ecology, along with the advisory committee, should assess effectiveness and address the cost-efficiency of various options with an eye toward developing more specific guidance at a later date.

- The CAT's recommended reduction strategies will be useful references for informing mitigation strategies.

4.2.2 KEY DISCUSSION POINTS

Should certain types of mitigation be preferred over other types of mitigation?

The IWG discussed whether mitigation options should be sequenced, for example, to: (1) avoid greenhouse gas emissions when possible; (2) reduce emissions that cannot be avoided; and (3) compensate for emissions that can neither be avoided nor reduced (for example, through the purchase of offsets). WAC 197-11-768 creates a sequencing definition for mitigation. IWG members had varying opinions on whether sequencing is desirable, largely because of varying opinions on the effectiveness of offsets as a mitigation strategy. Because of the wide range of opinions and limited time to discuss the issue, the IWG did not make a decision on mitigation sequencing or the use of offsets.

Who is responsible for enforcement and monitoring for effectiveness?

The IWG also briefly discussed the question of who should be responsible for enforcing to ensure effectiveness of mitigation measures once they are implemented. Some members expressed concern that small jurisdictions may lack the resources and expertise for robust enforcement of mitigation required for climate change impacts.

One member questioned who will be responsible for the costs of litigation that result from climate change mitigation requirements and suggested resolution of this issue as an area for future work for the IWG. Another member emphasized that, as a matter of law, the agency that is challenged is responsible for defending against that challenge. It is possible (and perhaps likely) that Ecology will assist in the defense, said the member, but Ecology's decision to do so is not an appropriate topic of discussion for stakeholders—rather, it is a decision that Ecology will make on a case-by-case basis in consultation with it's the Attorney General's office.

How does cap and trade fit in?

A final discussion point involved the issue of whether capped sources within a cap and trade system should be exempt from providing additional mitigation for greenhouse gas emissions under SEPA. The IWG also recognized the possibility of confusion and/or double regulation under cap and trade and SEPA. IWG members identified these as important questions that cannot be answered now because of the uncertainty over the details of an eventual cap and trade system. However, agencies will likely need to grapple with these issues in the future, so this may be an appropriate area for future Ecology guidance.

A member raised, and the IWG discussed, the concern that mitigation measures taken as a result of SEPA would not allow entities to use the emissions reduced under those mitigation measures as offsets or credits in a future cap and trade program.

Should it be possible to express the effectiveness of mitigation qualitatively?

Some members felt that Recommendation 5 should include a reference to Ecology developing recommendations for a qualitative analysis of mitigation effectiveness when it is not possible to conduct a quantitative analysis. Other members felt that this should not be part of the recommendation.

4.3 Focus Area 3: Using SEPA to Encourage Climate-Friendly Development

This focus area looked at concepts that may represent important opportunities to alter the way SEPA is used in order to achieve the end goals of meeting greenhouse gas emission targets. This work focused on new incentives under SEPA rather than those that already exist. For example, the SEPA IWG acknowledged that the existing option to obtain a "Mitigated Determination of Non-significance" (MDNS) was already a powerful incentive within SEPA.

The SEPA IWG waited to address this topic until after initial work on SEPA measurement and disclosure. Consequently, the IWG spent less time on it and did not discuss or vet the ideas presented to the same degree as many of the measurement and disclosure issues described in earlier parts of this report. However, the IWG was intrigued by the general idea of using SEPA incentives and disincentives to "leverage climate-friendly development."

4.3.1 WHAT WE LEARNED

- A subgroup of the SEPA IWG identified an initial list of over 30 ideas for "leveraging SEPA" and then selected six ideas to put forward to the full IWG. The full IWG voted on whether and how to recommend these ideas to the CAT; this vote became the basis for Recommendation 7. Full descriptions of the recommended ideas, as well as a table of other ideas, are included in Appendix C.

- The 30-plus ideas that arose from this focus area fell into the following broad areas:

    - Upfront SEPA, which emphasizes SEPA review at the planning level rather than the project level.
    - Expanded exemptions with reliance on local planning, which emphasizes exemptions for climate-friendly development in defined areas.
    - Regional planning, which emphasizes greenhouse gas emissions analysis or planning at a regional level.
    - Funding for planning, which addresses how to fund the advance analysis in the "Upfront SEPA" and "Regional Analysis" categories above.
    - Pre-approved mitigation measures, which, if included in a project proposal, would provide certainty that greenhouse gas impacts are fully or partially exempted from further greenhouse gas reduction requirements.
    - Disincentives, which are potential "sticks" to discourage actions that generate large or avoidable quantities of greenhouse gases or that would result in the loss of carbon sinks.

4.3.2 KEY DISCUSSION POINTS

What is "climate-friendly" development?

The IWG subgroup group did not adopt a strict definition for climate-friendly development. Generally, development approaches that increased densities in already developed areas with good access to transportation options, jobs, and services were considered favorable. Members mentioned some points of reference for determining what is "climate-friendly" such as LEED green building standards. Others felt climate-friendly development should be clearly tied to VMT and greenhouse gas reductions.

What are some of the concerns or considerations about "leveraging SEPA" ideas that should be taken into account when further developing these ideas?

Individual IWG members expressed some specific concerns or considerations about "leveraging SEPA" ideas that they felt would need to be addressed as ideas were further developed. A non-exhaustive list of opinions put forward by members is below:

- Local governments must analyze potential adverse environmental impacts and have greenhouse gas standards adopted into law before project level SEPA review is not required. That is how RCW 43.21C.240 works, i.e., local jurisdictions have adopted substantive standards that may take the place of subsequent SEPA review because pre-existing regulations or plans already have identified impacts and required mitigation to address those impacts. It would be impermissible under current law to allow local jurisdictions to truncate SEPA review without first demonstrating that existing regulations or plans have already identified greenhouse gas impacts and required mitigation to address those impacts.
- Local jurisdictions need to have shown that existing regulations (not just policies) identify and mitigate greenhouse gas impacts at the project level before local jurisdictions can avoid or reduce SEPA review at the project level.
- For "Upfront SEPA" and "Regional Planning" to work effectively, standards are needed in the Growth Management Act (GMA) and other applicable state laws. The scientific uncertainty around the solutions to global warming and the need to address new environmental problems must also be addressed. There are several alternative methods for addressing these questions.
- Given the current uncertain state of what needs to be done to address global warming, the lack of comprehensive programs to address greenhouse gas emissions, and the lack of local planning, exempting development from SEPA may increase global warming more than it decreases it. Also, exempting actions from SEPA means that we will be unable to respond to the next major environmental threat. (Other members argued that the "Upfront SEPA" idea does not exempt actions from SEPA but rather moves the SEPA process to the planning level and would impose strict standards on development to reduce greenhouse gas emissions.)
- Effectively leveraging SEPA requires certainty in the incentives or disincentives provided. The more open-ended "leveraging SEPA" provisions are, the less of an incentive or disincentive they will be.

What are advantages of emphasizing SEPA analysis at the plan level?

Some IWG members noted advantages of emphasizing analysis at the plan level rather than the project level. A non-exhaustive list of opinions put forward by members is below:

- Analysis at the plan level is one way of providing a "safe harbor" for local governments and project sponsors. Moreover, it addresses the issue of multiple SEPA reviews for the same circumstances and is in keeping with RCW 36.70B which states that "[f]undamental land use planning choices made in adopted comprehensive plans and development regulations shall serve as the foundation for project review." The Legislature went on to declare that the project review process "…should not reanalyze these land use planning decisions in making a permit decision." Analysis up front is more in keeping with the intent of the Legislature and provides a comprehensive, bigger-picture of how we address climate change in each of our communities, statewide.
- If strategies are to be implemented, I believe they need to be looked at the Plan level coinciding with required GMA updates. For the purpose of this report … I firmly believe that if these strategies are going to work they will have to be married with GMA requirements at the Plan level.
- Analyzing SEPA on a project by project basis places a burden on jurisdictions and developers to analyze development on a project by project basis without the expertise or necessary tools to do so.
- Regional plans may be most appropriate for VMT and transportation planning. Regional plans would be greatly facilitated by a statewide climate change greenhouse gas emission plan. Regional plans could then adopt the environmental analysis and goals from the statewide plan EIS.

- Doing the analysis at the planning level may allow the green list concept to incorporate certain categories of proposals (such as timber harvests within forests under long-term timber management commitments), or perhaps subarea plans where an EIS has already set the mitigation standards and directives that must be followed.
- "Upfront SEPA" is promising for transportation improvement projects. Because transportation projects are inherently connected with other roadways, evaluating the overall effects of an area's transportation projects and transit programs on emissions could be the most accurate way to conduct useful analyses. For projects included in planning-level analysis, project level evaluation could be streamlined.
- One of the real benefits of Upfront SEPA is to move dramatically beyond what SEPA now does by ensuring that the climate change and other mitigation identified as significant will in fact be achieved by development – in contrast to SEPA today, where whether or not to impose identified mitigation is strictly discretionary.
- Ecology is required by RCW 70.235.020(1)(b) to develop a statewide greenhouse gas reduction plan describing those actions necessary to achieve 2020, 2035, and 2050 emission reductions. An EIS may be required as part of the plan process. Both the plan and EIS could facilitate credible regional planning and upfront SEPA by identifying measurable regional goals or boundaries for regional elements of the statewide plan.

If there are incentives, should there also be disincentives?

Some concepts that were considered included both positive and negative elements (carrots and sticks). Some members of the IWG felt that incentives were a much more powerful tool for encouraging climate-friendly development. At least one IWG member, however, said that the scientific environmental regulation literature indicates that incentives alone, without costs, may not affect behavior very much. Other group members proposed that disincentives may also be needed and may be the natural result of incentives. For example, if some proposals are allowed to move to the front of the permitting line due to their inclusion of climate-friendly elements, others proposals will have to wait longer.

How would these proposals be funded?

The IWG did not develop specific funding proposals. However, the group recognized that any work done at the planning level needs to be funded in order to be successful. Funding is a critical consideration should policy makers opt to move forward with any of the recommendations for incentivizing climate-friendly development.

4.4 Focus Area 4: Vulnerabilities to Climate Change

4.4.1 WHAT WE LEARNED

- The SEPA review process includes an opportunity to analyze impacts of proposals in the context of a future environment altered by climate change. Mitigation options provide an opportunity to make sure that impacts from climate change are being considered upfront, and avoided or minimized when possible.
- Consideration of vulnerabilities requires not only an assessment of what vulnerabilities the proposal has due to a changing climate, but also what environmental effects will be exacerbated as a result of those vulnerabilities. The purpose of this analysis is for lead agencies to improve their understanding of future impacts by incorporating an analysis of predicted climate changes. This will enable lead agencies to improve designs and prepare long-lasting mitigation strategies. Examples include protecting water from pollution even in areas prone to floods, creating wetlands that aren't inundated by rising sea level, or designing bridge footings that resist scour due to rapid snow melt or more frequent rain-on-snow events.
- There are a variety of resources available that describe the latest predictions of how the climate may change in Washington (e.g., analysis by the University of Washington Climate Impacts Group). Because SEPA is a tool to assess vulnerability to climate change, applicable resources should be made easily

available to lead agencies and applicants. Particularly useful resources would be Geographic Information System layers showing predicted climate changes.

4.4.2 KEY DISCUSSION POINTS

IWG discussion of this issue was largely limited to it final September 30 meeting. The main points of discussion are captured in Recommendation 8 regarding the SEPA checklist and Recommendation 7, regarding further study of the idea of incorporating vulnerability and adaptation into other aspects of SEPA. Some members expressed concern that the IWG did not have enough time to talk about this topic.

5. FUTURE WORK

The Recommendations section of this report contains a number of items that the IWG proposes as future work for Ecology and an advisory committee of stakeholders. In addition to the items listed above, the IWG identifies the following additional tasks as important areas of future work by Ecology and its stakeholders. The IWG recommends that the following questions be addressed:

- Development of a roll-up matrix by Ecology (for review by stakeholders). This matrix will combine information on (1) types of projects and non-project actions, (2) the likely emissions sources arising from the actions, (3) possible tools for measuring emissions, and (4) appropriate mitigation options. The matrix will also show the current gaps in knowledge or tools. Project proponents and government agencies will be able to use this tool as a reference guide for analyzing specific types of projects under SEPA.
- An analysis of whether additional approaches to minimizing burden on certain jurisdictions (e.g., small local jurisdictions) are needed beyond the existing categorical exemptions and other features currently in SEPA—and what those approaches would be (e.g., exemptions, an additional "safe harbor," or more limited requirements for measurement or analysis used to make threshold determinations). This analysis may consider questions such as the following:
    - Should the state provide financial resources to local government to amend local SEPA procedures if that becomes necessary?
    - How will climate requirements under SEPA interact with existing requirements under the GMA?
- Should there be an approach to monitoring and evaluating the effectiveness of lead agencies' implementation of SEPA and climate change procedures in helping to achieve greenhouse gas reduction standards? If so, what should this approach be?
- Treatment of "avoided emissions" and "net emissions" within the contexts of measurement, disclosure, and mitigation.
- Development of a training plan for lead agencies and applicants to address climate change impacts through SEPA.
- Based on progress within other workgroups, potential work on integrating SEPA with other recommendations on topics such as land use and transportation planning.
- Development of guidelines for the use of planning level SEPA (non-project) to inform project greenhouse gas evaluations, including how decisions under SEPA relate to the requirements of the GMA.
- Work to clarify the relationship between threshold determination and state greenhouse gas reduction requirements.

6. ADDITIONAL IWG MEMBER COMMENTS

Some IWG members provided comments on initial drafts of this report that were not incorporated into the text of the report but provide additional perspective on the IWG's work and outputs. Those comments are captured below.

- "How does the climate change effort fit in with existing laws? What is the context of these recommendations in combination with other state mandates and laws? The Growth Management Act applies to all counties and cities in the state. More than half of these are required to fully plan under the Act. These counties and cities, and the remaining counties and cities, also plan under enabling legislation including RCW 35.63, 35A.63 and 36.70. How does the climate change effort get coordinated with these laws?"
- "For project-level review, it is important to remember the context under which local governments process permits. RCW 36.70B provides two important statements of legislative intent applicable to the recommendations of the SEPA IWG. These are:
    - The increasing number of local and state land use permits and separate environmental review processes required by agencies has generated continuing potential for conflict, overlap, and duplication between the various permit and review processes." RCW 36.70B.010(2).
    - This regulatory burden has significantly added to the cost and time needed to obtain local and state land use permits and has made it difficult for the public to know how and when to provide timely comments on land use proposals that require multiple permits and have separate environmental review processes." RCW 36.70B.010(3)."

- "How do the recommendations of the IWG address requirements for expeditious permit processing? RCW 36.70B.080 requires local governments to establish timeframes for permit processing. Most local governments retained the 120-day requirement of the original legislation, and it is politically impractical to amend this. How does adding another review requirement help local government achieve processing timelines? How does adding another review requirement fit into our efforts to improve the affordable housing picture in our state? These are questions that local governments will need to grapple with should changes be made to SEPA procedural requirements."

- "I remain uncertain as to the overall context of the state's climate change initiative. It is not enough to state that we have a goal of 'X' without articulating what it is we want our communities to look like, how we envision them modifying past practices and how we anticipate that they will thrive as a result. Our task may have focused on the role of SEPA, yet, can the state let us know what they want this to look like?"

- "It is well past time that SEPA be given a major overhaul. Making tweaks to it does not improve its effectiveness as a disclosure, evaluation and decision-making tool. After the efforts of the several key commissions (Growth Strategies, Land Use Study, etc.), after the adoption of the Growth Management Act and even after the adoption of new shoreline master program rules, I honestly thought that we, as a state, could muster the energy to improve our environmental review process; to orient it more in line with newer laws, newer approaches and newer philosophies. Instead, we are stuck with the 1970's attitude that somehow we can protect the environment one project at a time. I cannot identify anyone that benefits from this approach. SEPA is underutilized; and still at times it is used as a tool of obstruction. Both of these dilute the effectiveness of environmental review and the public's respect for the environmental review process."

- "The SEPA IWG has done an amazing job of identifying and narrowing issues and collecting data, but it has not had the time within the very aggressive schedule it was given to work through the recommendations. In other words, we are just getting to the most important work of the group. This initial draft report acknowledges that IWG members are seeing these recommendations for the first time. More time is needed to flesh out, refine, and decide upon specific recommendations … We request that the report

include an additional recommendation in which the CAT extends the duration of the SEPA IWG so that it can adequately complete its tasks." (Note: this comment was accompanied by further comments that the SEPA IWG, not Ecology, should (1) develop a draft revised SEPA checklist and measurement guidance, (2) guidance on the effectiveness of mitigation options, and (3) the treatment of avoided emissions and net emissions.)

7. ECOLOGY GUIDANCE OUTLINE (DRAFT)

SEPA Guide to Addressing Climate Change
Technical Assistance for Lead Agencies, Applicants, and Reviewers

1. **Forward**

2. **Purpose, Introduction, and Background**
    a. Why use SEPA to address greenhouse gas emissions?
    b. What are the impacts associated with Washington's emissions?
    c. What is the connection to other strategies addressing climate change?
        i. Overview of how SEPA fills the regulatory gap (using graphic timeline)
        ii. Climate Change legislation
        iii. Climate Action Team strategies
        iv. Western Climate Initiative
        v. State and Regional Climate Change Plans
    d. What types of climate change impacts are associated with projects and non-projects?
        i. Impacts from proposal's direct and indirect greenhouse gas emissions
        ii. Additional "vulnerability" impacts from proposal from changing climate conditions
    e. When should climate change impacts be addressed?
        i. Non-Project (including phased review, rules, etc.)
        ii. Project

3. **Brief Overview of SEPA Process (with links to handbook, rules, and statute)**

4. **Identifying Types of Proposals that Impact or are Vulnerable to Climate Change**
    a. Project and Non-project
    b. Non-exempt projects and non-exempt agency actions
    c. Placeholder for phased review, exemption issues, "green list," approaches in statewide plan, etc.

5. **Initial Screening and Evaluation of Emissions**
    a. Sources of Emissions
    b. Quantification and qualification of emissions
    c. Calculation tools
    d. Protocols for non-quantitative assessment
    e. Use of a Climate Change Worksheet to accompany SEPA's *Environmental Checklist*
6. **Considering Mitigation**
    a. Non-project
    b. Project

7. **Making the Threshold Determination**
    a. Recommended significance standard
    b. Alternative approaches for significance standard
    c. Mitigated Determination of Non-significance (MDNS)
    d. Determination of Non-significance (DNS)
    e. Determination of Significance (DS)

8. **Analyzing Alternatives in an EIS**

9. **Post-SEPA Agency Decision Making and Applying SEPA Supplemental Authority**
    a. Overview of SEPA supplemental authority process
    b. Applicable SEPA policies
    c. Agency responsibilities
    d. Using MDNS
    e. Using DNS
    f. Using EIS

Appendices

A. Sample summary of climate change impacts for use in SEPA documents
B. Roll-up matrix of sources of emissions, calculation tools and generic emission tables, and mitigation options
C. SEPA Checklist Greenhouse Gas Emissions Worksheet
D. Additional Information Links

Appendix A: SEPA IWG Scope of Work

Goal

The purpose of the SEPA working group is to provide a forum for members of the Climate Advisory Team and other stakeholders and government representatives to develop recommendations to ensure that consideration of climate change is included in the State Environmental Policy Act processes and documents. The recommendations would clarify how, where, and when to best address climate change in the state and local government (referred to as agencies) SEPA processes.

While not completely certain, the Department of Ecology believes, and the co-chairs of this SEPA IWG concur, that SEPA already requires an assessment of a proposal's potential impact on climate change. This includes a description of the proposal's likely affect on emissions of greenhouse gases and how environmental change that has already occurred or is likely to occur in the future as a result of climate change might impact the proposal.

SEPA requires agencies to act "to the fullest extent possible" when assessing the environmental impact of a proposed action. The current SEPA rules include "climate" as an element of the environment that should be included in assessing a proposal's environmental impact. Yet, environmental review documents rarely, if ever, discuss climate change. In other states and nationally, litigation has been initiated challenging SEPA-like environmental review documents and, to our knowledge, every court that has reviewed the question has ruled that NEPA and state equivalents do, in fact, require an assessment of the climate change impacts and implications raised by the proposed project. This kind of litigation has now been initiated in Washington.

Rather than leave this issue to the Courts, the CAT has recommended that a committee of stakeholders be formed to prepare recommendations on changes to SEPA rules, guidance and/or environmental review documents (EISs; environmental checklist, DNS, MDNS, etc.) to provide clarity and predictability to project proponents and administering agencies regarding how climate change is to be addressed through the environmental review process.

Tasks

There is currently no guidance on how to address climate change under SEPA. The SEPA working group should focus initially on the following questions:

1. What is needed, in terms of SEPA rule amendments, including possible changes to the environmental checklist, threshold determination and/or Environmental Impact Statements, policy statements of guidance to provide clarity and predictability in appropriately addressing climate change in the environmental review of project or non-project actions?
2. What information and/or guidance can be provided to help administering agencies quantify and analyze the impacts of greenhouse gas emissions <u>from</u> their actions, as well as the impact of climate change <u>on</u> their actions?
3. What guidance should be provided to agencies and project applicants to determine possible mitigation for the effects of the proposal on climate, as well as the impacts of climate change on the proposal?
4. What guidance should be provided to agencies and local governments to help determine when substantive SEPA authority might impact the approval or placement of conditions on projects?
5. Should the SEPA environmental review process itself be used as an incentive to promote climate friendly actions. For example, should residential development that is consistent with approved GMA comprehensive plans and development regulations and that promote density, infilling and avoid

sprawl and commute dependant communities be exempted from or otherwise expedited under SEPA?

The SEPA working group will produce:

- Recommended policy direction, new agency guidance, proposed revisions to SEPA forms, and other appropriate direction regarding how, where and when to identify, quantify, evaluate, and mitigate impacts of greenhouse gas emissions from actions and projects and impacts of climate change on proposed actions/projects.
- Recommended changes to the SEPA rules, and draft amendment language.
- Other policy recommendations crafted to better utilize SEPA itself and SEPA as it applies to land use and transportation decisions in particular to improve its use as a tool to reduce emissions of greenhouse gases.

Ecology currently intends to file the draft rule amendment with the state Code Reviser by January 2009, with adoption by May or June 2009

Existing work that the IWG may draw from

- With the passage of ESSB 6001 'Climate change – Mitigating Impacts', and E2SHB 2815 'Creating Framework for Reducing Greenhouse Gases Emissions in the Washington Economy' the Legislature acknowledged the environmental impacts of climate change and directed the state to reduce Washington's contribution to greenhouse gas emissions.
- The Climate Advisory Team (CAT) and the Technical Working Groups (TWGs) recommended that SEPA be used as a tool for identifying greenhouse gas emissions and mitigation options in decision making, planning processes, and development projects.
- The Preparation and Adaptation Working Groups (PAWGs) recommended that SEPA be used to analyze and address the impacts of climate change on governmental actions and public and private projects.
- Director Manning's Letter to lead agencies.
- Across the nation many states and local governments are developing environmental policies, regulations and guidance to address climate change through their SEPA-like statutes. Some of these actions arose from court challenges. Ecology has determined it is in everyone's best interests to act now to avoid a "policy by litigation" scenario in Washington State.

Connectivity to other efforts/legislation

- ESSB 6580 'Addressing the impacts of climate change through the Growth Management Act': Section 2 of ESSB 6580 directs the Department of Community Trade and Economic Development to work with the Washington State Department of Transportation to reduce VMT through land use modeling and planning strategies. This IWG will not work on those issues, but will keep track of ESSB 6580 activities and products.

Co-Leads

- Jim Lopez, King County
- Dick Settle, Foster Pepper
- Jeannie Summerhays, Ecology

Appendix B: Threshold Determination Voting

Below are the outcomes of the September 30 IWG meeting votes on four threshold determination topics. This voting is reflected in Recommendation 6.

A. *In regards to statewide consistency in setting significance standards, what should the state require lead agencies to do?*

The IWG conducted two rounds of voting. In the first, members were asked to select their one favored choice. In the second round—after discussion of the outcomes of the first round—members were asked to identify both their first and second choices.

Response Option	First Round (20 members voting)	Second Round (37 votes cast for 1st and 2nd choices)		
		1st choice	2nd choice	Total of 1st and 2nd choices
1. Implement statewide standard	3	1	1	2
2. Use State Standard <u>or</u> Adopt Local Standard WITH State Sideboards	**9**	8	10	**18**
3. Use State Standard <u>or</u> Adopt Local Standard WITHOUT State Sideboards	2	6	3	9
4. Adopt Local Standard WITH State Sideboards	0	0	2	2
5. Adopt Local Standard WITHOUT State Sideboards	0	0	1	1
6. No Required Local Standard*	3	3	2	5
7. Don't know/Can't decide at this point	3	0	0	0

Note: Choices 1-5 would require lead agencies to set a significance standard.

*During discussion, those voting for this choice said they preferred an approach where the state would play an active role in providing guidance about options for standards and possibly even a model standard—even though there would be no requirement that lead agencies set a standard.

B. *If there is some type of statewide standard (required or optional), what type of standard should it be?*

Response Option	Number of votes (21)
1. Percentage-based (e.g., % reduction from business as usual)	2
2. Volume-based (e.g., tons/unit, tons/year)	0
3. Hybrid of percentage and volume	7
4. Other type of standard/combined standard	**10**
5. Don't know/Can't decide at this point	2

Of those that picked option #4 (Other type of standard/combined standard), nine said they were attracted to the idea of a "menu" approach that would potentially combine a number of different types of standards.

When voting on options for the type of statewide standard, IWG members acknowledged that they had already voted to provide a complementary qualitative option for achieving a Determination of Non-significance (see Decision C below, which preceded the vote on Decision B).

C. *Should the IWG recommend that Ecology and its stakeholders develop approaches that allow proposals to qualitatively achieve a "Determination of non-significance" (e.g., a "green list," conformance with a climate plan, etc.). (Note: specific approach would be determined later.)*

- Yes: **19 votes**
- No: 0 votes
- Don't know/Can't decide at this point: 1 vote

D. *Should the state link the significance standard (or standards) to the state's greenhouse gas emissions requirements in some way?*

- Yes: **14 votes**
- No: 6 votes
- Don't know/Can't decide at this point: 1 vote

Appendix C: "Leveraging SEPA" Voting and Ideas

C.1 Voting on "Leveraging SEPA" Ideas

At the IWG's September 30 meeting, members voted on how to present a set of six "leveraging SEPA" ideas to the CAT. This voting is reflected in Recommendation 7. These six ideas were identified by individual participants in a subgroup of members and technical staff as the most promising ideas among a larger set identified by the subgroup. At the September 30 meeting, IWG members were asked to vote, for each idea, on whether the IWG should:

- Recommend it to the CAT as a promising idea
- Recommend it to the CAT as an idea that is potentially promising but needs further analysis, or
- Not recommend it to the CAT

The decision of whether and how to recommend the idea was based on a plurality of votes. Below is a summary of the outcomes of the vote.

"Leveraging SEPA" Idea	Recommend to CAT	Recommend for further analysis	Do not recommend	# of Members Voting
1. Neighborhood, District-level Exemptions	**13**	6	1	20
2. Upfront SEPA	**16**	3	0	19
3. Mitigation – Voluntary Mitigation List and "Green List" Projects	**13**	7	0	20
4. Leveraging Existing Categorical Exemptions	1	7	**12**	20
5. Future Vulnerabilities/Adaption Measures	1	**10**	9	20
6. Regional Planning	**11**	5	3	19

C.2 Description of "Leveraging SEPA" Ideas Recommended to the CAT

This subsection contains written descriptions of each of the ideas put forward by the IWG in Recommendation 7. These descriptions were written by individual IWG members, with review and some discussion by other members of a subgroup working on approaches to "leveraging SEPA." The descriptions provided here have not, however, been fully discussed or approved by the full IWG. Indeed, IWG members have raised a number of questions about each idea and specific aspects of the descriptions.

Specific disagreements with these write-ups or uncertainties about them that arose within the subgroup or full group discussions are identified in the subsection of each write-up titled "Areas of disagreement, uncertainty or ongoing discussion." Other, more general disagreements and considerations raised by other IWG members are contained in the "Key Discussion" section 4.3.2 of the main body of this report and noted in the text below.

Neighborhood, District-level Exemptions

Description of idea: Exemptions are a powerful tool for encouraging climate-friendly development. They reduce project risk and costs associated with both litigation and preparing SEPA documents. When carefully drafted, they can help achieve the objectives of local government, environmental interest groups, and developers.

To utilize this strategy, SEPA would be amended to authorize jurisdictions to provide a "neighborhood, district-level exemption." This would be for municipally designated areas within UGA's, where property owners agree to comply with statutorily set minimum sustainable development standards. The standards would require compact, connected, walkable neighborhoods, with good jobs ratios, open space, a wide variety of uses; transit supportive residential densities; and high performance buildings and infrastructure. To fully leverage the exemption, it would apply to both the government's "neighborhood designation" decision and implementing development projects.

This exemption could be a new statutory section, or RCW 43.21C.229 (the infill exemption) could be revised to incorporate this approach. The revisions would establish sustainable development prerequisites and expand the uses the exemption applies to, but limit its applicability to municipally established "districts." The language providing for a plan EIS would not apply, because more comprehensive criteria would be set for meeting the exemption.

Areas of disagreement, uncertainty, or ongoing discussion: Issues raised are: (1) ensuring jurisdictions can require adequate mitigation, in cases where they have traditionally relied on SEPA; and (2) ensuring that if new issues arise, the municipality has the ability to address them. Also, the exemption language will need to be carefully drafted, and would include specific statutory criteria to address the full range of environmental impacts.

Other specific issues raised by IWG members include:

- It would be inconsistent with both SEPA and GMA to allow jurisdictions to create neighborhood designations without SEPA review being done for the original designation. Exempting both the original neighborhood designation and the implementing development projects as proposed would mean that other government agencies and the public would never have an opportunity to raise any issues related to environmental impacts of the designation or a project at any point in time. There would also be no way to assure the exemption is being used properly.
- Any exemption should be clearly tied to achieving total greenhouse gas and VMT reductions to document or demonstrate effectiveness and ensure credibility.

What this idea will accomplish: The exemption: (1) makes SEPA's approach to climate clear and predictable and reduces future litigation; and (2) is a powerful incentive SEPA has available for reducing greenhouse gas emissions and future impacts related to changing climate.

Strengths and weaknesses of idea: *See* description above, and questions to be addressed.

How this idea could/would be implemented: Local jurisdictions would implement this strategy, by designating the geographic area the exemption would apply to, in concert with property owners, and consistent with statutory criteria. Future development within the district would then be required to comply with the sustainable development standards.

Description of necessary funding or changes to statue/rules: Statutory amendment needed. No new funding necessary.

Additional information or analysis needed: Draft legislation needed to develop the details embodied in this general concept.

Upfront SEPA

Description of idea: Allow cities to elect to designate a subarea for more compact commercial, residential, mixed use or industrial development ("Subarea"). If the city: (1) designates the Subarea; (2) conducts thorough SEPA review (EIS) of the Subarea which is a maximum build-out analysis that identifies mitigation steps to address significant environmental impacts (including climate change impacts); and (3) adopts as new Subarea development regulations that incorporate and require the climate change mitigation and any other mitigation identified in the Subarea SEPA review that is not already addressed in development regulations, then all subsequent development in the Subarea would be required to implement the climate change measures and would be exempt from any project-level SEPA or SEPA appeals. As with Planned Actions, a verification step would occur at the project stage (e.g., review an environmental checklist to verify the project meets the description and regulations and that no unanticipated significant adverse environmental impacts are associated with the project).

Developers would be required to pay their proportionate share of the Subarea SEPA review. Ideally this approach would be an improved form of Planned Actions with an upfront funding mechanism.

Areas of disagreement, uncertainty, or ongoing discussion: Planned actions are a very good idea in concept but have had some challenges in implementation. Any solution should be designed to address implementation challenges associated with Planned Actions.

Since proposals can have many impacts, not just impacts to climate, the planning phase analysis would need to address all environmental issues with subsequent development implementing those measures. Whether and how planned actions, or a similar proposal, can address unknown, but significant, future environmental impacts or scientific uncertainty over global warming and the necessary responses is a concern.

It is unclear whether this could fit in with Planned Action requirements and/or only require some minor modification.

What this idea will accomplish: This idea will encourage and support good, non-project environmental analysis, which is where we can best use SEPA to address the incremental/cumulative effects of greenhouse gas emissions. It will provide predictability to proponents and to the public. It provides more predictability about the quality of the environmental analysis because an EIS will be prepared that links implementation of mitigation between the non-project and project. Properly implemented, this idea will also help jurisdictions decide what appropriate development looks like for a particular area, given the environmental issues of that area, while non-project or project planning is in the design phase.

Strengths and weaknesses of idea: The Urban Land Institute Reality Check concluded that land use related greenhouse gas emissions could be reduced through density, compared to business as usual, as part of the movement to State 2050 requirements. The Center for Clean Air Policy has predicted that smart growth, Brownfield infill development, and transit oriented development can reduce VMT by as much as 3% to 50%. In areas where there is a market and a jurisdiction completes the steps, this will create a very powerful incentive for developers to step up and invest sooner than would otherwise be the case.

How this idea could/would be implemented: This idea would occur as part of a local agency's planning and would focus on a subarea in the jurisdiction. This approach provides an alternative process from the standard SEPA process for project level environmental analysis and threshold determination. One IWG reviewer suggested that it would be linked with statewide greenhouse gas emission requirements and goals for total vehicle miles traveled in the analysis or as part of a larger plan's analysis.

Description of necessary funding or changes to statute/rules: A key challenge will be to identify the upfront funds to enable interested jurisdictions to conduct the subarea SEPA review. These measures would require initial financing/loan to assist participating cities with the upfront cost of subarea SEPA review; this cost would be reimbursed over time by developers. Perhaps there could be some kind of revolving account that would be reimbursed as developers pay on the loan.

These measures may require amendments of SEPA provisions and rules.

Additional information or analysis needed: More work is needed to explore why current law and rule provisions allowing for SEPA at the planning stage haven't been implemented as fully as envisioned.

Voluntary Mitigation List and "Green List" Projects

Description of idea: Mitigation measures that adequately address greenhouse gases up front are one way in which the state can create a clear path for project proponents to meet their obligations for greenhouse gas reductions. This type of mitigation strategy can reduce the administrative burden of the State while still allowing for goal attainment. By creating relatively clear and unambiguous options for compliance, the state would be incentivizing applicants to do their part to meet the state's greenhouse gas reduction requirements.

Programs for greenhouse gas emission mitigation or mitigation measures which, if included in a project proposal, could provide certainty that greenhouse gas impacts are addressed, and thus fully or partially exempted from further greenhouse gas reduction requirements. For example, specific mitigation measure and programs could be included on a "Green List." "Green List" projects (or project types) would be considered a positive contribution to the state's efforts to reduce greenhouse gas emissions, and as such would be exempted from further mitigation measures. Additionally, aspects of projects or programs may have recognized mitigation impact, and as such would be given a mitigation value that would reduce or eliminate the need to further address greenhouse gas (a mitigation alternative list). One potential mitigation category is as follows:

> Project alternatives in design and/or construction: Includes voluntary alternatives such as LEED/Green Globe certification and strategies; construction-transportation techniques; use of recycled materials, waste reduction, local materials; urban in-fill, Brownfield development; and use of VMT-limiting elements such as high transit use and work-live space.

Areas of disagreement, uncertainty, or ongoing discussion: This idea may be subject to uncertainty relative to science and policy. First, rapidly changing scientific evaluative techniques may lead to instability in the valuation of mitigation alternatives. This weakness may over or under inflate the value of such an alternative. Second, the trade-offs inherent in potential inclusions (particularly "Green List" inclusions such as on-site energy production) will need to be debated in the public arena, and, as such, will be subject to evolving community values.

Mitigation/green list and mitigation effectiveness would need to be clearly linked with any statewide greenhouse gas and VMT reduction plan or requirements.

What this idea will accomplish: This idea will accomplish two primary objectives: First, it will make SEPA's approach to climate clear and predictable and reduce future litigation. By laying out a clear path for compliance through a "Green List" or a list of project/program aspect with mitigation value, the process will be simplified for applicants. This "user friendly" framework will encourage its use.

Second, by encouraging the use of a "Green List" approach, greenhouse gas production will be reduced in the present and we will likely see a net benefit into the future.

Strengths and weaknesses of idea: This idea has several strengths. First, it provides a very clear path in which a project proponent can comply. Second, to the extent that the mitigation measures are voluntary, it provides an incentive for participation. Third, this idea also provides a catalyst for important public policy debates regarding the priorities of the state or local jurisdiction. Fourth, the simplicity of using a "Green List" will reduce the administrative burden typically associated with new initiatives.

The weaknesses of idea are threefold. (1) As discussed above, there are questions as to the valuation of mitigation alternatives given the nature of the underlying science. (2) Also discussed above was the concern over policy considerations with specific potential "Green List" inclusions. (3) The question of at what level of government or with what guidelines the development of specific inclusions to the "Green List" or the mitigation alternative list would need to be settled.

How this idea could/would be implemented: The "Green List" and mitigation alternative list could be implemented through the checklist. That is, if a project was included on a "Green List" it would simply note that on the form. Additionally, a project proponent would denote the mitigation alternatives it was implementing along with the value of that alternative and that would satisfy the documentation requirement.

Description of necessary funding or changes to statue/rules: Could be implemented through SEPA or non-SEPA legislation.

Additional information or analysis needed: Critical to this concept is the mitigation value of the specific mitigation alternative or "Green List" inclusion. The lists would need to be developed and valued prior to implementation. Amendments to the underlying lists could be made on an ongoing basis.

Regional Planning

Description of idea: Develop and adopt a regional or statewide Climate Change Plan (GHG Reduction Plan) that would identify the broad direction of the state/region. It can be incorporated into local planning and environmental analysis. As part of that Plan process, prepare a statewide EIS on greenhouse gas emissions, impacts, and mitigation that can be adopted into local plan-level EISs.

The statewide EIS would be prepared anticipating its use for local planning SEPA analysis. The statewide/regional plan could identify regional targets and identify alternative ways that local agencies could translate the regional targets into local plan and project level environmental analysis and significance thresholds. If the regional analysis is done separately, another product/effort would need to be implemented to ensure the regional piece is done and that it is consistent with the statewide effort.

Areas of disagreement, uncertainty, or ongoing discussion: There has not been a lot of discussion of this idea. This approach is a very good one in theory but can have challenges during implementation. For example, the products of regional planning could be flawed/incomplete and not provide the information that local jurisdictions need. Or local and state agencies could decide they disagree with the product and do very little or something completely different. Local/state agencies could use the information inappropriately to meet the basic requirements, without effectively accomplishing the purpose of addressing climate change. In those cases, there would be no efficiencies or effectiveness achieved.

The products of this idea could be "tested" to ensure their usability for agencies of varying size. The products would need to include good tools/direction on how to incorporate them into local planning and project analysis. This idea would benefit from some mandatory procedural "checks" to make sure they are appropriately implemented to achieve greenhouse gas reductions.

On commenter noted that he needed to give more thought to the plan consistency requirement. He had thought of this as more of a SEPA EIS product analyzing a range of climate change issues at the regional or state level, and as a product smaller jurisdictions could adopt this analysis by reference for whatever efforts they are undertaking. A consistency requirement, he felt, is a little more directive, and may engender opposition by local governments for a variety of reasons. It also could turn out to be a litigation opportunity. He felt this issue raised the larger question of what climate change specific standards, if any, will be proposed by CAT or others. Who will develop them? He said the larger SEPA IWG and CAT are or will zero in on these, and whatever outcome is reached will have to circle back to this regional planning piece.

What this idea will accomplish: This idea will: (1) assist local jurisdictions to address greenhouse gas emission and climate change issues,(2) help ensure that climate change is addressed at all levels of government, and (3) increase consistency and predictability for the public and applicants.

A state level plan and environmental analysis will save money by eliminating duplication. Other agencies can use the work rather than recreate it. It will reduce challenges, because once the state plan and analysis is completed and has passed any challenges that might arise, it will be a solid foundation for other jurisdictions to build on. Applicants will be happier, because approaches and requirements across the state will be more similar and predictable. Also, their proposals/permits will be more defensible and less likely to fail a challenge. The public will have more confidence in a smaller jurisdictions adherence to SEPA if the smaller jurisdiction uses the statewide documents as their foundation.

Local consideration of greenhouse gas emissions/climate change will have a greater chance of getting done and getting done correctly by jurisdictions, if they have assistance in the form of cost savings and useful information/environmental analysis. A statewide plan and environmental analysis will help us make sure we have looked at all the issues together so when local work is done it will be part of a bigger plan that makes sense and has been thoughtfully prepared to be effective.

When this approach includes regional targets and alternatives for implementing those regional targets, it would provide the middle step that connects the high level planning with local level planning and projects.

Strengths and weaknesses of idea: This activity would require no changes in laws/rules but would require substantial funding for the statewide effort. However, this idea could be incorporated into any statewide plan that might be underway. Producing the document would take some time and would be less useful, the longer it takes. However, costs would increase if we tried to shorten the timeline for completing the plan.

Creation of statewide or regional plans supports SEPA's purpose to address gaps and would be flexible to accommodate new science and tools. If implemented as intended, it would increase appropriate analysis and good proposals. It would particularly help jurisdictions with funding or climate change/SEPA technical expertise challenges. Also, it would save agency time during planning.

Since the plan would include an EIS, some level of assurance that the plan itself has properly conducted SEPA might be inherent.

How this idea could/would be implemented: A specific agency would be assigned for developing the statewide/regional plan and preparing the programmatic EIS. (For example, Ecology is already developing a plan for the Legislature that describes reduction measures that can be taken using existing authority plus any additional authority granted by the Legislature.) The agency would coordinate heavily with current regulatory efforts to address climate change, as well as with all stakeholders. The effort would include SEPA templates/guidance for implementation (SEPA analysis) at the local level. The statewide analysis and plan would then be used during local and state planning (e.g., comprehensive planning, transportation planning, forest planning, etc.).

Description of necessary funding or changes to statute/rules: Funding would be a critical need for this effort. No statutory or rules changes would be required although they may be important to ensure the product is effective. Rule changes could include: a requirement for consistency with the plan.

Additional information or analysis needed: A well thought out plan, that considers how this statewide/regional plan and environmental analysis will translate down to the later planning and project levels, would be essential for ensuring this product is useful and used by state and local agencies.

"Region" needs to be better defined. Does it mean one county or does it mean a group of counties that could have similar situations or similar approaches for addressing climate change? Or, a region might be a group of counties working together to translate their regional amounts into jurisdictional emission amounts and formulas for local planning and permitting (regional transportation planning organizations or MPOs?).

C.3 Description of "Leveraging SEPA" Idea Recommended to the CAT for Further Analysis

Note: the ideas put forth for further analysis in Idea #5 are those not already covered by the SEPA IWG Recommendation 8.

Future Vulnerabilities/Adaption Measures in Environmental Impact Statements

Description of idea: Studies show that Washington is already experiencing the adverse effects of global climate change. As global warming continues we will experience flooding due to sea level rise and more winter precipitation falling as rain rather than snow. Our water supplies will be reduced and we will experience many other impacts. SEPA can be used to assess and reduce the impacts of these existing and future vulnerabilities on proposed actions. This could be done by:

- Continuing to fund research into the probable effects of global warming.
- Continuing to synthesize research into the probable effects of global warming and providing information to decision makers.
- Providing guidance on how to anticipate and mitigate the adverse effects of global warming as part of SEPA review.
- Amending the SEPA rules to require an analysis of the adverse impacts of global warming on the proposed action as part of an EIS. This may already be required, but is not explicitly identified as a requirement.
- Amending the SEPA rules to require that EISs must include and analyze an alternative that would be minimally affected by the adverse impacts of global warming.
- Requiring reopeners or contingent mitigation for uncertain, but high cost impacts. Some impacts, such as what will be the future flood heights in or near our current flood plains, are unknown but will have significant adverse impacts on proposed actions. The SEPA rules could be amended to require reopeners or contingent mitigation that would require an analysis of this impact if an event occurs or when information becomes available. Or a reopener or contingent mitigation could be imposed as an MDNS or EIS mitigation requirement. For reopeners or contingent mitigation to work, monitoring would be required and a contingency plan prepared that includes identified, implementable, and effective mitigation. The contingency plan would have to be identified up front with the required monitoring.

These could be mitigation measures that if included in a project proposal would provide certainty that greenhouse gas impacts are fully or partially exempted from further greenhouse gas reduction requirements. Or they could be required mitigation that some or all non-project or project actions would have to implement. Some options, such

as funding research or the synthesis documents, could be information that is made available to action proponents and the proponent could choose to act based on the information or not.

Areas of disagreement, uncertainty, or ongoing discussion: Members did not agree on whether additional SEPA exemptions or requirements are desirable. These options could be voluntary, incentives for an exemption, or required. Other questions include whether the requirement for more analysis or another alternative should only be required for non-project EISs and whether reopeners should be applied to project actions or even any actions.

What this idea will accomplish: This proposal will reduce the adverse impacts of climate change on project and non-project actions. This will increase protection for people and property and reduce future costs for proponents and the public. For example, siting a building or highway outside an area likely to be inundated by sea level rise will save lives and reduce property damage.

Strengths and weaknesses of idea:

Strengths: Since regulations do not cover many greenhouse gas emissions, requiring an analysis of the impact of global warming on the proposal, a least impacted alternative, reopeners, or mitigation would further SEPA's umbrella and gap filling role. These measures would be linked to available scientific information and methods. No particular science or tool is required, which allows agencies to retain the flexibility to use better tools. These measures could apply statewide, achieving consistency and predictability. Litigation may be avoided, but there may be litigation over whether these requirements are being met. These ideas may increase SEPA compliance costs, but decrease operation and maintenance costs, and the need to relocate or replace a project. These ideas, if properly implemented, would better protect people and property. Reopeners increase uncertainty and may make some project actions infeasible.

Weaknesses: Some options would reduce agency discretion. Some of these options will be controversial.

How this idea could/would be implemented: See the description of the idea above.

Description of necessary funding or changes to statue/rules: Some options, such as funding research or preparing synthesis reports, would be information made available to action proponents. Guidance on how to determine future effects would be a guidance document. Others would require amendments to the SEPA rules. Additional research and synthesis reports, and the guidance would require additional funding. The SEPA rule amendments may or may not require additional funding.

Additional information or analysis needed: (1) What global warming impacts should trigger the reopeners or require contingent mitigation? (2.a) When would a reopener occur, after the proposal is implemented? (2.b) How would the new analysis be used? (2.c) Would the proponent have to shut down the project?

C.4 Other "Leveraging SEPA" Ideas Identified by the SEPA IWG

The SEPA IWG generated over 30 ideas for "leveraging SEPA" through incentives and disincentives. These are described in the table below. Five of these ideas were further elaborated in the previous section of this Appendix. An additional "leveraging SEPA" idea was raised by a CAT member and discussed by the CAT at its October 14-15, 2008. This idea involved giving applicants the option of paying a greenhouse gas "mitigation fee"—possibly 1% of project costs—that would then release them from any further requirements under SEPA. This idea was not fully discussed or decided on by the IWG, but could be considered along with other leveraging SEPA ideas by Ecology and its stakeholders.

#	Concept	SEPA piece	Non-SEPA piece	Additional Info Needed, Next Steps
Planning - Local Level				
1	**Leverage Upfront SEPA to promote and accelerate compact sustainable development.** Allow cities to elect to designate a subarea for more compact commercial, residential, mixed use or industrial development ("Subarea"). If the city: 1) designates the Subarea; 2) conducts thorough SEPA review of the Subarea which is a maximum build-out analysis that identifies mitigation steps to address significant environmental impacts (including climate change impacts); and 3) adopts as new Subarea development regulations that incorporate and require the climate change mitigation and any other mitigation identified in the Subarea SEPA review that is not already addressed in development regulations, then all subsequent development in the Subarea would be required to implement the climate change measures and would be exempt from any project-level SEPA or SEPA appeals. Developers would be required to pay their proportionate share of the Subarea SEPA review.	Probable new provision of SEPA statute.	Possible GMA amendment	Upfront source for money to fund Subarea EIS needed to ensure this is used (see below). draft proposed SEPA GMA amendment
2	**Sustainable neighborhoods exemption** (compact, connected, walkable, good jobs-to-housing ratio, open space, wide variety of uses, transit supported residential densities, high performance buildings, infrastructure). Local jurisdiction designates a geographic area subject to those standards within a UGA, then, both the jurisdiction's designation decision and future development projects within the designated area would be exempt.	Incentives for both designation of sustainable neighborhood (non-project) and development within area (project). SEPA law changes needed.		How to define criteria for exemption. What issues are currently addressed (by cities) using SEPA? How would those issues be addressed without SEPA?
3	**Enhance Infill Exemption** in 43.21C.229 by defining "mixed use" and reducing local EIS requirement	Amend SEPA	Local ordinance required to implement	How has infill exemption been used?

#	Concept	SEPA piece	Non-SEPA piece	Additional Info Needed, Next Steps
4	**Clarify and make more attractive and user-friendly Section 240** of statute and provisions on Planned Actions and GMA-SEPA integration	Clarify reliance on SEPA done at planning level, to reduce SEPA at project level. Guidance needed, plus SEPA Rule and Law changes.		What issues are Lead Agencies using project-level SEPA to address? Are there other obstacles to use of planned actions?
5	**Establish new category of Climate Change Essential Public Facilities:** e.g. non-Carbon energy facilities, adaptation water supply facilities, transit			
Planning - Regional Level				
6	**Develop and adopt a regional or statewide Climate Change Plan**	For non-project, use existing question #5 in Part D of the environmental checklist to identify and address conflicts with the Climate Change Plan. Guidance needed.	The Plan itself, would be a non-SEPA product (although Plan would have SEPA conducted on it)	1. do we have sufficient science on climate change and GHG emissions to develop a plan? 2. funding 3. identify lead agency
7	**Divide state GHG goals into regional targets,** to help the SEPA analysis be calculated more easily for each region. These numbers could potentially be divided in each region by jurisdiction and type of use. Jurisdictions in each region would determine the formula and the proportions.	Utilize regional GHG goals in agency planning and SEPA analysis, as a consistency check, at a minimum. Using the info could be optional without a rule or law in place. guidance needed.	Use of goals could be mandated (in GMA)	1. is it feasible to develop regional goals and how would that happen? 2. how would an agency use the regional goal in their planning and in SEPA? 3. assess compatibility with current direction for addressing climate change; 4. assess compatibility with WCI, state law, etc
8	Prepare **general statewide EISs (or regional environmental study)** on certain GHG emissions (or climate change) that can be adopted into local plan-level EISs	State and local agencies: 1) Incorporate the study "by reference" for non-project SEPAs, OR 2) adopt and supplement a SEPA EIS on statewide climate change/GHG environmental issues for local analysis . Using the info would be optional. guidance important	Study could be recognized as Best Available Science and be mandated (in GMA)	1. how would we produce an adequate document? 2. how would we ensure appropriate use of the document in SEPA and planning? 3. funding

#	Concept	SEPA piece	Non-SEPA piece	Additional Info Needed, Next Steps
Planning – Funding				
9	**Funding should be provided to the Planning Environmental Review Fund (PERF)**, to help perform more detailed SEPA analysis on comp plans or subarea plans. Funding PERF to help cities and counties analyze impacts of increased mixed use development in selected subareas (including GHG impacts/savings) would enable them to use these same subareas as TDR receiving areas and achieve less stormwater impact to Puget Sound.			
10	**Other funding mechanisms for upfront SEPA** such as: 1. use of late-comer fees 2. use of any future carbon tax 3. revolving fund loans for local planning instead of grants			
11	**Establish GHG controls and non-Carbon energy as public purpose** to allow public funding-lending of credit			
Project Level – Mitigation				
12	**Project mitigation that fully or partially exempt developers from further GHG reduction requirements**. Informal Green list Concept. Incentive for proponent to include voluntary measures in proposal so that mitigation for GHG emissions would already be addressed. 1. Achievement of LEED/Green Globe certification 2. Development of a Brown-field sites (or any other site requiring soil remediation) 3. Development and Implementation of an alternate transportation plan 4. Use of lean construction techniques 5. Use of local materials 6. Use of recycled materials 7. Waste Diversion 8. Key strategies included in Green Globe/LEED checklist 9. Credit for urban in-fill development	Measures could also avoid DS/EIS. Guidance only, no rule or law changes needed.		What are the specific measures? How much do those measures mitigate GHG emissions?
13	**Incentive for sinks, wetland banks, conservation easements, TDRs, Ag-Forest water banking**			
14	**TDR program** targeting isolated (high VMT) property and banking/sink property			
15	**Include need for future adaptations (e.g. inundations) in TDR program**			
16	**Incentives for VMT-limiting development:** e.g. housing with transit aspects, work-live space development			

#	Concept	SEPA piece	Non-SEPA piece	Additional Info Needed, Next Steps
17	**Authorize impact fees for a greater range of capital facilities and for certain operations such as transit operations.** Impact fees are currently only authorized for public streets and roads, parks and recreation facilities, school facilities, and fire facilities for jurisdictions not part of a fire district. So many needed capital facilities cannot be funded with impact fees, including transit facilities that are not road based or transit operations. Expanding the capital facilities and services that can be funded by impact fees could help reduce GHGs by expanding transit and also make SEPA exemptions more realistic as SEPA would not be needed as much to raise the funds for counties and cities to use in paying for growth.	None.	Amend impact fees statutes, RCW 82.02.050 to 090,	None
Project Level - Disincentives				
18	**Better use existing flexible thresholds.** Thresholds for minor new construction categorical exemption could be used more advantageously to encourage development in more climate-friendly locations.	Incentive for building in appropriately zoned areas, disincentive for building in other areas, Local SEPA ordinances would need to changed		How are flexible thresholds currently being used? Are there opportunities for improvements? Update Ecology database of local SEPA ordinances by adding more cities and make sure flexible thresholds data is updated
19	**Modify, reduce, or repeal certain categorical exemptions.** The existing categorical exemption for parking lots, for example, could be repealed, reduced from the maximum of 40 spaces to a smaller number of parking spaces, or limited so the exemption only applies in locations or for actions that will not generate large quantities of greenhouse gases, such as high density, mixed-use developments near transit routes. Or the exemptions could be qualified so that they only apply in jurisdictions that have plans to reduce GHG generation consistent with RCW 70.235.020(1)(a)'s GHG emission limits.	Amend the SEPA exemptions in Part Nine of Chapter 197-11 WAC. No amendment would be required to SEPA.	None	1. Which exempt actions are generating, individually or cumulatively, large quantities of GHGs?
20	**Qualify exemptions so they do not apply in certain locations or if a certain level of GHG emissions would occur.** This could apply like the "lands covered by water exception" to the minor land use decision exemptions in WAC 197-11-800(6) or the authority in WAC 197-11-908(1) for counties and cities to select SEPA exemptions that do not apply in critical areas.	An amendment to the regulations would be required, no amendment would be required to SEPA.	None	1. What circumstances lead, individually or cumulatively, to the generation of large quantities of GHGs?

#	Concept	SEPA piece	Non-SEPA piece	Additional Info Needed, Next Steps
21	**Require EISs for categories of actions that generate significant qualities of GHGs.** For example, conversions of forest land could be required to always do an EIS because of the loss of the carbon sink and the GHGs that will be generated by the subsequent development. Similarly, transportation projects that would provide for increased single-occupancy vehicle traffic could always be required to prepare an EIS.	Amend SEPA rules. No amendment would be required to SEPA.	None.	1. What actions are likely to generate large quantities of GHGs?
22	**Require a more exacting level of analysis, a wider range of alternatives, or more analysis of potential mitigation measures for actions that generate significant qualities of GHGs.** For example, under existing regulations if a private action is consistent with the local government's comprehensive plan, the EIS does not need to analyze offsite alternatives. This provision could be made inapplicable to large GHG generators and EISs for such actions would then have to consider offsite alternatives which may generate less GHGs.	Amend SEPA rules. No amendment would be required to SEPA.	None.	1. What actions are likely to generate large quantities of GHGs? 2. What actions would benefit from a wider range of alternatives? 3. What actions would benefit from more analysis of mitigation measures?
23	**Require mitigation for certain levels of emissions or certain actions.** The current view of SEPA is that it authorizes, but does not require mitigation. SEPA could be amended to require mitigation in certain circumstances or for certain levels of impact.	Would require an amendment to SEPA.	None.	1. What actions are likely to generate large quantities of GHGs? 2. What actions should be mitigated?
24	**Require that actions that would generate certain levels of GHG emissions go to the back of the line and allow actions that would generate fewer emissions to "cut in front" of these actions.**	Could be accomplished by changing agency procedures or processes.	Change to agency procedures and, potentially, state regulations and local ordinances or regulations.	1. What actions are likely to generate large quantities of GHGs?
25	**Create added disincentive for conversion of forest land** to other use such as residential development	Could require SEPA or rule change	Forest Practices	What are the GHG emission estimates for FP conversions? Coordinate with Forest Sector Workgroup
Reducing Future Vulnerabilities				
27	**Continue to fund research** into the probable effects of global warming.	None.	Continue to use state funds for research.	None.
28	**Continue to synthesize research** into the probable effects of global warming **and provide to decision makers**.	None.	Continue to use state funds and staff for synthesis and to make the research available.	None.

#	Concept	SEPA piece	Non-SEPA piece	Additional Info Needed, Next Steps
29	**Provide guidance on how to anticipate and mitigate the adverse effects** of global warming as part of SEPA review.	An Ecology guidance document or an addition to the SEPA Handbook.	None.	None.
30	**Amend the SEPA rules to require an analysis of the adverse impacts of global warming on the proposed action** as part of an EIS.	An amendment to the regulations would be required, no amendment would be required to SEPA.	None.	None.
31	**Amend the SEPA rules to require that EISs must include and analyze an alternative that would be minimally affected** by the adverse effects of global warming.	An amendment to the regulations would be required, no amendment would be required to SEPA.	None.	None.
32	**Require reopeners for certain uncertain, but high cost impacts.** Some impacts, such as what will be the future flood heights in or near our current flood plains, are unknown but will have significant adverse impacts on proposed actions. The SEPA rules could be amended to require reopeners that would require an analysis of this impact if certain event occur or when information becomes available.	An amendment to the regulations would be required, no amendment would be required to SEPA.	None.	1. What global warming impacts should trigger the reopeners?
33	**Require mitigation for certain adverse effects of global warming**, such as sea level rise that will flood a highway or development or a use that will not have any available water in ten years. The current view of SEPA is that it authorizes, but does not require mitigation. SEPA could be amended to require mitigation in certain circumstances or for certain levels of impact.	Would require an amendment to SEPA and probably the SEPA rules.	None.	1. What global warming impacts should trigger the mitigation requirement?

Appendix D: Sources of Greenhouse Gas Emissions that SEPA can Address

The following table lists various sources of GHG emissions and compares how each is considered in related policy forums. These emissions sources can be evaluated quantitatively or qualitatively to address greenhouse gas reduction strategies. A "Yes" does not necessarily mean that the emissions category must be quantified or mitigated. A "?" indicates that the referenced document is silent on the emission source.

GHG Emissions 6 Kyoto Gases (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6) *	Definition and Examples	CAPCOA Guidance "CEQA and Climate Change" *CEQA*	King County Draft* *SEPA*	MA *MEPA*	The Climate Registry *Reporting*	CAT Interim Report Feb. 2008 *Addressed in Recommendations*
D-1. Direct Construction	Generators and equipment exhaust, this includes off-site haul trucks during construction	Yes	Yes	?	Yes	Yes
D-2. On-Site Mobile Sources and Company-Owned VMT.	Mobile sources operating within the Proponent's facility. Company-owned vehicles traveling off-site.	Yes	Yes	Yes	Yes	Yes
D-3. Stationary Sources and Direct Facility Emissions	Space Heating and industrial emissions. On-site combustion processes from company-owned equipment.	Yes	Yes	Yes	Yes	Yes
D-4. Fugitive Emissions	GHG emitted from points other than tailpipes, vents, stacks, or other locations that can be collected. E.g., landfill gas emissions, gas pipeline fugitive losses, enteric emissions from livestock.	Yes	Yes	Yes	Yes	Yes
D-5. Direct Agricultural Emissions	Livestock methane, land clearing, planting, harvest, fertilizer application, and on-site manure handling.	Yes	Yes	?	No	Yes
D-6. Forestry Conversion and other land or Aquatic Vegetation Disturbance	One-time soil-carbon emissions during land clearing, and permanent annual loss of CO_2 sink following removal of trees or vegetation.	?	Yes	?	No	Yes
D-7. Direct emissions from maintenance activities	Emissions from landscaping and maintenance equipment, chemicals	Yes	Yes	?	Yes	Yes

GHG Emissions 6 Kyoto Gases (CO2, CH4, N2O, HFCs, PFCs, SF6) *	Definition and Examples	CAPCOA Guidance "CEQA and Climate Change" *CEQA*	King County Draft* *SEPA*	MA *MEPA*	The Climate Registry *Reporting*	CAT Interim Report Feb. 2008 *Addressed in Recommendations*
I-1. Extraction of Purchased Materials	Off-site mining, timber mining/extraction, petroleum products (e.g. fuel and plastic products) for products and materials that are purchased by the proposal.	Yes	Yes	?	Optional	Yes
I-2. Processing of Purchased Materials	Off-site energy used and emissions from processing raw materials or end products purchased by a proponent (e.g. cement, metals, plastics, wood, fuel).	Yes	Yes	?	Optional	Yes
I-3. Transportation of purchased materials by Non-Company Owned Transport	Delivery of purchased raw materials to the proposed facility by non-company-owned trucks, and shipment of produced product from the facility by non-company-owned trucks, trains and ships.	Yes	Yes	?	Yes, some	Yes
I-4. Employee Commute VMT	Tailpipe emissions from employee commuting	Yes	Yes	?	?	Yes
I-5. Other Indirect VMT	Traffic from associated development, indirect change in traffic pattern, customer VMT (vs. company owned), associated public services (parks, emergency response)	Yes, but with limitations on study area	Yes	Maybe **	No	Yes
I-6. Purchased electricity	Off-site emissions from fossil-fuel power plants that provide electricity to the proponent.	Yes	Yes	Yes	Yes	Yes
I-7. Water Use and Wastewater Disposal.	Energy used to provide water and dispose of polluted water. GHG emitted from off-site pump stations and water treatment plants for water used by proposal. GHG emitted from off-site sewage lift stations and POTWs used to convey and treat wastewater from the proposed SEPA facility. This includes fugitive methane from POTWs. It does not include biogenic CO2 emitted from POTWs.	Yes	Yes	Possibly combined with Energy	Yes	Yes
I-8. Solid Waste	Off-site emissions from off-site solid waste disposal (construction, agriculture, general trash, food). Includes tailpipe emissions from trucks and trains	Yes	Yes	?	optional	Yes

GHG Emissions 6 Kyoto Gases (CO2, CH4, N2O, HFCs, PFCs, SF6) *	Definition and Examples	CAPCOA Guidance "CEQA and Climate Change" *CEQA*	King County Draft* *SEPA*	MA *MEPA*	The Climate Registry *Reporting*	CAT Interim Report Feb. 2008 *Addressed in Recommendations*
	used to collect refuse and haul it to the disposal site and off-site emissions from pre-processing of solid waste (e.g., transfer stations), and fugitive methane emissions from solid waste landfills. It does NOT include biogenic CO2 emissions from solid waste disposal facilities.					
I-9. End-use emissions from use of proponent's products sold to others	Use and disposal of products sold by the proponent to consumers, industry etc. This could include emissions generated from combustion of fuels manufactured or distributed by the proposed facility.	Yes	Yes	No	optional	Yes

* King County notes that greenhouse gas emissions from some sources for some projects may be too small to be relevant to the SEPA review.

Greenhouse gas - a gas that contributes to the greenhouse effect by absorbing infrared radiation
CFC, chlorofluorocarbon - a fluorocarbon with chlorine; formerly used as a refrigerant and as a propellant in aerosol cans; "the chlorine in CFCs causes depletion of atmospheric ozone"
Carbon dioxide, CO2 - a heavy odorless colorless gas formed during respiration and by the decomposition of organic substances; absorbed from the air by plants in photosynthesis
N2O, nitrous oxide – naturally emitted by bacteria and also by agricultural practices, industrial processes and fossil fuel combustion
HFC, hydrofluorocarbon - a fluorocarbon emitted as a by-product of industrial manufacturing
Perfluorocarbon, PFC - a powerful greenhouse gas emitted during the production of aluminum
Sulfur hexafluoride, - a colorless gas that is soluble in alcohol and ether; a powerful greenhouse gas widely used in the electrical utility industry

"Direct" emissions generally means generated onsite
"Indirect" emissions are generally generated offsite and some are considered "embodied emissions"

Concept of "net emissions" (emissions minus offsets or creation of carbon dioxide sinks) is evaluated during consideration of mitigation options

** Massachusetts policy acknowledges that some projects will have sources of emissions not explicitly covered by transportation, stationary sources and energy consumption. They may require additional modeling of emissions on a case-by-case basis.

Appendix E: Initial List of Criteria When Considering What Emission Sources to Evaluate

The following document was a working draft developed by a sub-group of the SEPA IWG and discussed by the full group. However, it was not fully vetted or agreed-upon by the full IWG and should not be considered a final IWG product.

Final Draft
8/08/08

Sub-bucket Group: Karin Landsberg and Annie Szvetecz (revisions), Jim Wilder, Hilary Franz, Dan McGrady, Mark Kulaas, Fred Greef, Ann Farr, Patricia Betts

Guiding Principle:

Does the level of effort (cost, difficulty, etc.) of calculating a specific type of emission from a specific proposal outweigh its contribution to climate change impacts? ("de minimus" issue)

Criteria for Considering Sources of Emissions to be Measured (project and non-project):

1. Has the source of the emission for this proposal been addressed (analyzed and mitigated) in another SEPA document, or local, regional, or state plan?
2. Can the source be credibly measured or assessed (quantified or otherwise) with the tools/information currently available?
3. Can the boundary (scope or scale) of the emission be determined?
4. What is relative importance (regionally, nationally, or globally) of the contribution of this emission source to climate change impacts? (*E.g. indirect transportation emissions might be a relative minor part of a proposal's emissions but cumulatively they are a major GHG source for Washington. Also, direct or fugitive emissions methane and nitrous oxide could be lower in total contribution of a proposal but they're higher in greenhouse gas potency than* Co_2.)
5. Can the proposal be modified to avoid, minimize, or otherwise mitigate its contribution of this emission source?

Points to Consider in Determining What Gets Measured:

a. What gets quantified or otherwise evaluated gets considered, managed, and potentially mitigated by agencies with jurisdiction.
b. For project proposals, should the lead agency or the applicant be responsible for calculating a specific type of emission?
c. Can Ecology or lead agency provide guidance to the applicant on how to do the analysis?
d. The applicable mitigation could be broad, programmatic (such as requiring additional GHG emission reporting).
e. The carbon sink part of mitigation (net emissions) is more complex, more speculative, with less definitive science, especially in the agricultural arena. This may require different metrics such as wetland acreage loss with 2:1 substitutions or transfer of development rights (TDR) on similar soil and climate types, or afforestation acreage to compensate deforestation on similar soil/climate type. Ecology statewide rollup may be the place to require net emissions calculations from GHG carbon sinks, with optional use of Ecology models for the SEPA checklist.

f. Should we assume all GHG emissions are adverse impacts (not necessarily significant impacts) that must be disclosed. Then set some reasonable parameters such as readily available, credible and not speculative science.

g. Can we allow flexibility for lead agency to go beyond a "minimum" GHG assessment that Ecology guidance or new Ecology exemption rules prescribe?

h. Can the future content and format of the GHG measurement worksheet or checklist questions address the following?
   - Does this information facilitate the threshold determination by lead agency?
   - Does this information help fill the regulatory gaps and identify the regulatory overlaps?
   - Is it easy, fill-in the blank reporting?
   - Provide certainty and consistency for proponents?
   - Understandable, and do-able at the project or non-project stage?
   - Applies to variety of typical SEPA actions?
   - Allow for initial mandatory analysis to use best available and credible science but be flexible for future updates to model and source data. This may lower the tier and increase future reporting and analysis requirements?
   - Does it provide an accurate or "fair" picture of a project's impacts?
   - Does this adequately address the "cumulative" nature of climate change impacts?
   - Will the scope of emissions enhance or reduce mitigation opportunities?
   - Prevents option of choosing less GHG rich material or preventing more GHG intense activity.
   - Will this assessment of emissions help agencies with jurisdiction reach state GHG reduction goal since the goals are based on total GHG emissions?

Appendix F: Compilation Table of Measurement Tools

Spreadsheet available at
www.ecy.wa.gov/climatechange/2008CATdocs/IWG/sepa/092908_appendix_f_sepa_tools_matrix.xls.

Appendix G: Possible SEPA Mitigation Strategies for Climate Change Impacts (Draft 10/24/08)

This document is a draft compilation of various existing strategies for greenhouse gas emission reductions gathered from other states and jurisdictions. This list does not represent an endorsement from the SEPA IWG or the Department of Ecology. Additional research and discussion related to mitigation will result in an updated version of this information. In further revising this table, we anticipate participating in parallel efforts by other jurisdictions (e.g., King County, City of Seattle) to review and assess available mitigation options.

Possible SEPA Mitigation Strategies for Climate Change Impacts

Project Actions *Site Design*	**Comments**	**Emissions Category**			**Possible Qualitative Assessment**
		Direct[6]	**Indirect**[7]	**Trans-portation**[8]	
Encourage infill, redevelopment, and higher density development, whether in incorporated or unincorporated settings.	Minimizes sprawl and reduces **direct and indirect VMT** and encourages a pedestrian built environment and high density is more energy efficient per capita.	•	•	•	
Provide permanent protection and restoration for open space/natural areas on the project site.	Reduces (**indirectly) vegetation disturbance emissions** and maintains carbon sink, avoids future built environment projects and subsequent energy consumption patterns.		•		•
Plant trees and vegetation near structures to shade buildings.	Reduces **onsite fuel combustion emissions** and **purchased electricity** plus enhances carbon sinks.	•	•		•
Preserve or replace onsite vegetation (that is removed for construction) as a means of providing carbon storage.	Reduces direct carbon emissions and loss of carbon sink from **vegetation disturbance**	•			•
Minimize building footprint.	Reduces **onsite fuel combustion emissions** and **purchased electricity** consumption, **materials used, maintenance, land disturbance, and direct construction emissions.**	•	•		•

[6] Direct emissions include emissions generated onsite that the proponent of the action has direct control over. Examples include stationary combustion, physical and chemical processes other than fuel combustion, and fugitive sources of emissions (i.e., emissions that do not pass through a stack, chimney, exhaust pipe, or similar opening).

[7] Indirect emissions include those generated offsite and for which the proponent does not have direct control over. Examples include emissions associated with purchased or acquired electricity, embodied emissions, and emissions associated with extraction of materials and fuels.

[8] Transportation emissions can be either direct (i.e., within the control of the proponent) or indirect (i.e., outside of the proponent's direct control). Transportation emissions are called out as a separate category because they constitute a sizable proportion of Washington's overall GHG emissions and because the tools for measuring transportation emissions typically vary from the tools for measuring other kinds of emissions.

Project Actions *Site Design*	Comments	Emissions Category			Possible Qualitative Assessment
		Direct[6]	Indirect[7]	Trans-portation[8]	
Design project to support alternative transportation to site including transit, walking, and bicycling.	Reduces **VMT** and **direct and indirect emissions** from reduced parking facilities.		•	•	•
Use low impact development for stormwater design.	Improves hydrological functions and reduces **purchased energy** use for runoff management. Can reduce project footprint and minimize **vegetation disturbance.**	•	•		•
Design water efficient landscaping.	Minimizes **water consumption, purchased energy,** and upstream emissions from water management.		•		
Minimize energy use through building orientation.	Reduces **onsite fuel combustion emissions** and **purchased electricity** consumption	•	•		

Project Actions *Building Design and Operations*	Comments	Direct	Indirect	Trans-portation	Qualitative Assessment
Apply third-party certified green standards for design and operations. (*note: could be detailed further*)	Reduces **onsite fuel combustion emissions** and off-site/indirect **purchased electricity**, **water use, waste disposal**	•	•		•
Purchase Energy Star equipment and appliances.	Reduces **onsite fuel combustion emissions** and **purchased electricity** consumption	•	•		•
Incorporate on-site renewable energy production, including installation of photovoltaic cells or other solar options.	Reduces **onsite fuel combustion emissions** and **purchased electricity** consumption.	•	•		•
Replace traffic lights, street lights, and other electrical uses to energy efficient bulbs and appliances.	Reduces **purchased electricity**.		•		
Construct "green roofs" and use high-albedo roofing materials.	Reduces **onsite fuel combustion emissions** and **purchased electricity** consumption	•	•		•
Install high-efficiency HVAC systems.	Minimizes **fuel combustion and purchased electricity** consumption.	•	•		•
Eliminate or reduce use of refrigerants in HVAC systems.	Reduces **fugitive emissions**. Compare refrigerant usage before / after to determine GHG reduction.	•			•
Reduce energy demand using peak shaving or load shifting strategies.	Reduces **purchased electricity**.		•		•

Project Actions ***Building Design and Operations***	**Comments**	**Direct**	**Indirect**	**Trans-portation**	**Qualitative Assessment**
Maximize interior day lighting through floor plates, increased building perimeter and use of skylights, celestories and light wells.	Increases natural/day lighting initiatives and reduces **purchased electrical energy** consumption.		•		•
Incorporate energy efficiency technology such as: super insulation motion sensors for lighting and climate control efficient, directed exterior lighting on-site renewable energy sources into project including solar, wind, geothermal, low-impact hydro, biomass, and bio-gas strategies combined heat and power (CHP) technologies	Reduces **fuel combustion and purchased electricity** consumption.	•	•		
Use water conserving fixtures that exceed building code requirements.	Reduces **water consumption**.		•		
Re-use gray water and/or collect and re-use rainwater (*note: currently there are some legal limitations on use of rainwater*).	Reduces **water consumption**.		•		
Provide for storage and collection of recyclables (including food, paper, corrugated cardboard, glass, plastic, and metals) in building design.	Reduces **solid waste disposal** and promotes material re-use which reduces **extraction of purchased materials** and some **transportation of purchased materials.**		•	•	•
Use recycled building materials and products.	Reduces **extraction of purchased materials,** possibly **reduces transportation of materials,** encourages recycling and reduction of **solid waste disposal**.		•	•	•
Use salvaged and reclaimed building products	Reduces **extraction of purchased materials, reduces transportation of materials,** encourages recycling and reduction of **solid waste disposal**.		•	•	•
Use building materials that are extracted and/or manufactured within the region.	Reduces **transportation of purchased materials**			•	
Use rapidly renewable building materials.	Reduces emissions from **extraction of purchased materials**		•		•

Project Actions ***Building Design and Operations***	**Comments**	**Direct**	**Indirect**	**Trans-portation**	**Qualitative Assessment**
Use third-party certified wood products. (*note: could be detailed further*)	Reduces emissions from **forest conversion**, **extraction of purchased materials** and **processing of purchased materials.**	•	•		•
Use low-VOC adhesives, sealants, paints, carpets, and wood.	Reduces **fugitive emissions** and indirect emissions from **extraction and processing of purchased materials, and from solid waste disposal.**	•	•		•
Conduct 3rd party building commissioning to ensure energy performance.	Reduces **fuel combustion and purchased electricity** consumption.	•	•		•
Track energy performance of building and develop strategy to maintain efficiency.	Reduces **fuel combustion and purchased electricity** consumption.	•	•		•
Provide construction and design guidelines to facilitate sustainable design for build-out by tenants.	Reduces **fuel combustion and purchased electricity** consumption. Reduces emissions from indirect sources such as **extraction of purchased materials, processing, transportation of materials, solid waste disposal, and water use**	•	•		•

Project and Non-Project ***Transportation***	**Comments**	**Direct**	**Indirect**	**Trans-portation**	**Qualitative Assessment**
Locate new buildings in or near areas designated for transit-oriented development (TOD) and, where possible, incorporate TOD principles in employee and customer activity patterns.	Reduces **direct and indirect VMT**			•	
Purchase low-carbon fuel and/or fuel efficient vehicles for fleet.	Reduces direct emissions from transportation sources			•	
Support the use of low/zero carbon fueled vehicles, such as the charging of electric vehicles from green electricity sources.	Reduces direct and indirect emissions from transportation sources		•	•	
Join or form a transportation management association.	Reduces direct and indirect **VMT**.			•	•

Project and Non-Project *Transportation*	Comments	Direct	Indirect	Trans-portation	Qualitative Assessment
Provide new transit service or support extension/expansion of existing transit (buses, trains, shuttles, water transportation).	Reduces direct and indirect **VMT**			•	•
Support expansion of parking at Park-n-Ride lots and/or transit stations.	Reduces direct and indirect **VMT**			•	•
Develop or support multi-use paths to and through site.	Reduces direct and indirect **VMT**			•	•
Size parking capacity to not exceed local parking requirements and, where possible, seek reductions in parking supply through special permits or waivers.	Reduced parking discourages auto dependent travel, encouraging alternative modes such as transit, walking, biking etc. Reduces direct and indirect **VMT**			•	•
Develop and implement a marketing/information program that includes posting and distribution of ridesharing/transit information.	Reduces direct and indirect **VMT**			•	•
Subsidize transit passes. Reduce employee trips during peak periods through alternative work schedules, telecommuting, and/or flex-time. Provide a guaranteed ride home program.	Reduces employee **VMT**			•	•
Provide on-site amenities such as banks, dry cleaning, food service, childcare.	Reduces direct and indirect VMT			•	•
Provide bicycle storage and showers/changing rooms.	Reduces employee **VMT**			•	

Non-Project Actions *Transportation and Energy Efficiency*	Comments	Direct	Indirect	Trans-portation	Qualitative Assessment
Traffic signalization and coordination to improve traffic flow and support pedestrian and bicycle safety.	Reduces transportation emissions and **VMT**	•		•	
Plan for cluster multimodal transportation oriented development and redevelopment to integrate high density housing, civic, and retail amenities (jobs, schools, parks, shopping opportunities) to help reduce VMT.	Reduces direct and indirect **VMT**			•	•

Non-Project Actions ***Transportation and Energy Efficiency***	**Comments**	**Direct**	**Indirect**	**Trans-portation**	**Qualitative Assessment**
Apply advanced technology systems and management strategies to improve operational efficiency of transportation systems and movement of people, goods, and services.	Reduces emissions from transportation by minimizing idling and maximizing transportation routes / systems for fuel efficiency.			•	
Implement street improvements that are designed to relieve pressure on a region's most congested roadways and intersections.	Congestion relief reduces fuel consumption which may be considred direct emissions or indirect option 3 if not under the control of the project.			•	•
Limit idling time for commercial vehicles, including delivery and construction vehicles.	Reduces transportation emissions			•	•
Develop shuttle systems around business district parking garages to reduce congestion and create shorter commutes.	Reduces idling fuel emissions and direct and indirect VMT			•	•
Create a business or community-based online ridesharing program.	Reduces direct and indirect **VMT**			•	•
Public leveraging/encouraging of large businesses to develop commute trip reduction plans.	Reduces direct **VMT**			•	•
Develop a *Safe Routes to School* program that allows and promotes bicycling and walking to school.	Minimizes diesel emissions, and school district's **VMT**			•	•
Recognize and promote energy saving measures beyond Title 24 requirements for residential and commercial projects	Reduces **fuel combustion and purchased electricity** consumption	•	•		
Educate the public, schools, other jurisdictions, professional associations, business, and industry about reducing GHG emissions.	Reduces direct and indirect emissions	•	•		•
Retrofit public buildings using an Energy Savings Performance Contract with a private entity to. This type of contract allows the private entity to fund all energy improvements in exchange for a share of the energy savings over a period of time.	Reduces **fuel combustion and purchased electricity** consumption	•	•		•
Retrofit municipal water and wastewater systems with energy efficient motors, pumps and other equipment, and recover wastewater treatment methane for energy production.	Reduces **fuel combustion and purchased electricity** consumption	•	•		
Convert landfill gas into energy sources for use in fueling vehicles, operating equipment, and heating buildings.	Reduces **fuel combustion and purchased electricity** consumption			•	•

Non-Project Actions ***Transportation and Energy Efficiency***	**Comments**	**Direct**	**Indirect**	**Trans-portation**	**Qualitative Assessment**
Purchase low-carbon fuel government vehicles and buses Promote the use of these vehicles in the general community.	Reduces emissions from transportation			•	•
Offer government incentives to private businesses for developing buildings with energy and water efficient features and recycled materials. The incentives can include expedited plan checks and reduced permit fees.	Reduces direct and indirect emissions	•	•		•
Offer rebates and low-interest loans to residents that make energy-saving improvements on their homes.	Reduces direct and indirect emissions	•	•		•
Create incentives to increase recycling and reduce generation of solid waste by residential users.	Reduces emissions from **solid waste disposal**			•	•
Implement a Construction and Demolition Waste Recycling Ordinance to reduce the solid waste created by new development.	Reduces direct and indirect emissions	•	•	•	•
Add residential/commercial food waste collection to existing greenwaste collection programs.	Reduces solid waste disposal		•		•
Offer government employees financial incentives to carpool, use public transportation, or use other modes of travel for daily commutes.	Reduces direct **VMT**			•	•

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Appendix H: Measurement Test Cases

The measurement "test cases" in this appendix were developed by individual SEPA IWG members as an exercise to illustrate what emissions sources are appropriate for different kinds of projects and plans. The individual test cases were not discussed in detail by the full IWG and should not be considered as final products of the IWG. Rather, they are working documents that are presented here to help inform guidance development regarding what sources of greenhouse gases to measure for certain types of projects and plans.

H.1 Measurement Test Case: 75-acre Timber Sale

Background

Clearcut harvest proposal on 75 acres in a state forest that has a larger landscape forest plan and a still larger habitat conservation plan (70 year commitment to sustainable tree growth and habitat protection). Cable yarding, loaders, tracked ground-based shovels and other logging equipment will be used for removing and loading logs. Some road construction, maintenance, and abandonment will accompany the proposal. Road construction requires gravel. The rock pit may be new but would be on site or nearby on public land. There would be no commercial use of the rock pit. Some burning at landings would likely occur. Log trucks will haul logs to mills. This description does not include activities at a lumber mill or beyond.

Two EIS documents already cover the Sustainability of the harvest and the wildlife habitat protection commitment across all of western Washington. A forest land planning unit EIS covers 150,000 acres, including the proposal area. The proposal is also within the EIS analysis area for a 40,000 acre state forest plan.

Harvest methods have changed little in last ten years and the same number of log trucks will haul the same number of log loads to the same log mills. The milled wood products will still be used for home construction. Cable yarding equipment, loaders, tracked ground-based shovels and all logging equipment is much the same as 10 years ago. Fewer new roads are needed each year to access the timber than was historically the case (on forest-wide basis). Rock-pit expansion to build or rebuild roads is less than or typical of historical annual rock pit use. Older rock pits are reclaimed and planted back to timber.

CO_2 Calculation Assumptions

The calculations for log trucks are based on six miles per gallon of diesel fuel, 17 gallons per 100 mile round trip to sawmill, and 22.38 pounds of CO_2 per gallon of diesel. Similar assumptions can be used for the other heavy equipment, but may be based on hours of use per day, or gallons of diesel fuel actually used rather than miles per gallon. It should also be noted that the log hauling constitutes by far the largest share of all the emissions.

Notes

The Test Case Worksheet for the 75-acre timber sale is not that difficult to calculate and has been filled out as a test, regardless of whether there is no net increase in forest emissions since 1990 or possible decreases based on management practices for the larger forest area. Please see attached 75-acre project level analysis on the Test Case Worksheet.

At the 150,000 acre forest planning level assume we already know roughly 1,200,000 pounds of CO_2 are emitted per year from typical log truck trips. The Governor's Climate Change Framework Legislation (HB 2815) only requires reporting by 2010 for motor vehicle fleets exceeding 5,511,500 pounds of carbon per year. The EIS for the 150,000 acre sustainable forest planning unit might be the best place for these calculations.

Project-level timber harvests might become green-listed or exempt from the GHG calculation part of SEPA analysis if already addressed by a larger scale sustainable forest land plan. Forest carbon-sink sequestration calculations may not be needed where land is not converted out of forest use. Forest managers might want to calculate carbon sequestration to take credit for long term carbon storage gains via management practices such as commercial thinning and marketing of thinning products for house construction (another carbon sink). Old forests eventually cease to add carbon to their stockpile of stored carbon and release more carbon from decay than they store in growth. Harvesting large trees and storing the carbon in lumber in buildings to replant fast-growing trees can maintain or improve carbon storage. Conversions out of forest use destroy the sink.

75-Acre Timber Sale

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
Direct Emissions						
Construction	Generators and equipment exhaust, this includes off-site haul trucks during construction *Rock hauling (loader, dump trucks) , dozer, excavator and grader for road construction and rock pit extraction*	Yes, should be in larger forest planning area EIS	Yes, forest rd. construct. easy enough to measure	Yes, new rd. location and rock pit, as well as timber harvest area	No. Quite small; occurs once every 50-70 years. At larger forest level, no increase over 1990.	Not much. Newer, cleaner engines? Biodiesel? Abandon equal miles of road to achieve zero net increase?
Mobile Sources and Direct VMT	Directly related to project (company generated) or non-project (all commuting, and commercial transportation (includes distance and type of transport). *Log trucks, yarders, shovels, skidders, loaders, employee transportation for timber harvest.*	Yes, should be in larger forest planning area EIS	Yes, log truck and crew truck VMT; logging equipment diesel quantity	Yes, mileage to work for the crew, to the mill for log trucks	No. Quite small; 500 log truck round trips 100 miles each = 190,000 pounds of CO_2 over 2 months. Occurs every 50 or 70 years. At larger forest level, no increase over 1990.	Not much. Logging crew carpool. Log trucks and all heavy equipment use biodiesel, or cleaner low-sulphur diesel.
Stationary Sources and Direct Facility Emissions	On-site combustion processes usually from company-owned equipment.	N/A		N/A mill is too far downstream	No increase in day to day average	

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
Fugitive Emissions	Unintentional emissions, accidental releases such as leaks from industrial facilities, gas releases from drilling operations etc. GHG emitted from points other than tailpipes, vents, stacks, or other locations that can be collected.	N/A				
Direct Agricultural Emissions	Livestock methane, land clearing, fertilizer application, and on-site manure handling.	N/A				
Forestry Conversion and other land or aquatic vegetation disturbance	One-time soil-carbon emissions during land clearing, and permanent annual loss of CO_2 sink following removal of trees or vegetation. *Temporary tree loss and landing clearing; potential permanent new road construction,*	**Not a conversion**, but: should be in larger forest planning area EIS	Yes, measure acres and site-class (tree growth rate potential) Only for conversions?	Yes	No	Maybe. Reforest within same forest or plant new forest elsewhere of equal or more acres and site class.
Maintenance activities	Emissions from equipment, chemicals *Fertilizer, pesticides, or thinning*	Yes, could be in larger forest planning area EIS	Maybe, if fertilizer, pesticides, or thinning occur after replanting (downstream)	Yes, on site use only	No. At larger forest level, no increase over 1990; not much quantity, fertilizer rarely used, pesticides not used much, thinning may occur, but lesser impacts	Not much; more hand work instead of pesticides but not effective; would likely require gas operated equipment
Indirect Emissions						
Extraction of Materials	Off-site mining, timber mining/extraction, petroleum products (e.g. fuel and plastic products) for products and materials that are used by the proposal. *Rock pit extracting, crushing, processing, and loading trucks*	Yes, should be in larger forest planning area EIS	Yes, see construct. row above	Yes , see construction row above	No, see construction row above	See construction row above

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
	– also see construction row above; if rock pit is not in same forest, it would fit in this row.					
Processing of materials	Energy used and emissions from processing raw materials or end products for a proposal (e.g. cement, metals, plastics, wood, fuel).	N/A, too far downstream				
Transportation of materials	Delivery of raw materials to the facility by non-company-owned trucks, and shipment of produced product from the facility by non-company-owned trucks.	N/A				
Employee Commute VMT	Tailpipe emissions from employee commuting	Possible. Could look at in upstream EIS	Yes, mileage to work for the crew	Yes, home to work site	No, at larger forest level, no increase over 1990. Not much project level impact either (two months and not many vehicles, one trip/day each)	Some. Crew could carpool in one or two crummies, or fewer vehicles.
Other Indirect VMT	Traffic from associated development, indirect change in traffic pattern, customer VMT (vs. company owned), associated public services (parks, emergency response)	N/A				
Energy Use	Usually purchased energy from off-site energy power plants.	N/A				
Water Use and Wastewater Disposal	Quantity used during construction, operation and closure, - energy used to provide water and dispose of polluted water. GHG emitted from off-site pump stations and water treatment plants for water used by proposal. GHG emitted from off-site sewage lift stations and POTWs used to convey and treat wastewater from the proposed SEPA facility. This includes fugitive methane from POTWs. It does not include biogenic CO2 emitted from POTWs.	N/A				
Solid Waste	Emissions from disposal (usually off-site) of all types of waste (construction, agriculture, general trash, food). Could	Yes, could be in larger forest	Yes/probably. Could crudely	Yes	No	Possibly less burning, or

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
	include tailpipe emissions from trucks and trains used to collect refuse and haul it to the disposal site and off-site emissions from pre-processing of solid waste (e.g., transfer stations), and fugitive methane emissions from solid waste landfills. It does NOT include biogenic CO2 emissions from solid waste disposal facilities. *Wood waste burning*	planning area EIS, or in statewide forest burning plan SEPA review.	measure slash piles burning emissions if done following timber harvest	Boundary could be each project or any landscape scale up to statewide, but statewide may make more sense for this source.	At larger forest level, no increase over 1990 and probably decreasing; not much slash disposal burning any more (especially west side) and not large source.	collect for paper making or ethanol production; more diesel to collect.
End-use emissions from product use	Use and disposal of products by consumers, industry etc. This could include emissions generated from combustion of fuels manufactured or distributed by the proposed facility. ***Milling lumber, lumber transport and used in structures; additional wood waste handling*** ***Currently not considered part of the timber sale although some notes provided***	(Yes, some analysis could be in larger forest planning area EIS although not typically done now)	(Maybe. Might be able to measure new structure's carbon storage (board feet of lumber into carbon stored); measure add'l wood waste and disposal?)	(Difficult Best measured at time of construction, not at time of the logging)	(Yes)	(Yes. but not considered as part of this analysis)

H.2 Measurement Test Case: Box Store (New Construction of Major Commercial Center)

Details:
Proposed on undeveloped land in a County's Urban Growth Area, with wetlands, flood plain, near highway, new off-ramp, access road, parking lot, onsite wastewater treatment, new water supply, new power lines, 70 employees will travel 10-30 miles to work.

Example of this type of project analysis for GHG emissions:
Yucca Valley Retail Specific Plan Environmental Impact Report (EIR), State of California 2008 –for Wal-Mart Supercenter –Final EIR Air Quality Section: http://www.yucca-valley.org/pdf/eir/Sections/4.3_Air_Quality.pdf

Box Store

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
Direct Emissions						
Construction	Generators, equipment exhaust, this includes off-site haul trucks during construction **Land-clearing, paving, construction of building**	Probably not	Yes	Yes	Medium?	Yes, alternative fuel, use local materials
Mobile Sources and Direct VMT	Company transportation of products **Air, overseas shipping, rail, trucking of products for resale**	Maybe	Yes	Yes	High?	Yes, alternative fuels, use products from more local sources
Stationary Sources and Direct Facility Emissions	On-site combustion processes usually from company-owned equipment. **Cooking facilities, space heating, back-up electrical generator** **CO2, NO**	Probably not	Yes	Yes	High?	Efficient appliances and space heating/cooling alternative fuels

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
Fugitive Emissions	Unintentional emissions, accidental releases such as leaks from industrial facilities, gas releases from drilling operations etc. GHG emitted from points other than tailpipes, vents, stacks, or other locations that can be collected. **Hydrofluorocarbons from refrigerants during operation and disposal**	No	Yes	Yes	Medium?	Yes, more efficient appliances, better quality refrigerants, better disposal practices
Direct Agricultural Emissions	Livestock methane, land clearing, fertilizer application, and on-site manure handling.	n/a	n/a	n/a	n/a	n/a
Forestry Conversion and other land or aquatic vegetation disturbance	One-time soil-carbon emissions during land clearing, and permanent annual loss of CO_2 sink following removal of trees or vegetation. **Land conversion of upland and aquatic vegetation**	Possibly	Yes?	Yes	Medium?	yes
Maintenance activities	Emissions from equipment, chemicals **Landscaping, repaving, painting**	No	Yes	Yes	Medium?	Yes, alternative fuels, efficient equipment, low-maintenance landscaping
Indirect Emissions						
Extraction of Materials	Off-site mining, timber mining/extraction, petroleum products (e.g. fuel and plastic products) for products and materials that are used by the proposal.	Possibly some	possibly	Could be difficult to determine what materials and products to address	High?	Yes, use of recycled steel, plastic, sustainable timber
Processing of materials	Energy used and emissions from processing raw materials or end products for a proposal (e.g. cement, metals, plastics, wood, fuel).	Possibly some	Yes	Could be difficult	Medium?	Yes, see above

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
Transportation of materials	Delivery of raw materials to the facility by non-company-owned trucks, and shipment of produced product from the facility by non-company-owned trucks.	Possibly by transportation plan, port plan etc.	Yes	Yes	High?	Yes, use of more local materials, choose carriers with efficient and/or alternative fuels
Employee Commute VMT	Tailpipe emissions from employee commuting	Possibly	Yes	Yes	High?	Yes, promote carpooling, mass transit, biking etc.
Other Indirect VMT	Traffic from associated development, indirect change in traffic pattern, customer VMT (vs. company owned), associated public services (parks, emergency response) **Highway off-ramp, new access road,**	Possibly	Yes	Yes –done for traffic studies	High?	Yes, see above
Energy Use	Usually purchased energy from off-site energy power plants.	Probably not	Yes	Yes	Medium?	Yes, efficient building, alternative energy (solar hot water, outdoor lighting) efficient appliances
Water Use and Wastewater Disposal	Quantity used during construction, operation and closure, -energy used to provide water and dispose of polluted water. GHG emitted from off-site pump stations and water treatment plants for water used by proposal. GHG emitted from off-site sewage lift stations and POTWs used to convey and treat wastewater from the proposed SEPA facility. This includes fugitive methane from POTWs. It does not include biogenic CO2 emitted from POTWs.	Possibly	Yes	Yes	Medium?	Yes, water conservation measures, low flow plumbing etc.
Solid Waste	Emissions from disposal (usually off-site) of all types of waste (construction, agriculture, general	Probably not	Yes	Yes	Medium?	Yes, aggressive recycling (motor oil,

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
	trash, food). Could include tailpipe emissions from trucks and trains used to collect refuse and haul it to the disposal site and off-site emissions from pre-processing of solid waste (e.g., transfer stations), and fugitive methane emissions from solid waste landfills. It does NOT include biogenic CO2 emissions from solid waste disposal facilities.					vegy oil, on-time cameras,packaging material etc.), composting, minimize disposables,
End-use emissions from product use	Use and disposal of products by consumers, industry etc. This could include emissions generated from combustion of fuels manufactured or distributed by the proposed facility.	Possibly some	Possibly	challenging	Medium?	Yes, provide and promote "climate-friendly" alternative products

H.3 Measurement Test Case: Relocation of Business

Relocation of Business

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
Direct Emissions						
Construction	Generators and equipment exhaust, this includes off-site haul trucks during construction?	No	Yes	Yes	Minimal	Yes
Mobile Sources and Direct VMT	Directly related to project (company generated) or non-project (all commuting, and commercial transportation (includes distance and type of transport).	No	Maybe	Yes for commuting; maybe for others	No, when proposal is a relocation of business	Yes
Stationary Sources and Direct Facility Emissions	On-site combustion processes usually from company-owned equipment.	No	Yes	Yes	Yes, depending on industrial process/product	Yes
Fugitive Emissions	Unintentional emissions, accidental releases such as leaks from industrial facilities, gas releases from drilling operations etc. GHG emitted from points other than tailpipes, vents, stacks, or other locations that can be collected.	No	Yes	Yes	No	Yes
Direct Agricultural Emissions	Livestock methane, land clearing, fertilizer application, and on-site manure handling.	N/A				
Forestry Conversion and other land or aquatic vegetation disturbance	One-time soil-carbon emissions during land clearing, and permanent annual loss of CO_2 sink following removal of trees or vegetation.	N/A				
Maintenance activities	Emissions from equipment, chemicals	No	Yes	Depends on	Possible	Yes

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
				activity		
Indirect Emissions						
Extraction of Materials	Off-site mining, timber mining/extraction, petroleum products (e.g. fuel and plastic products) for products and materials that are used by the proposal.	Possibly in SEPA review for those activities	Difficult, depending on specific industrial process/product	Difficult	Unknown	Unknown
Processing of materials	Energy used and emissions from processing raw materials or end products for a proposal (e.g. cement, metals, plastics, wood, fuel).					
Transportation of materials	Delivery of raw materials to the facility by non-company-owned trucks, and shipment of produced product from the facility by non-company-owned trucks.	No	Yes	Probably	Possible	Yes, but not under proponent's control?
Employee Commute VMT	Tailpipe emissions from employee commuting	Yes, possibly in comp plan or transportation plan	Yes	Yes	Yes	Yes
Other Indirect VMT	Traffic from associated development, indirect change in traffic pattern, customer VMT (vs. company owned), associated public services (parks, emergency response)	Same as above	Yes	Yes	Yes	Yes, but not under proponent's control
Energy Use	Usually purchased energy from off-site energy power plants.	Yes	Yes	Yes	Yes	Yes
Water Use and Wastewater Disposal	Quantity used during construction, operation and closure, -energy used to provide water and dispose of polluted water. GHG emitted from off-site pump stations and water treatment plants for water used by proposal. GHG emitted from off-site sewage lift stations and POTWs used to convey and treat wastewater from the proposed SEPA facility. This includes fugitive methane from POTWs. It does not	Yes	Yes, for water use directly measurable & used for process	No	Yes	Only for water use under proponent's control

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
	include biogenic CO2 emitted from POTWs.					
Solid Waste	Emissions from disposal (usually off-site) of all types of waste (construction, agriculture, general trash, food). Could include tailpipe emissions from trucks and trains used to collect refuse and haul it to the disposal site and off-site emissions from pre-processing of solid waste (e.g., transfer stations), and fugitive methane emissions from solid waste landfills. It does NOT include biogenic CO2 emissions from solid waste disposal facilities.	Yes	Yes, for solid waste generated by contruction/operations	No	Yes	Only for wastes directly generated by construction/ops
End-use emissions from product use	Use and disposal of products by consumers, industry etc. This could include emissions generated from combustion of fuels manufactured or distributed by the proposed facility.	No	Difficult, depends on product/process	No	Yes?	

H.4 Measurement Test Case: County Comprehensive Plan (Snohomish County as example)

General description: Snohomish County would estimate GHG emissions, as part of the 5-year update to the County Comprehensive Plan. Emission estimates would be divided into two categories: 1) the County's own municipal operations; and 2) community emissions from the population living and working in the County.

County Comprehensive Plan

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
Direct Emissions (Emitted by the Proponent)						
Construction	Generators and equipment exhaust, this includes off-site haul trucks during construction?	Questionable. Some, but not all, of construction operations within the County might be included in individual proponents' SEPA.	Favorable. There are existing tools to estimate construction emissions by land use type.	Favorable. The boundary would be anything within the County.	Questionable. Construction emissions are a small fraction of the Washington state GHG emissions.	Questionable. There are some, but not many, mitigation measures to reduce construction emissions. Perhaps use of bio-diesel?
On-Site Mobile Sources and Company-Owned VMT.	County-Owned Municipal Fleet. Mobile sources operating within the Proponent's facility. Company-owned vehicles traveling off-site.	Questionable. The County's own municipal fleet operation might have been covered in a separate EIS.	Favorable. There are existing tools to forecast County-owned VMT and GHG.	Favorable. The boundary would be anything within the County.	Favorable. VMT emissions are the main component of GHG emissions.	Favorable. The County could impose VMT reduction measures on its own fleet, and could impose County-wide trip reduction measures on the general public.
Stationary Sources and Direct Facility Emissions	Space Heating and industrial emissions. On-site combustion processes usually from company-owned equipment.	Unfavorable. Space heating emissions would not have been covered in previous EIS.	Favorable for space heating. Unfavorable for industrial emissions. There are existing tools to forecast County-side	Favorable. The boundary would be anything within the County.	Favorable. Space heating and industrial combustion are major components of statewide GHG.	Favorable. The County could impose new energy conservation measures.

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
			space heating emissions by land use type. However, there is no reliable way to forecast industrial emissions.			
Fugitive Emissions	Closed landfills, active landfills, cattle raising. GHG emitted from points other than tailpipes, vents, stacks, or other locations that can be collected. E.g., landfill gas emissions, gas pipeline fugitive losses, enteric emissions from livestock.	Questionable. Fugitive emissions from closed landfills and cattle raising would probably not be covered in previous EIS/	Favorable. There are existing tools to forecast methane emissions from closed landfills and active cattle raising.	Favorable. The boundary would be anything within the County.	Favorable. Landfills and cattle raising are major components of statewide GHG.	Unfavorable. There are few **feasible** ways to reduce fugitive emissions from closed landfills and active cattle yards.
Direct Agricultural Emissions	Existing farms within County. Livestock methane, land clearing, fertilizer application, and on-site manure handling.	Unfavorable. Few farms would have been covered by previous EIS.	Favorable. There are existing tools to forecast GHG emissions from farms, and to estimate the benefits of farms as GHG sinks.	Favorable. The boundary would be anything within the County.	Favorable. Farms and agriculture are major components of statewide GHG.	Unfavorable. There are few cost-effective means to reduce agricultural GHG emissions. One potential measure would be to encourage farm protection programs, to maintain existing farms as GHG sinks.
Forestry Conversion and other land or aquatic vegetation disturbance	Loss-of-Sink due to conversion of forest land or farm land to new development. One-time soil-carbon emissions during land clearing, and permanent annual loss of CO_2 sink following removal of trees or vegetation.	Unfavorable. It is unlikely the huge number of future developments that would cause loss-of-sink would have been covered by previous EIS.	Favorable. If the County can forecast loss of land area, there are existing tools to calculate loss-of-sink.	Favorable. The boundary would be anything within the County.	Favorable. Forest land GHG sinks are a major component in Washington state.	Favorable. The County could impose measures to discourage loss-of-sink, or could require future developers to obtain GHG offsets.

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
Maintenance activities	Emissions from equipment, chemicals	Unfavorable. It is unlikely routine maintenance would have been covered by previous EIS.	Municipal = Favorable. The County can forecast its own maintenance programs. Community = Unfavorable. There is no reliable way to forecast future maintenance programs by the general public.	Favorable. The boundary would be anything within the County.	Questionable. Routine maintenance is probably a minor component of statewide GHG emissions.	Unfavorable. There are few ways to reduce GHG emissions from routine maintenance. Perhaps the County could require some fraction of all diesel fuel sold in the County to include biodiesel?
Indirect Emissions (Emitted by Parties Other Than SEPA Proponent)						
Off-Site Extraction of Purchased Materials	Off-site mining, timber mining/extraction, petroleum products (e.g. fuel and plastic products) for products and materials that are used by the proposal.	Unfavorable. Limestone, steel and petroleum used to construct facilities in the County likely come from mines not subject to previous SEPA.	Questionable. The County could derive some factors to roughly estimate emissions from mining of raw materials and from crude oil extraction, for materials used within the County.	Unfavorable. Limestone, steel, wood, and crude oil could originate from a wide variety of sources, few of which would be under County jurisdiction.	Unfavorable. Most of the emissions from mining, timber, and crude oil extraction likely are generated outside Washington state.	Unfavorable. The County would have few options to impose mitigation on out-of-state mines and oil fields.
Off-site Processing of Purchased Materials	Energy used and emissions from processing raw materials or end products purchased by a proponent (e.g. cement, metals, plastics, wood, fuel).	Unfavorable. Manufacturing of goods used by County residents probably is done at factories not subject to previous SEPA.	Unfavorable. There is no way to estimate emissions by factories used to manufacture goods used within the County.	Unfavorable. Factories used to manufacture goods used in the County come from a wide variety of sources, few of which would be under County jurisdiction.	Unfavorable. Most of the emissions from factories manufacturing goods used by County residents likely are generated outside Washington state.	Unfavorable. The County would have few options to impose mitigation on out-of-factories.
Transportation of materials by Non-Company Owned	Delivery of purchased raw materials to the facility by non-company-owned trucks,	Favorable. County-wide VMT would have been included in PSRC's regional	County Municipal = Questionable. It would be difficult for the	Questionable. On a County-side basis, it might be feasible to	Favorable. VMT emissions are major component of	Unfavorable. The County would have difficulty imposing

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
Transport	and shipment of produced product from the facility by non-company-owned trucks.	plan.	County to forecast VMT by non-county trucks delivering purchased goods to County facilities. Community = Favorable. The PSRC model includes a category "Trucks", which could be interpreted to mean VMT by trucks delivering purchased goods to County residents.	forecast the travel radius of trucks delivering purchased goods to County residents. Community = Favorable. PSRC's VMT forecasts for the "Truck" category have well defined boundaries	Washington state GHG emissions.	VMT reduction measures on commercial trucking companies delivering goods to County residents.
Employee Commute VMT	Tailpipe emissions from employee commuting	Favorable. County-side VMT would have been included in PSRC's regional plan.	County Municipal = Favorable. The County can forecast its own employees' commute emissions. Community = Favorable. There are existing tools to forecast County-side employment, commute VMT, and GHG emissions.	Favorable. There are ways to forecast the travel radius and VMT generated by commuters within the County.	Favorable. VMT emissions are major component of Washington state GHG emissions.	Favorable. The County could impose tighter employee commute trip reduction measures for all companies within the County.
Other Indirect VMT	Traffic from associated development, indirect change in traffic pattern, customer VMT (vs. company owned), associated public services (parks, emergency response)	Favorable. County-side VMT would have been included in PSRC's regional plan.	Favorable. County-side VMT is forecast by PSRC.	Favorable. PSRC's VMT forecasts have well defined boundaries.	Favorable. VMT emissions are major component of Washington state GHG emissions.	Favorable. The County could impose stringent trip reduction measures for all new development.

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
Purchased electricity	Off-site emissions from energy power plants that provide electricity to the proponent.	Favorable. Most regional power plants have been subject to previous SEPA review.	Favorable. There are existing tools to forecast GHG emissions from out-of-County power plants.	Favorable. The locations of out-of-County power plants are well defined.	Favorable. GHG emissions by fossil-fuel power plants are a major component of Washington state GHG emissions.	Favorable. The County could impose stringent energy conservation measures on all new development within the county.
Water Use and Off-Site Wastewater Disposal	Quantity used during construction, operation and closure, -energy used to provide water and dispose of polluted water. GHG emitted from off-site pump stations and water treatment plants for water used by proposal. GHG emitted from off-site sewage lift stations and POTWs used to convey and treat wastewater from the proposed SEPA facility. This includes fugitive methane from POTWs. It does not include biogenic CO2 emitted from POTWs.	Favorable. Water supply systems and POTWs are usually subject to SEPA review.	Favorable. On a County-wide basis, the County could develop GHG emission factors for GHG emissions per million gallons of water purchase and GHG per million gallons of wastewater conveyance and treatment.	Favorable. The locations of regional water supply systems and POTWs are well defined.	Favorable. Electricity usage is an important component of statewide GHG emissions.	Unfavorable. The County could impose new water usage restrictions on new development, but the resulting GHG emission reductions would be small. The County would have few options to impose restriction on wastewater discharges from new development.
Off-Site Solid Waste	Off-site emissions from disposal of all types of waste (construction, agriculture, general trash, food). Could include tailpipe emissions from trucks and trains used to collect refuse and haul it to the disposal site and off-site emissions from pre-processing of solid waste (e.g., transfer stations), and fugitive methane emissions from solid waste landfills. It	Favorable. MSW landfills that accept refuse from the County are generally subject to SEPA.	Favorable on a County-Wide basis. The County could develop factors for GHG emissions per ton of MSW collected and shipped to the regional landfills.	Favorable. The locations of regional MSW landfills are well defined.	Favorable. Landfills are an important component of State-side GHG emissions.	Favorable. The County could impose stringent new MSW reduction programs and recycling requirements on new development.

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
	does NOT include biogenic CO2 emissions from solid waste disposal facilities.					
Off-Site End-use emissions from use of proponent's products sold to others	Use and disposal of products sold by the proponent to consumers, industry etc. This could include emissions generated from combustion of fuels manufactured or distributed by the proposed facility.	Unfavorable. End users of products manufactured in the County would not be subject to SEPA.	Unfavorable. There are no tools to forecast how consumers use and dispose of the wide variety of products sold within the County.	Unfavorable. There are few ways to predict where the wide variety of products manufactured within the County are used by consumers.	Unfavorable. Many of the products manufactured within the County are used by out of state consumers.	Unfavorable. The County could not impose standards on consumers of products manufactured within the County.

H.5 Measurement Test Case: Port Expansion (Example of Port of Tacoma Master Plan for Marine Terminal Expansion)

General description: the Port would be its own lead agency for a SEPA EIS for its Master Plan to expand the Port. The Port would fund construction of the infrastructure for the new terminal. Future tenants (e.g., Hanjin Shipping) would then lease the terminal space and would operate the terminal. With the exception of initial construction emissions, the tenants would generate all of the future GHG emissions.

Port Expansion

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
Direct Emissions (Emitted by the Proponent)						
Construction	Generators and equipment exhaust, this includes off-site haul trucks during construction?	Favorable. Usually the responsibility of the proponent.	Favorable. There are readily available tools to calculate construction and dredging emissions.	Favorable. Boundary is easy to define.	Favorable. Construction emissions can be very large from some types of SEPA proposals.	Favorable. Use of biofuels is feasible. The proponent can also pay GHG offset fees.
On-Site Mobile Sources and Direct Company-Owned VMT	Directly related to project (company generated) or non-project (all commuting, and commercial transportation (includes distance and type of transport)Mobile sources operating within the Proponent's facility. Company-owned vehicles traveling off-site.	Favorable. Usually the responsibility of the proponent.	Favorable. There are readily available tools to calculate	Favorable. Boundary is easy to define.	Favorable. Non-road emissions are an important part of statewide emissions	Favorable. Use of biofuels is feasible. The proponent can also pay GHG offset fees.
Stationary Sources and Direct Facility Emissions	On-site combustion processes usually from company-owned equipment.	Favorable. Usually the responsibility of the proponent. In this case the future tenants would generate the emissions, but the Port should be able to quantify the emissions as part of the Master Plan.	Favorable. Emissions would be generated by tenants, not by the SEPA proponent. There are readily available tools for stationary sources typically found at a marine terminal (space	Favorable. Boundary is easy to define for on-site facilities.	Favorable. Industrial process emissions are an important part of statewide emissions	Favorable. Space heating emissions can be reduced by conventional methods. The proponent can also pay GHG offset fees.

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
			heating, power generation)			
Fugitive Emissions	Unintentional emissions, accidental releases such as leaks from industrial facilities, gas releases from drilling operations etc. GHG emitted from points other than tailpipes, vents, stacks, or other locations that can be collected. E.g., landfill gas emissions, gas pipeline fugitive losses, enteric emissions from livestock.	Not applicable. Few fugitive emissions at a typical marine terminal.				
Direct Agricultural Emissions	Livestock methane, land clearing, fertilizer application, and on-site manure handling.	N/A for a marine terminal				
Forestry Conversion and other land or aquatic vegetation disturbance	One-time soil-carbon emissions during land clearing, and permanent annual loss of CO_2 sink following removal of trees or vegetation.	Favorable. Usually the responsibility of the proponent.	Favorable. If the Port graded existing native vegetation, then IPCC equations can forecast the loss-of-sink.	Favorable. Boundary easily defined.	Favorable. Probably a minor fraction of GHG emissions at a Port, but this is an important component of state-side emissions.	Favorable. If the Port can't avoid wetlands and upland plants, they would have to mitigate by off-site restoration. Then, they can purchase GHG offset credits.
Maintenance activities	Emissions from equipment, chemicals	Favorable. Usually the responsibility of the proponent.	Favorable. There are readily available tools	Favorable. Boundary easily defined	Favorable. Maintenance activity would be a small fraction of GHG emissions at a Port, but this category contributes to statewide emissions.	Favorable. The Port could use biofuels for maintenance equipment. The proponent can also pay GHG offset fees.
Indirect Emissions (Emitted by Parties Other Than SEPA Proponent)						

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
Off-Site Extraction of Purchased Materials	Off-site mining, timber mining/extraction, petroleum products (e.g. fuel and plastic products) for products and materials that are used by the proposal.	Unfavorable. Marine terminal construction would require lumber, concrete, asphalt, concrete, and steel, which would be mined or logged from a wide variety of sources that are not subject to SEPA. Operation would require use of diesel fuel for marine vessels, locomotives and trucks, which originate from oil wells not subject to SEPA.	Unfavorable. The SEPA proponent would not be able to accurately calculate emissions from mining of limestone, iron ore, and aggregate needed to build the facility. The Port cannot forecast the source of the crude oil used to refine diesel oil used to power future tenants' ships, trains, and trucks.	Unfavorable. The Port would not be able to identify the mines and oil fields used to supply raw materials used to build the Port and to refine diesel oil.	Unfavorable. Mining (limestone and iron ore) and oil extraction are negligible contributors to Washington's GHG emissions.	Unfavorable. The SEPA proponent (the Port) would have little control over emissions from ore mining and oil production for materials purchased by future tenants. The only feasible mitigation measure would be GHG offset fees.
Off-site Processing of Purchased mMaterials	Energy used and emissions from processing raw materials or end products for a proposalpurchased by a proponent (e.g. cement, metals, plastics, wood, fuel).	Unfavorable. Marine terminal construction would require lumber, concrete, asphalt, concrete, and steel, which would be purchased from a wide variety of industrial plants that are not subject to SEPA. The Port would use little fuel for future operation, but the tenants would use large amounts of fuel. Tneant operation would require use of diesel fuel for marine vessels, locomotives and trucks, which originate from oil refineries not subject to SEPA.	Unfavorable. The SEPA proponent (Port of Tacoma) would not be able to accurately calculate emissions from mining of limestone, iron ore, and aggregate needed to build the facility. Diesel fuel used to operate the marine terminal would be purchased by future tenants, not by the SEPA proponent (the Port). The Port cannot forecast the source of the crude oil used to refine diesel oil used to power future tenants' ships, trains, and trucks, so the SEPA	Unfavorable. Diesel oil used to operate marine vessels, trains, and trucks would be purchased by future tenants, not by the SEPA proponent (the Port). The SEPA proponent would not be able to define where the purchased materials would originate from.	Questionable. Cement plants, oil refineries, and steel mills are important GHG emission sources in Washington State. However, it is uncertain whether the steel and diesel fuel used by the future tenants would originate in Washington state.	Unfavorable. The SEPA proponent (the Port) would have little control over oil refining for diesel fuel used by future tenants. The only feasible mitigation measure would be GHG offset fees.

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
			proponent could not accurately predict their emissions.			
Transportation of materials by Non-Company Owned Transport	Delivery of purchased raw materials to the facility by non-company-owned trucks, and shipment of produced product from the facility by non-company-owned trucks.	Unfavorable. Marine vessels, trains and trucks used to haul material into and out of the Port would be owned by companies not subject to SEPA. The shipping companies would contract to the Port's future tenants, not directly to the SEPA proponent (the Port).	Favorable. Diesel fuel usage and GHG emissions by future tenants can be predicted with reasonable accuracy.	Unfavorable. Marine vessels visiting the Port's tenants originate from worldwide sources, and trains departing the Port's tenants are heading for destinations throughout the U.S. The SEPA proponent (the Port) cannot accurately predict the origins and destinations for its tenants' shipments.	Favorable. Ships, trains and trucks are major contributors to Washington state GHG emissions.	Unfavorable. The SEPA proponent (the Port) would have little control over fuel usage and GHG emissions generated by shipping companies contracted to future tenants.
Employee Commute VMT	Tailpipe emissions from employee commuting	Questionable. Future employees would work for future tenants, not for the SEPA proponent (the Port).	Favorable. If the Port can predict its future tenant's employment figures, then the Port can predict VMT emissions from its tenants' commuters.	Favorable. Tenant commuter travel would be in the near vicinity to the Port.	Favorable. VMT emissions are a major contributor to Washington state GHG emissions.	Questionable. Can the SEPA proponent (the Port) control commuter travel by future tenants?
Other Indirect VMT	Traffic from associated development, indirect change in traffic pattern, customer VMT (vs. company owned), associated public services (parks, emergency response)	Favorable. Other future developments that would affect traffic patterns around the Port will likely be subject to SEPA.	Favorable. The Port should be able to forecast future changes in traffic patterns and VMT indirectly caused by its tenants' new contribution to regional traffic.	Favorable. The Port's SEPA traffic impact analysis would be able to define the geographical boundary of the traffic study area.	Favorable. VMT emissions are a major contributor to Washington state GHG emissions.	Unfavorable. The SEPA proponent would have no control over travel patterns by outsiders. The only available mitigation would be purchase of GHG offset fees.
Energy	Off-site emissionsUsually	Unfavorable. Electricity	Favorable. GHG	Favorable. The	Favorable. GHG	Favorable. The

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
UsePurchased electricity	purchased energy from off-site energy power plants that provide electricity to the proponent.	would be purchased from power plants not subject to SEPA.	emissions from purchased electricity are easily calculated.	electricity providers are well defined.	emissions by out-of-state fossil fuel power plants are a major contributor to Washington state GHG emissions.	SEPA proponent (the Port) could impose energy conservation measures on future tenant improvements.
Water Use and Off-Site Wastewater Disposal	Quantity used during construction, operation and closure, -energy used to provide water and dispose of polluted water. GHG emitted from off-site pump stations and water treatment plants for water used by proposal. GHG emitted from off-site sewage lift stations and POTWs used to convey and treat wastewater from the proposed SEPA facility. This includes fugitive methane from POTWs. It does not include biogenic CO2 emitted from POTWs.	Questionable. The local water utility and POTW will eventually be subject to SEPA for their long-range plans. However, it is unknown if those SEPA actions would be completed in time for consideration as part of the Port's SEPA EIS for the expansion project.	Unfavorable. The Port would have difficulty obtaining records from the water district and the POTW with enough detail to allow the Port calculate GHG emissions per million gallons of water purchase or POTW discharges.	Favorable. The local water utility and the local POTW are well defined.	Unfavorable. GHG emissions from electricity usage and POTW emissions contribute only a small fraction of statewide GHG emissions.	Unfavorable. Few mitigation options would be available, other than to buy GHG offsets.
Off-Site Solid Waste	EOff-site emissions from disposal (usually off-site) of all types of waste (construction, agriculture, general trash, food). Could include tailpipe emissions from trucks and trains used to collect refuse and haul it to the disposal site and off-site emissions from pre-processing of solid waste (e.g., transfer stations), and fugitive methane emissions	Unfavorable. The regional MSW landfill will eventually be subject to SEPA for their long-range plans. However, it is unlikely the landfill's SEPA actions would be completed in time for consideration as part of the Port's SEPA EIS for the expansion project.	Unfavorable. The Port would have difficulty obtaining records from the regional landfill with enough detail to allow the Port calculate GHG emissions per ton of refuse shipped to offsite landfills.	Favorable. The location of the regional landfill and associated transfer facilities is easily defined.	Favorable. Landfill emissions are a contributor to statewide GHG emissions.	Unfavorable. Few mitigation options would be available, other than to buy GHG offsets.

Emissions Source	Examples	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
	from solid waste landfills. It does NOT include biogenic CO2 emissions from solid waste disposal facilities.					
Off-Site End-use emissions from use of proponent's products sold to others use	Use and disposal of products sold by the proponent to by consumers, industry etc. This could include emissions generated from combustion of fuels manufactured or distributed by the proposed facility.	Unfavorable. The Port would not be able to determine which of its tenants' customers have been subject to recent SEPA actions.	Unfavorable. The Port would not be able to predict how its tenants' exported materials are used and disposed of. Such emission calculations would be impossible.	Unfavorable. The Port would not be able to determine who will use its exported products over the life of the project.	Unfavorable. Many of the Port's tenants' products would likely be used by end-use customers outside of Washington.	Unfavorable. The Port and its tenants would be unable to forecast these emissions, and there would be no feasible way to mitigate the emissions.

H.6 Measurement Test Case: Regional Transportation Plan

Emissions Source	Examples	How source related to test case?	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
Direct Emissions							
Construction	Generators and equipment exhaust, this includes off-site haul trucks during construction?	Construction of transportation projects developed as a result of plan	Addressed in project level document	Can be estimated	Yes	Modest in comparison to overall use of transportation system	NA
Mobile Sources and Direct VMT	Directly related to project (company generated) or non-project (all commuting, and commercial transportation (includes distance and type of transport).	All mobile source emissions are indirect, see below	NA	NA	NA	NA	NA
Stationary Sources and Direct Facility Emissions	On-site combustion processes usually from company-owned equipment.	NA	NA	NA	NA	NA	NA
Fugitive Emissions	Unintentional emissions, accidental releases such as leaks from industrial facilities, gas releases from drilling operations etc. GHG emitted from points other than tailpipes, vents, stacks, or other locations that can be collected.	NA	NA	NA	NA	NA	NA
Direct Agricultural Emissions	Livestock methane, land clearing, fertilizer application, and on-site manure handling.	NA	NA	NA	NA	NA	NA
Forestry Conversion and other land or aquatic vegetation disturbance	One-time soil-carbon emissions during land clearing, and permanent annual loss of CO_2 sink following removal of trees or vegetation.	Forestry conversion could be an issue if land converted for roadways.	Would also be addressed at project level	NA	NA	NA	NA

Maintenance activities	Emissions from equipment, chemicals	Roadway maintenance not considered at plan level	NA	NA	NA	NA	NA
Indirect Emissions							
Extraction of Materials	Off-site mining, timber mining/extraction, petroleum products (e.g. fuel and plastic products) for products and materials that are used by the proposal.	Materials extracted to construct transportation projects resulting from plan	Could be addressed by extractor. May be discussed at project level	No. Materials for specific projects undefined at the plan level.	No		No
Processing of materials	Energy used and emissions from processing raw materials or end products for a proposal (e.g. cement, metals, plastics, wood, fuel).	Materials processed to construct transportation projects resulting from plan	Could be addressed by processor. May be discussed at project level	No. Materials needed for specific projects undefined at the plan level.	No		No
Transportation of materials	Delivery of raw materials to the facility by non-company-owned trucks, and shipment of produced product from the facility by non-company-owned trucks.	Materials transported to construct transportation projects resulting from plan.	Because all transportation in region is included, transportation of construction materials within region is included in plan. Materials transport to the region is not included, but would be covered in appropriate region's plans.	Unable to differentiate emissions attributable to transportation of materials for projects resulting from plan. The supplier for specific projects is not chosen at a plan level; delivery distances can't be projected. Regional estimates might be relevant.	No	Transport of materials for transportation infrastructure construction minimal compared to overall transportation emissions.	No
Employee Commute VMT	Tailpipe emissions from employee commuting	Included in indirect VMT	NA	NA	NA	NA	NA
Other Indirect VMT	Traffic from associated development, indirect change in traffic pattern, customer VMT (vs. company owned), associated public services (parks, emergency	Mobile source emissions are the focus of transportation plan	Mobile sources could be addressed in plans at multiple levels	Regional Travel Demand Models examine population growth and VMT. Mobile source	Yes	This is the level to make decision on the nature of transp system	Yes, consider alternate projects/ programs for transportation

	response)			emissions most reliably assessed at plan level		developed, types of projects that are pursued, and evaluate GHG effects.	system.
Energy Use	Usually purchased energy from off-site energy power plants.	Electricity for transport only an issue if evaluating increase in electric vehicles.	NA	NA	NA	NA	NA
Water Use and Wastewater Disposal	Quantity used during construction, operation and closure, -energy used to provide water and dispose of polluted water. GHG emitted from off-site pump stations and water treatment plants for water used by proposal. GHG emitted from off-site sewage lift stations and POTWs used to convey and treat wastewater from the proposed SEPA facility. This includes fugitive methane from POTWs. It does not include biogenic CO2 emitted from POTWs.	NA	NA	NA	NA	NA	NA
Solid Waste	Emissions from disposal (usually off-site) of all types of waste (construction, agriculture, general trash, food). Could include tailpipe emissions from trucks and trains used to collect refuse and haul it to the disposal site and off-site emissions from pre-processing of solid waste (e.g., transfer stations), and fugitive methane emissions from solid waste landfills. It does NOT include biogenic CO2 emissions from solid waste disposal facilities.	NA	NA	NA	NA	NA	NA

End-use emissions from product use	Use and disposal of products by consumers, industry etc. This could include emissions generated from combustion of fuels manufactured or distributed by the proposed facility.	Use of transportation system part of indirect mobile emissions	NA	NA	NA	NA	NA

H.7 Measurement Test Case: Road Widening (Example of widening county road from 2 to 4 lanes and

Road Widening (Note: Project is due to regional population growth)

Emissions Source	Examples	How source related to test case?	Addressed in another SEPA document?	Credibly measured or assessed?	Boundary Determined?	Importance to Climate Change Impacts?	Mitigation Available?
Direct Emissions							
Construction	Generators and equipment exhaust, this includes off-site haul trucks during construction?	Construction of new lanes	No	Energy use is estimated based on construction costs	Direct emissions emitted from fuel used	Modest compared to use of roadway	Alternative fuels, improve fuel efficiency of equipment, how equipment is used
Mobile Sources and Direct VMT	Directly related to project (company generated) or non-project (all commuting, and commercial transportation (includes distance and type of transport).	Vehicles traveling on this section of roadway, changes in travel patterns on connecting road network – really an indirect source.	Yes, planning level document	No, difficult to discern effects of single project on roadway network	Difficult to discern boundaries of effects of single project on roadway network	Important source to reduce. Choices about transportation system best made at plan level.	Difficult to mitigate single transportation project. Decisions made at planning level determine nature of roadway network.
Stationary Sources and Direct Facility Emissions	On-site combustion processes usually from company-owned equipment.	NA	NA	NA	NA	NA	NA
Fugitive Emissions	Unintentional emissions, accidental releases such as leaks from industrial facilities, gas releases from drilling operations etc. GHG emitted from points other than tailpipes, vents, stacks, or other locations that can be collected.	NA	NA	NA	NA	NA	NA
Direct Agricultural Emissions	Livestock methane, land clearing, fertilizer application, and on-site manure handling.	NA	NA	NA	NA	NA	NA

Forestry Conversion and other land or aquatic vegetation disturbance	One-time soil-carbon emissions during land clearing, and permanent annual loss of CO_2 sink following removal of trees or vegetation.	Filling in wetland removes sink	No	Estimated based on size and quality of wetland lost	Yes		Wetland loses are already mitigated.
Maintenance activities	Emissions from equipment, chemicals	Maintenance of roadway and roadside	No	No	Difficult to determine maintenance for small section of roadway	Minimal.	Direct emissions from roadway maintenance reported in WSDOT emissions inventory.
Indirect Emissions							
Extraction of Materials	Off-site mining, timber mining/extraction, petroleum products (e.g. fuel and plastic products) for products and materials that are used by the proposal.	Materials used to construct new lanes, e.g., asphalt, concrete	Extraction emissions may be captured in extractor's environmental documents.	Difficult to determine emissions from extraction that could occur at many places.	What emissions are included as part of extraction? Difficult to know where to stop.		Use alternate materials, alternate vendor with lower emissions. Extractor emissions may be regulated under cap and trade system.
Processing of materials	Energy used and emissions from processing raw materials or end products for a proposal (e.g. cement, metals, plastics, wood, fuel).	Materials used to construct new lanes, e.g., asphalt, concrete	Processing emissions may be captured in processor's environmental documents.	Difficult to determine emissions from processing that could occur at many places.	What emissions are included as part of extraction? Difficult to know where to stop.		Use alternate materials, alternate vendor with lower emissions. Processing emissions may be regulated under cap and trade system.
Transportation of materials	Delivery of raw materials to the facility by non-company-owned trucks, and shipment of produced product from the facility by non-company-owned trucks.	Fuel used to deliver materials to construction site	All transportation emissions would be captured in transportation plan	Difficult to determine emissions specifically related to materials transported for	Difficult to determine boundary. Where do you stop?		Use locally extracted, processed, manufactured materials, if available.

				single project. What about transportation of parts prior to assembly?			
Employee Commute VMT	Tailpipe emissions from employee commuting	Commute to construction site	All transportation emissions would be captured in transportation plan			Minimal	Encourage alternative transportation modes: carpooling, transit, shuttle bus, work schedules
Other Indirect VMT	Traffic from associated development, indirect change in traffic pattern, customer VMT (vs. company owned), associated public services (parks, emergency response)	Adding new road could encourage yet more development in area. Induced growth	Likely addressed in planning documents: transportation plan, comp plan, etc.	Unable to measure at project level	Difficult to determine boundary.		Planning level most effective place to make transportation and land use choices.
Energy Use	Usually purchased energy from off-site energy power plants.	NA	NA	NA	NA	NA	NA
Water Use and Wastewater Disposal	Quantity used during construction, operation and closure, -energy used to provide water and dispose of polluted water. GHG emitted from off-site pump stations and water treatment plants for water used by proposal. GHG emitted from off-site sewage lift stations and POTWs used to convey and treat wastewater from the proposed SEPA facility. This includes fugitive methane from POTWs. It does not include biogenic CO2 emitted from POTWs.	NA	NA	NA	NA	NA	NA
Solid Waste	Emissions from disposal (usually off-site) of all types of waste (construction, agriculture, general trash, food). Could include tailpipe	NA	NA	NA	NA	NA	NA

	emissions from trucks and trains used to collect refuse and haul it to the disposal site and off-site emissions from pre-processing of solid waste (e.g., transfer stations), and fugitive methane emissions from solid waste landfills. It does NOT include biogenic CO2 emissions from solid waste disposal facilities.						
End-use emissions from product use	Use and disposal of products by consumers, industry etc. This could include emissions generated from combustion of fuels manufactured or distributed by the proposed facility.	Emissions from use of roadway	See Mobile Sources above.	NA	NA	NA	NA

Appendix I: Analysis of Threshold Determination Options

The documents in this appendix were used by the SEPA IWG to analyze options for threshold determination. These were working documents that should not be considered final products of the SEPA IWG.

I.1 Options for Significance Standard (Authors: Hilary Franz and Patricia Betts)

This Appendix discusses six options for setting a standard significance thresholds for greenhouse gas emissions under SEPA. This Appendix explores each option and discusses the advantages and disadvantages of each.

I. **DEGREE OF REQUIREMENT**

A. Set in rule, required to be used for determining significance (and possibly used for determining mitigation)

B. Presented in guidance, directing agencies to use it for determining significance, but with no "teeth" nor directive for agencies to adopt it.

C. Set in law, required to be used for determining significance.

D. Set in law, required to be used for determining significance and determining mitigation.

II. **QUESTIONS**

A. Does establishing a significance threshold of zero (or other level) affect the use of categorical exemptions?

Possible strategies: If regulatory approach is pursued, 197-11 could provide caveats (exceptions) for exemptions. These caveats or exceptions could mention BMPs for climate impacts as a means to remain exempt or could require analysis and limit it to climate change. If the procedural approach is pursued, agencies could create their own exceptions to the exemptions as with critical areas (197-11-908).

A. How could the scaling of GHG reduction plans remain consistent with the Emissions Reduction Law?

B. What is the relationship between non-project (plans) and project emissions inventories?

C. Would the purchase of emissions "credits" through a regional Cap & Trade system be allowed for the purpose of mitigating project and non-project actions? If so, would certification of emission inventories be necessary?

D. Does the approach make it easier to minimize project-level SEPA review and emphasize review at the sub-area or planning level?

III **STATEWIDE STANDARD**

A. Zero Significance Threshold

1. ***SINGLE OPTION***

(i) ***Description***: This approach sets the GHG emission threshold at zero increase in tons/year. Under this approach any increase in emissions would be significant.

1) Projects that result in a reduction of GHG emissions compared to baseline emissions would be less than significant. Projects that result in a net increase of GHG emissions would be required to mitigate their emissions to zero or exceed the threshold.

2) This threshold approach is based on the belief that 1) all GHG emissions contribute to global climate change and could be considered significant, and 2) not controlling emissions from smaller sources would be neglecting a major portion of the GHG inventory.

3) Project Steps:
   i. Inventory of GHG emissions generated by project,
   ii. Inventory of energy needs of project, and
   iii. Provide onsite and offsite mitigation to reduce GHG emissions to net zero or exceed the threshold.

4) Non-Project Steps:
   i. provide an inventory of GHG emissions generated within the planning area,
   ii. provide an inventory of energy needs of the planning area, and
   iii. develop a GHG Reduction Plan for the planning area that implements the GHG Emission Reduction to zero or exceed the threshold.

b) ***Advantages***:

1) Addresses the cumulative impact of many small GHG sources. While individually many GHG sources are too small to make any noticeable difference to climate change, it is also true that the countless small sources around the globe combine to produce a very substantial portion of total GHG emissions.

2) Under this option, all projects subject to SEPA would be required to quantify and mitigate their GHG emissions. All would fall under the SEPA microscope.

3) Potentially greater degree of certainty for project proponents

4) Possible to establish GHG Best Practices for smaller projects to achieve compliance without forcing extensive analysis for them

c) ***Disadvantages***:

1) Increased administrative costs and pressure on environmental review system capacity given that some projects that previously would have qualified for an exemption could require substantial analysis.

2) May be that the increased volume of projects requiring review reduces the quality of consideration given to review worst projects

3) Should consider whether meaningful mitigation can be achieved from smaller projects

B. Non-zero Significance Threshold
Note: There are ways that some of the following thresholds could be a zero threshold, but it is not assumed or assured as it is with the zero threshold.

1. ***OPTION 1: Set x tons/unit threshold, x tons/year threshold, or x tons/person threshold***

a) ***Description:*** Set a bright line numerical threshold.

1) Project: If the threshold was set at xx tons per year then each project that exceeds that threshold would be considered to have a significant impact (e.g., residential development threshold = 900 tpy, an industrial project could not exceed 25,000 tpy). A project could then use mitigation to bring itself below the threshold.

Steps are:
i. Inventory of GHG emissions generated by project,
ii. Inventory of energy needs of project, and
iii. If above XX tpy threshold then provide onsite and offsite mitigation to reduce GHG emissions to below threshold.

2) Non-project:

i. Provide an inventory of GHG emissions generated within the planning area,
ii. Provide an inventory of energy needs of the planning area, and
iii. If action exceeds numerical threshold, develop a GHG Reduction Plan for the planning area that implements the GHG Emission Reduction to below the numerical threshold or adopt feasible reduction measures to reach GHG reduction target and come below numerical threshold.

b) Advantages:

1) Excludes small projects that have a relatively small contribution to state GHG inventory. If limit set at tons per unit, then small projects could be captured.

2) Single threshold easier to apply to projects and more easily understood by the public, applicants and lead agencies.

Question: Would a single threshold be applied to all project types? If done on a unit basis, this would not work, would need to be different for each type of project.

c) ***Disadvantages***

1) If set too low may discourage mitigation and if set too high may not capture enough projects to meet state requirements of GHG reduction targets

2) Larger projects shoulder greater burden of reductions to compensate for smaller projects not requiring mitigation, in order to reach reduction targets statewide.

3) Projects designed to be just under the limit to avoid dealing with the threshold.

4) It is not clear that a threshold that allows for unmitigated GHG emissions will meet the emission reduction requirements in RCW 70.235.020(1)(a). If all actions are allowed 900 metric tons per year of GHG emissions, for example, without some sort of required future reduction it is unlikely the required emission reductions could be met.

5) Per capita thresholds would not likely meet the emission reduction requirements in RCW 70.235.020(1)(a) since they call for an absolute reduction in emissions whereas per capita thresholds with a growing population will likely allow continued emissions growth.

2. OPTION 2: Meeting WA State GHG Reduction Requirements

a) ***Description***: In 2008, the Washington State Legislature set requirements for reducing statewide GHG emissions to 50 % below 1990 levels by 2050. RCW 70.235.020(1)(a). RCW 70.235.020(1)(b) specifically authorizes actions to achieve these reductions under existing statutory authority, which would include SEPA. Since one of the SEPA considerations for when an EIS is required is whether an action is inconsistent with state law, the adoption of limits is significant for SEPA review.

Reducing GHG emission levels 50 % below 1990 levels will require both reductions in existing GHG emissions and new emissions.

Question: What about emission reductions in response to cap and trade?

This threshold option would require a project/non-project to show that they will meet the required reductions in order to be considered less than significant.

Question: How would percent reduction be chosen in relation to increase state reduction goal? Would the project reduction goal change over time to meet changing state goal?

Emissions could be allocated to sectors or geographic areas. The allocation could take into account the feasibility of reductions from a particular sector or use and the most cost effective ways to reduce greenhouse gas emissions. Because the allowed emissions are reduced over time the needed reductions could also be phased as new technologies become available.

Question: Once a project is included in a complying plan, would the project need it's own emissions analysis?

1) <u>Project</u>:

i. This threshold approach would require a project to show that they will meet the required reductions based on the average reductions needed from the 1990 emission levels from all GHG sources. The required reductions could be determined on a case-by-case basis by comparing projected future emissions against estimated 1990 emissions and then determining a fair share reduction needed to achieve the necessary reductions.

ii. Alternatively, a state agency or local government could allocate the required reductions in the same manner as emissions are allocated for non-project actions.

2) <u>Non-project</u>:

i. A local jurisdiction or state agency determines 1990 emissions, current emissions, and projected emissions.

ii. Jurisdiction then calculates the necessary reductions/net emissions to meet 50% below 1990 target requirements.

iii. Any proposal that does not meet the reduction (net emissions) state levels, would be considered to have significant impacts on climate, and all the climate change associated indirect effects.

3. ***OPTION 3: Uniform Percentage-Based Reduction***

a) ***Description***:

State would adopt a percentage reduction below business as usual necessary to reach set level overall as end strategy (could be part of achieving the state GHG reduction requirements or another number based on science). (Note: This approach assumes a percentage less than 100 percent.)

This approach is not that different from Option 2 except that it presents a different percentage. This different percentage could be applied to different project types.

1) Project: A project would be required to meet a percent reduction target based on the average reductions needed from the business-as-usual emission from all GHG sources to be considered less than significant. (E.g., the threshold could be 15 tpy per residential unit (25% below BAU) and 50 tpy per 1000 sq. ft. retail (25% below BAU)).

2) Non-Project: Including in Comprehensive planning documents measures necessary to reach percentage reduction in GHG. Such measures could include mitigation in the area of energy efficiency and conservation, recycling and waste management, transportation, water, and land use and design.

b) ***Advantages of Options 2-3 Percentage Based Approach***:

1) Using a percentage/time based requirement as the basis for a significance threshold may be more appropriate to address the long term adverse impacts associated with climate change

2) If this goal is connected to the statewide requirements then it presents more likelihood of actually achieving statewide requirements.

c) ***Disadvantages of Options 2-3 Percentage Based Approach***:

1) Difficult to allow for changes in the baseline and future emission inventories estimates Need to provide clarification on role of emission inventories needed.

2) Projecting future inventories over the next 15 to 50 years involves uncertainty.

3) It is not clear that a reduction over business as usual can achieve the reductions required by state law. RCW 70.235.020(1)(a) requires reductions first to the 1990 level and than to 25 or 75 percent below the 1990 levels. A reduction from business as usual implies that emissions will be allowed to grow, although at a slower rate.

4. ***OPTION 4: Standard Threshold By Type of Project***

a) ***Approach 1: Quantitative Threshold Based on Market Capture***

1) **Project**

a. Residential: Review data from at least 20 diverse cities and counties on pending applications for development.

b. Determine the unit threshold that would capture approximately 90 percent of the residential units in the pending application lists. (E.g., in CA based on data of 90%, thresholds selected would be 50 residential units. GHG emissions associated with 50 single-family residential units is 900 metric tons/yr. So single threshold is 900 metric tons for residential projects.)
c. Office: Similar approach for residential with threshold being 30,000 square feet. So single threshold of 900 metric tons.
d. Industrial: Less amenable to a unit-based approach given diversity of projects within sector. Option would be to adopt a quantitative GHG emissions threshold for industrial projects equivalent to that for the residential/commercial thresholds.

2. **Non-project:**

a. Option would be to adopt a quantitative GHG emissions threshold for non-projects equivalent to that for the residential/commercial thresholds.

3) Advantages

i. Proposed threshold would exclude the smallest proposed developments from potentially burdensome requirements to quantify and mitigate GHG emissions
ii. Captures 90 percent of each market to show that cumulative reductions are being achieved
iii. Requires vast majority of new dev't emission sources to quantify GHG Would require all proponents to quantify to determine if under/over threshold.

4) Disadvantages

i. Requires extensive information on jurisdictional applications for each economic sector.
ii. Data changes over time
iii. Necessary data and resources not likely available presently.
iv. Larger projects shoulder greater burden of reductions to compensate for smaller projects not requiring mitigation, in order to reach reduction targets statewide.
v. Under this proposal, ten percent of all development would be exempt from review. This may not achieve the reductions required by state law. RCW 70.235.020(1)(a) requires reductions first to the 1990 level and than to 25 or 75 percent below the 1990 levels.
vi. Could encourage development of projects just under threshold.
vii. Dynamic changes in the market by year and by region.

***b) Approach 2: Uniform %-Based Reduction by Economic Sector/ by Region (*This threshold option would use a tons/year GHG threshold specific to the economic sector associated with a project.)**

1) **Project**

i. There would be specific threshold for each economic sector (residential, commercial, and industrial). E.g., For residential could set at xx tpy which would be set based on percent of projects trying to capture or be set so the existing categorical exemptions would remain exempt.

2) <u>Non-Project</u>

i. This uniform percentage based reduction could also be applied to a geographic region for purposes of non-project action. The threshold standard could specify a percentage level for regions of the state. The areas within each region required to plan must then demonstrate that through their plans they are in compliance with the percent reduction goal.

3) Advantages

i. Allows selection of the best regulatory goal for each sector taking into account available technology and costs.
ii. Avoids over-regulating projects (i.e., requiring emissions to be controlled in excess of existing technology) or under-regulating projects (i.e., discouraging the use of available technology to control emissions in excess of regulations)

4) Disadvantages

i. Requires extensive information on the emission inventories and best available control technology for each economic sector.
ii. More viable option in the long term but necessary data and resources not likely available presently.
iii. Larger projects shoulder greater burden of reductions to compensate for smaller projects not requiring mitigation, in order to reach reduction targets statewide.

c) Approach 3: A flexible range based on amount of GHG emissions

1) Local jurisdictions are required to choose a threshold within a designated range.
- *e.g. choose between 500 and 5,000 MTCO2e*
- *e.g. choose between a number of units (5- 20 residential units)*
- *e.g. choose another GHG emissions reporting requirement (2,500 for mobile sources and 10,000 MTCO2e for stationary sources)*

2) Advantages

i. Could capture a certain % of development related emissions or be set so that the existing categorical exemptions remain exempt.
ii. Could be defined to capture most emissions but exclude small projects
iii. Could lower burden on small developments
iv. Could lower burden on SEPA lead agencies

3) Disadvantages

i. Requires knowledge of the type of projects and their GHG emissions that are likely to go through each SEPA lead agency
ii. Larger projects shoulder greater burden of reductions to compensate for smaller projects not requiring mitigation, in order to reach reduction targets statewide.
iii. Depending on the threshold, this alternative may not achieve the reductions required by state law. RCW 70.235.020(1)(a) requires reductions first to the 1990 level and then to 25 or 75 percent below the 1990 levels.

d) ***Approach 4: Identify certain types of projects (e.g., industrial projects, mining projects, road projects, small projects) as significant without mitigation and prescribe feasible mitigation measures based on project size and type***

1) This would need to be used in conjunction with another approach for other types of projects that are not automatically considered significant.

e) ***Approach 5:*** **Standard Threshold by Size of Project**

a) ***Description***

i. Projects of a certain size would qualify as exceeding the threshold. E.g., proposed residential dev't of more than x dwelling units, proposed shopping center or business employing more than x number of people or encompassing more than x square feet of floor space, proposed hotel of more than x rooms.

The question with this approach is what is the threshold number the project must mitigate under – does it mitigate to point of reducing GHG emissions to level of project size below threshold. So if the threshold were set at a 40 unit housing development, a 50 unit development would need to mitigate to the same emissions as a 40 unit development, Or a 200 unit mitigate to a 40 unit development

2) **Project**: e.g., If the threshold was set at 15 residential units/10,000 sq.ft commercial space, each project that exceeds that size would be considered to have a significant impact. A project could then use mitigation to bring itself below the emissions level of 15 residential units/ 10,000 sq. ft. The thresholds could be set so the categorical exemption would continue to be exempt.

3) **Non-project**: Under this category, a threshold standard could be set for cities and counties based on the size/scale of the local jurisdiction for Comprehensive Plans. The County would then have to show its CP meets the threshold in order to be considered less than significant.

4) ***Advantages/Disadvantages***

i. Same advantages and disadvantages as Option 1 under the Non-Zero Threshold.
ii. Rigid option with potential for litigation
iii. Could require detailed list of thresholds by project type.

5. OPTION 5: Tiered Approach/Decision Tree Approach

a) Description

The goal of this approach is to maximize reduction predictability while minimizing administrative burden and costs. This would be accomplished by prescribing feasible mitigation measures and reserving the detailed review of an EIS for those projects of greater size and complexity.

This approach would "bin" projects based on established characteristics, with increasing requirements for each bin, or tier

1) Tier 1: *Less than Significant*:

Emissions associated with a project/plan are assumed to have a significant impact unless one can arrive at a less-than-significant finding by at least one of the following methodologies:

a. For Non Project and Project Action, Demonstrate that a planning document is in compliance with State's goal or other stated standard threshold (zero-threshold, uniform % reduction threshold, etc.).

(e.g., A comp plan fully document 1990 and 2020/50GHG emission inventories. If its 2020/50 mitigated emissions are 25% and 50%, respectively, less than 1990 emissions it is considered less than significant.

(e.g., if the threshold is zero then a project does not have significant impacts if it meets zero net GHG emissions, or if threshold set at Quantitative (tons/year) or Qualitative (unit based on market capture) then project not significant impact if comes below Quantitative or Qualitative threshold due to other legal authority.)

b. For Project Action, Demonstrate the Project is Exempt

(e.g., for CA projects funded under its Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act and Disaster Preparedness and Flood Prevention Bond Act may be exempt)

Question: How is exemption determined? Need to be careful if exemption is based on funding titles, as definitions of 'safety' and other terms can be squishy and change over time.

OR

c. For Project Action, Demonstrate that the project is on the "Green List".

The Green List would consist of a list of projects and project types that are deemed a positive contribution to state efforts to reduce GHG emissions. (Ex. A wind farm that had negligible construction emissions; Small hydroelectric at existing facilities that generate 5 mw or less; increase in bus service along an existing bus line; Dev't of bicycle, pedestrian, or zero emission transportation infrastructure to serve existing regions; Extension of public transportation services to currently developed but underserved communities; Recycled water projects that reduce energy consumption related to water supplies, etc.)

OR

d. For Non- project or Project Action, Demonstrate that project is consistent with local and regional jurisdictions' GHG Reduction Plan. Ecology could also do a GHG reduction plan and a project that copies with it could be non-significant.

Where a project can demonstrate it is consistent with an appropriate planning document's or state agency's GHG Reduction Plan (CGRP), the project can be declared less than significant. Comprehensive and other long-range planning processes would analyze GHG emissions, significance, mitigation, etc. and

develop a Greenhouse Gas Reduction Plan (GGRP). A project would start with analysis done at non-project stage and verify that the project was consistent with the plan and that appropriate non-project analysis for GHG emissions was conducted. Requires thorough GHG analysis at non-project level and additional guidance or rule.

If Not Then

2) Tier 2: *Exceeds Threshold but Mitigated to Less than Significant*:
In Tier 2, those projects that did not meet the threshold analysis would be required to implement a comprehensive set of Level 1 mitigation to bring themselves below the threshold. Quantitative and Qualitative inventories would be required.

   a. If applying a zero threshold: A project results in a net increase of GHG emissions, but is mitigated to zero through direct mitigation or offsets. An approach similar to mitigation sequencing could be applied to put mitigation before offsets in priority
   b. If applying a Quantitative threshold (tons/year) : A project would implement a comprehensive set of Level 1 mitigation strategies to bring it below the threshold (ex. Parking reduction beyond code, solar roofs, LEED Silver or Gold Certification, TDM measures, intelligent transportation systems, etc.)
   c. If applying a Qualitative threshold (unit-based market capture- # of dwu, sq ft space or per capita ratio): Projects with emissions above the standard threshold would be required to implement a comprehensive set of Level 1 mitigation. Projects below Tier 1 threshold would not be required to quantify emissions or reductions.

3) Tier 3: *Significant and Unavoidable Impacts or Mitigated to Less than Significant*:

   If impacts still exceed the Tier 1 threshold an even more aggressive set of Level 2 mitigation measures would be required to reduce emissions below the Tier 1 threshold. In Tier 3 for those projects that did not meet threshold after Tier 2 mitigation and analysis, the project would be required to reduce net emissions using Level 2 reductions, in addition to Level 1 mitigation strategies. This tier would distinguish the larger projects from the smaller ones.

   a. Projects may remain significant and unavoidable where mitigation infeasible to reduce emissions to zero (e.g., cost to offsets infeasible for project or offsets not available)
   b. For Quantitative approach, more aggressive set of Level 3 mitigation measures would be required (could include such measures as on-site renewable energy system, LEED Platinum certification, required recycled water use for irrigation, etc. that would mitigate to less than significant.)
   c. For Qualitative approach, apply Level 3 mitigation and require offsets for remainder (when feasible) in the amount of 90 percent of net emissions after application of Level 1, 2 and 3 mitigation. A variant could be to require mandatory Level 3 mitigation without quantification and offsets

Questions: If emissions are qualitatively discussed, not quantitatively discussed, how can 90 percent of emissions be offset. Especially when entering the carbon market for offsets, emissions will need to be carefully calculated.

4) Tier 4: EIS

For projects that are cannot mitigate or offset to below the threshold, an EIS would be necessary

b) Advantages

1) Allows flexibility by establishing multiple thresholds to cover a wide range of projects

2) Tiers could be set at different levels depending on GHG emissions, size and characteristics of projects

3) Could design to support WA state GHG reduction goals

c) Disadvantages

1) Similar disadvantages as explained in approaches above.

2) Approach is relatively complex although complexity could be reduced through a well designated flow chart.

Table 1: Option 6 Tiering Approach

	Zero Threshold Standard	Quantitative Threshold Standard	Qualitative Threshold Standard
Tier 1	Project results in a net reduction of GHG emissions below zero = *Less than Significant Impacts*	Project in compliance with state law req't, a Comp. Plan CGRP, on Green List, or below Tier 2 threshold Implement Level 1 Reductions (Reductions like Energy Star roofs and appliances, water use efficiency, etc.) = *Less than Significant if Level 1 Reductions applied*	Project in compliance with state law req't, a Comp. Plan CGRP, on Green List, or below Tier 2 threshold Implement Level 1 Reductions (same as measures under 2B) = *Less than Significant if Level 1 Reductions applied*
Tier 2	Project results in net GHG increase Mitigate to zero (through direct or offsets) = *Mitigated to Less than Significant Impacts*	Emissions above Tier 2 threshold Level 2 Mitigation (Mitigation such as parking reductions beyond code, solar roofs, LEED standards) = *Less than Significant if Level 1 and 2 mitigations applied*	Project meets Tier 2 criteria Level 2 Mitigation Reductions necessary (see measures under 2B) = *Less than Significant if Level 1 and 2 mitigations applied*
Tier 3	Net GHG increase Mitigation infeasible to reduce emissions to zero (e.g., cost of offsets infeasible for project or offsets not available) *Significant and Unavoidable Impacts*	Emissions above Tier 2 threshold with Level 1 and 2 Mitigation Level 3 Mitigation (On-site renewable energy systems, LEED Platinum certification, zero waste/high recycling requirements, offsets/carbon impact fees, etc.) = *Mitigated to Less than Significant with Level 1, 2 and 3 mitigation*	Above Tier 3 thresholds Quantify Emissions, Level 3 Mitigation (see measures under 2B) and offsets for 90% of remainder = *Significant and Unavoidable Impacts*

6. *OPTION 6: Decision Tree - Alternative*

a) ***Tier 1***: Are all GHG emissions addressed by a Comprehensive GHG Reduction Plan or a regulatory structure (local, state, and federal requirements requiring reduction in emissions)?

i) If YES, then no SEPA analysis required.

ii) If NO, then:

i. Those GHG emissions not addressed by a regulatory structure or a Comprehensive GHG Reduction Plan would undergo SEPA analysis. Do those additional emissions exceed the standard threshold?

ii. If the development regulations do not account for all the emissions associated with the project, you then calculate the remaining emissions. If the remaining emissions do not exceed the threshold determination a DNS would be issued for the project.

b) ***Tier 2***: If remaining emissions exceed the threshold determination, then mitigate the remaining emissions to bring below the selected standard threshold. (MDNS) Assuming

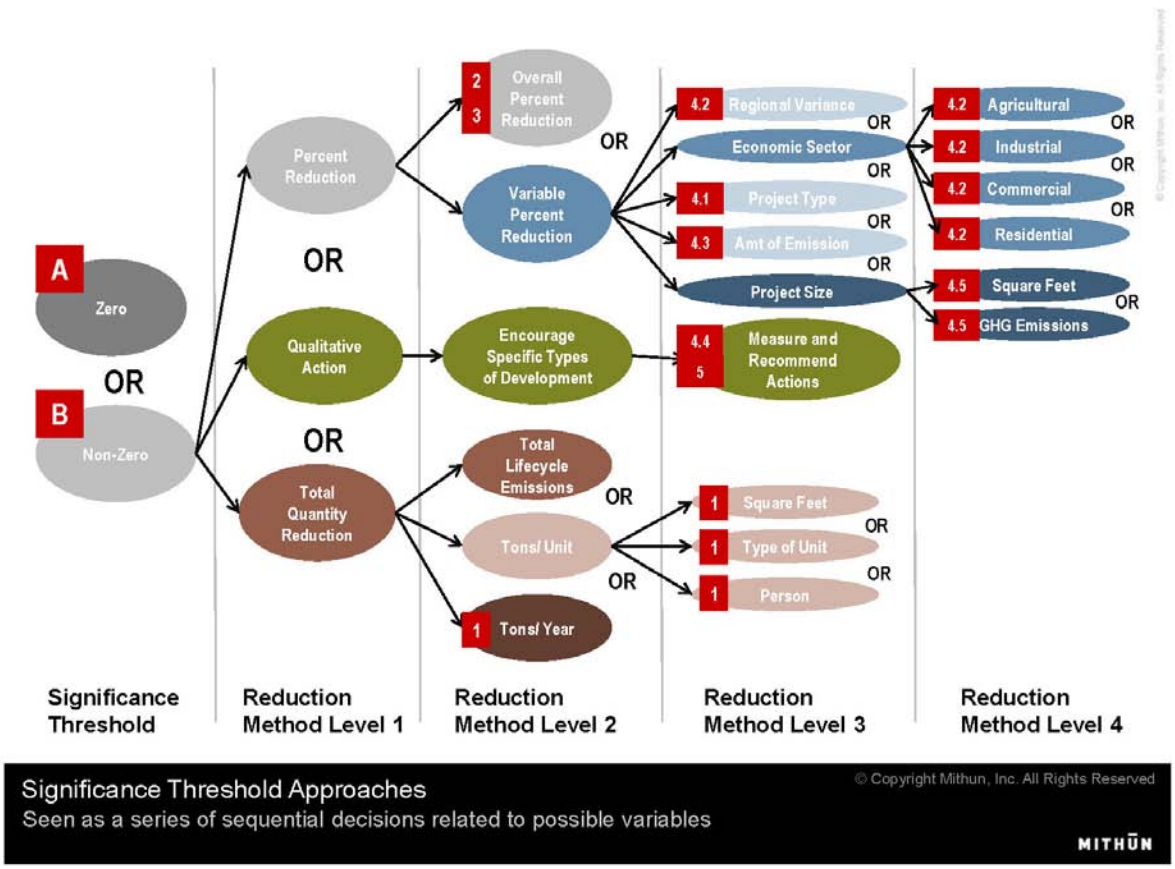
the SEPA analysis determines mitigation is required the project would then be required to mitigate down to the threshold determination level. At this point the project proponent would be able to select from a pre-identified list of mitigation options to satisfy the required mitigation. (Note: refer to work done by Mitigation Subgroup)

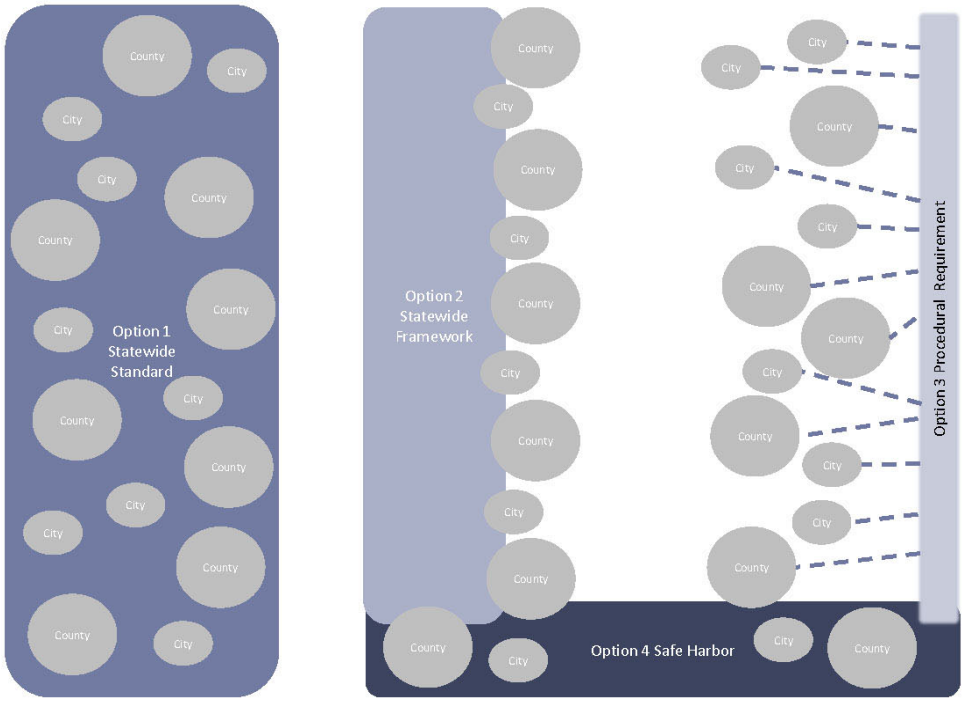
c) ***Tier 3***: If need further aggressive mitigation or offsets to bring GHG emissions below the threshold, then apply to project/non-project to reach MDNS

d) ***Tier 4***: For projects unable to meet threshold after mitigation and offset, then EIS.

I.2 Options for Significance Standards (Graphics)

The following slides were used by the SEPA IWG to illustrate options for significance standards described above in Appendix Section I.1.





Significance Threshold Approaches
Options for Statewide Consistency

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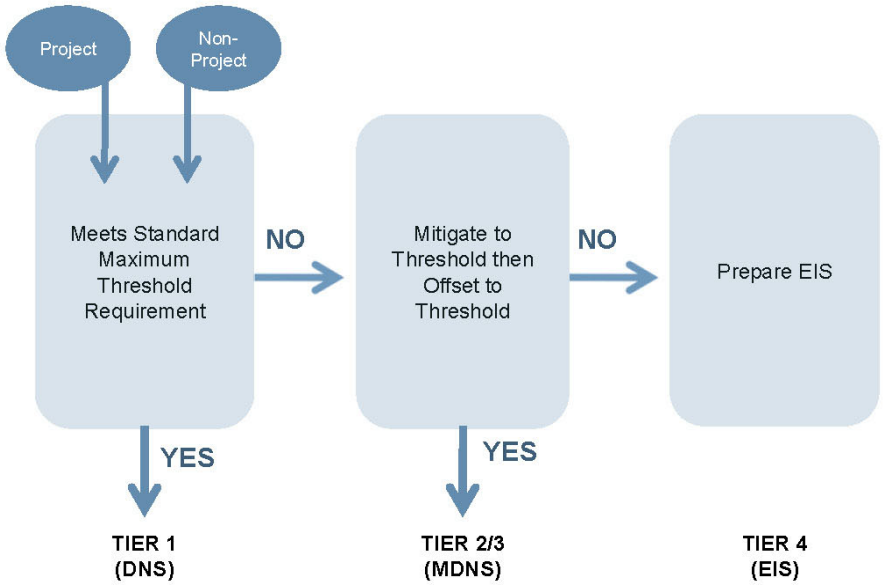

Significance Threshold Approaches
Standard SEPA process for all applications

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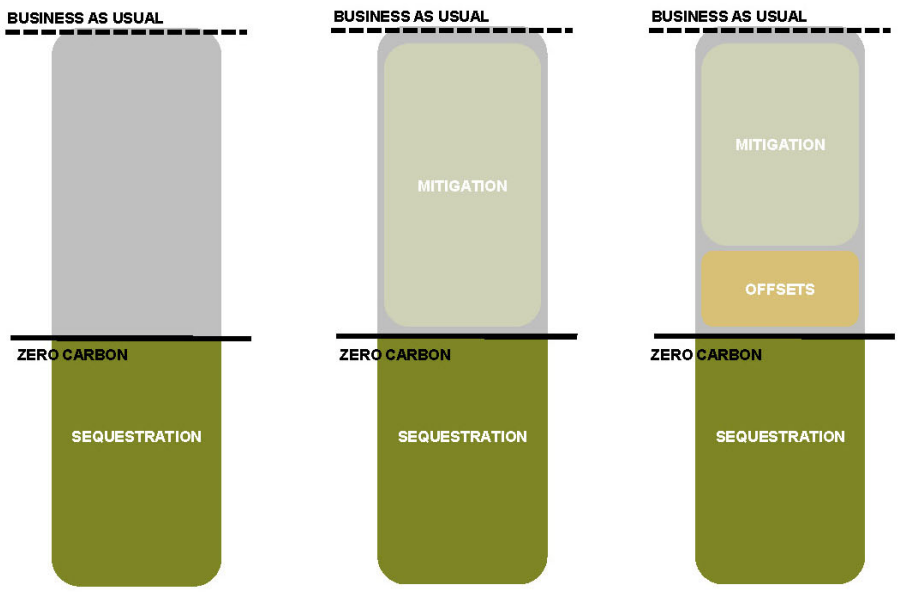

Significance Threshold Approaches
1) Zero Significance Threshold

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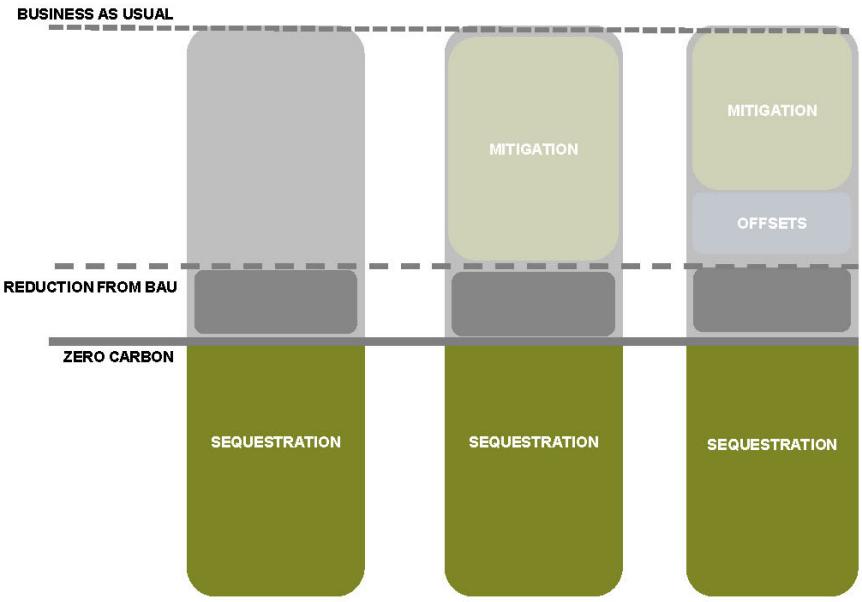

Significance Threshold Approaches
2) Non Zero Significance Threshold – All Options

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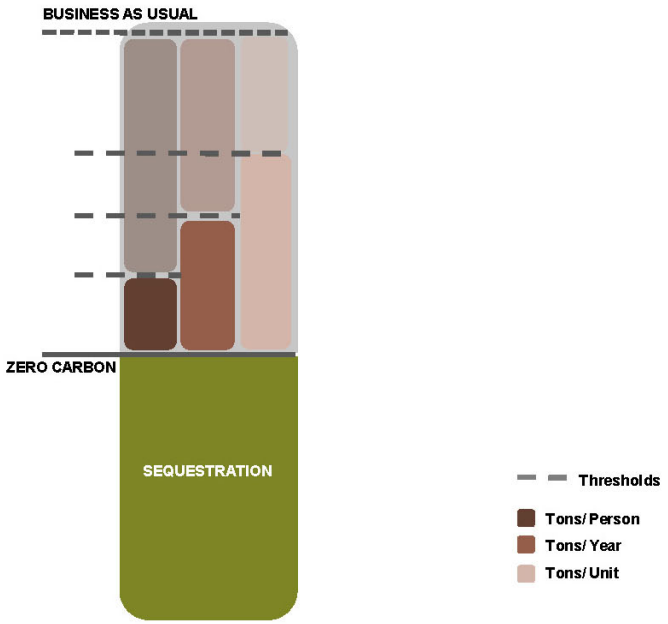

Significance Threshold Approaches
2) Non Zero Significance Threshold – Option 1: set x tons/ unit, x tons/ year or x tons/ person threshold

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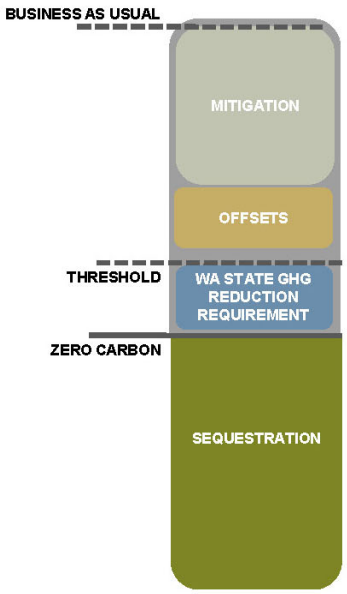

Significance Threshold Approaches
2) Non Zero Significance Threshold – Option 2: Meeting WA State GHG Reduction Requirements

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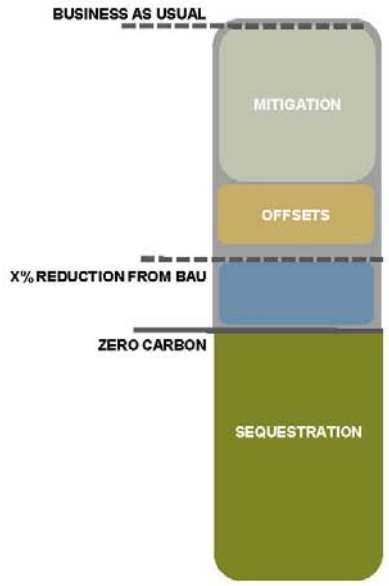

Significance Threshold Approaches
2) Non Zero Significance Threshold – Option 3: Uniform Percentage Based Reduction

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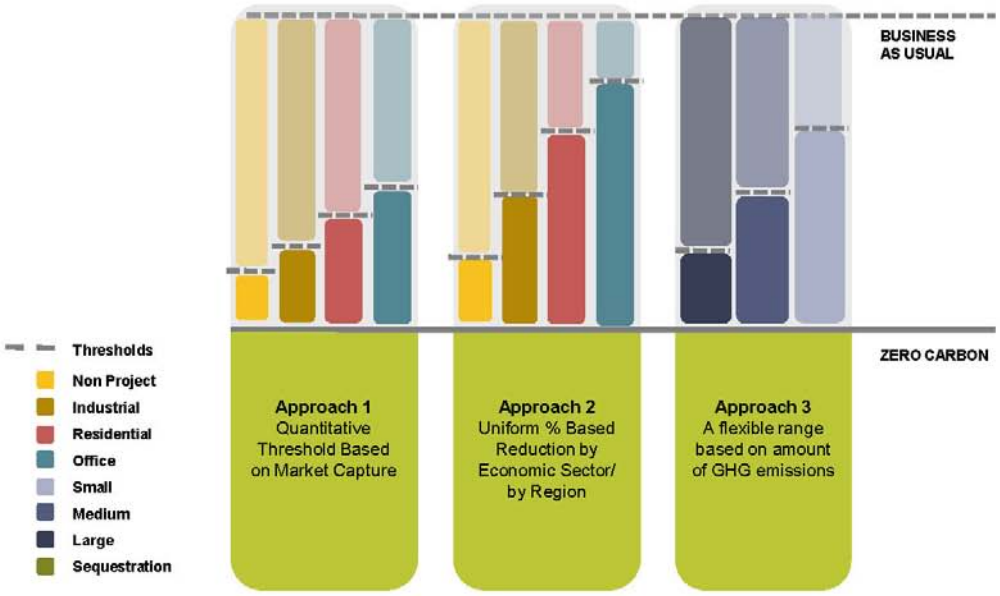

Significance Threshold Approaches
2) Non Zero Significance Threshold – Option 4: Standard Threshold by Type of Project

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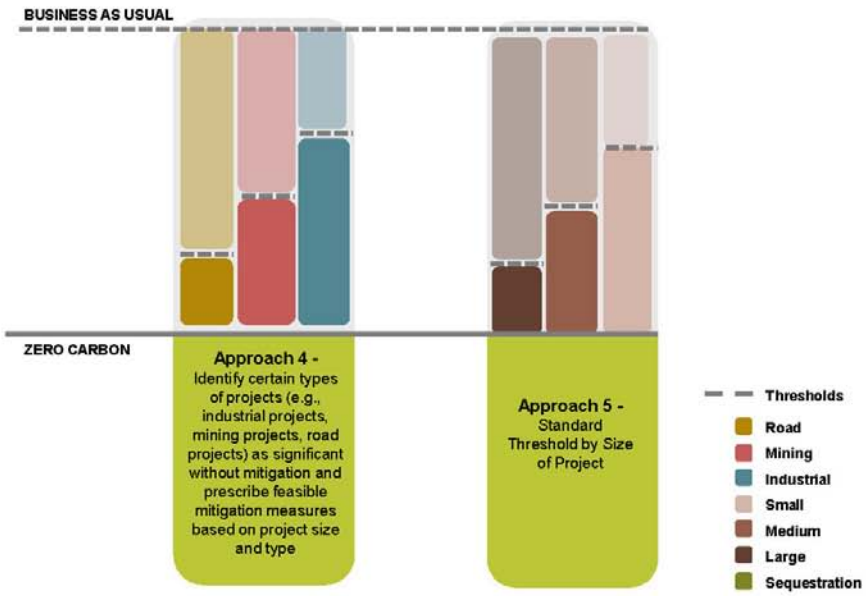

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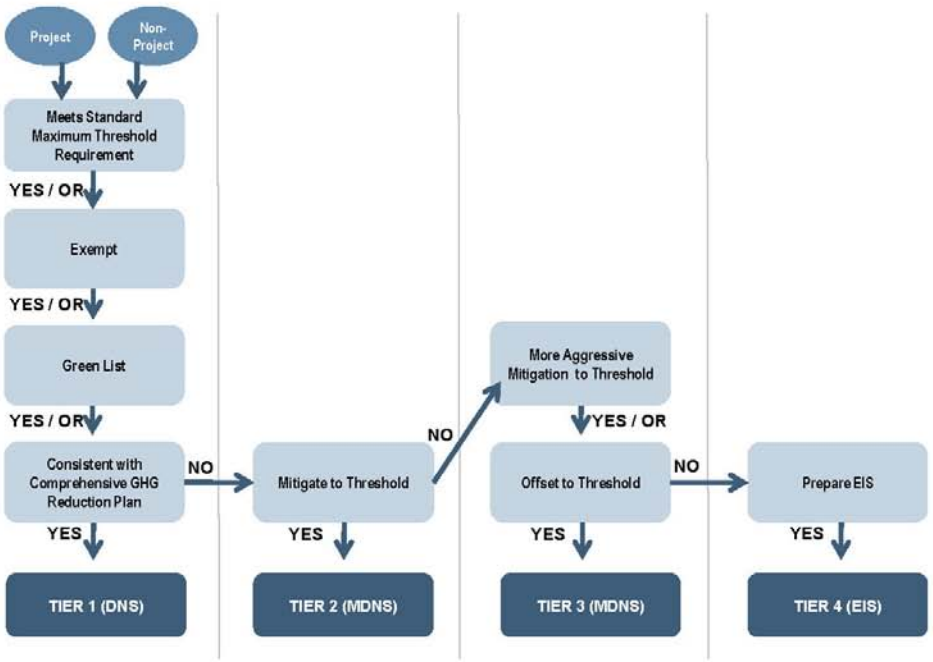

Significance Threshold Approaches
2) Non Zero Significance Threshold – Option 5: Decision Tree/ Tiered Approach
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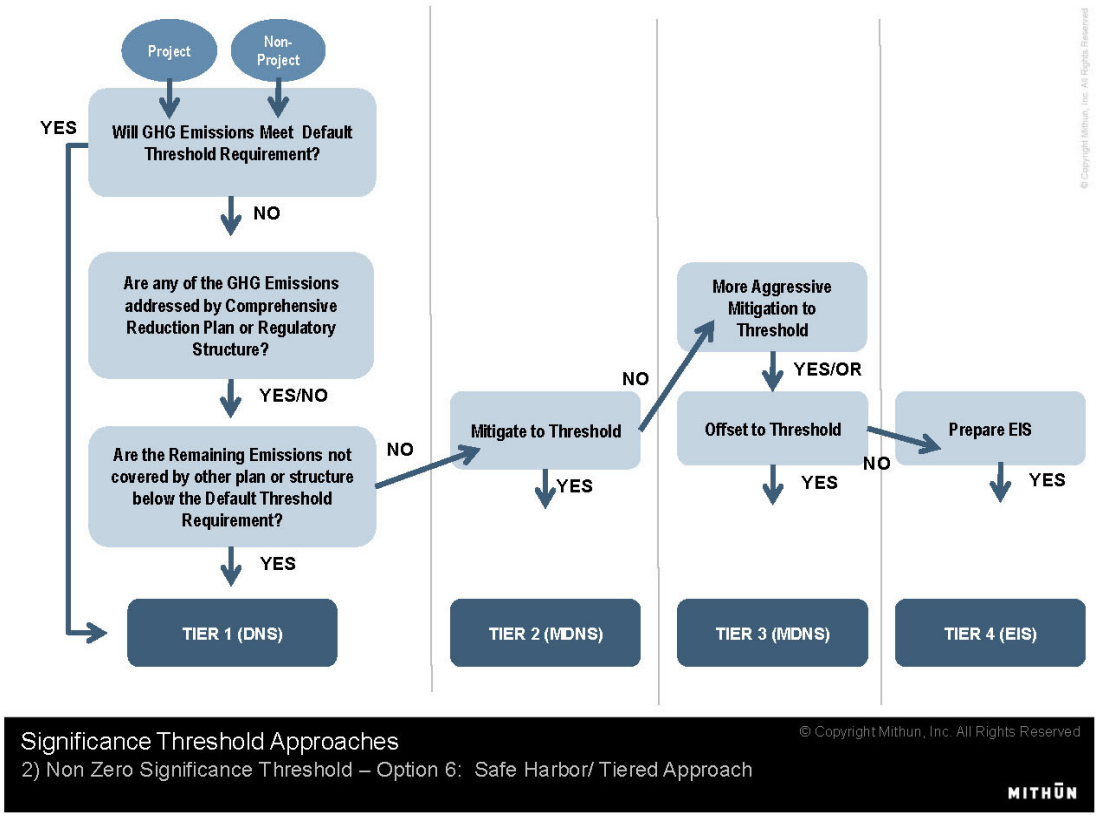

Significance Threshold Approaches
2) Non Zero Significance Threshold – Option 6: Safe Harbor/ Tiered Approach

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I.3 Test case worksheet for types for threshold options:

Significance Threshold	Non-Project: County Comprehensive Plan	Rezone	Major Mixed Use Residential	Small Suburban Subdivision	75-acre DNR Timber Sale (not conversion)	Port Expansion	Boxed Store
Zero Threshold	Does the CP result in increased GHG emissions? Likely YES, so County must: 1) provide an inventory of GHG emissions generated within the planning area, 2) provide an inventory of energy needs of the planning area, and 3) develop a GHG Reduction Plan for the planning area that implements the GHG Emission Reduction and offsets to zero <u>or</u> 4) it exceeds the threshold.	Does the rezone result in increased GHG emissions? Likely YES, so local jurisdiction must: 1) provide an inventory of GHG emissions generated by the rezone, 2) provide an inventory of energy needs of the rezone and 3) incorporate mitigation and offsets to get down to zero <u>or</u> 4) it exceeds the threshold. Questions: 1. GHG emissions being counted isn't there a potential of counting at project stage – how is double	Does the Mixed Use Residential Project result in increased GHG emissions? If YES, the project could then use mitigation and offsets to bring itself below the threshold. Steps: 1) provide an inventory of GHG emissions generated by the project, 2) provide an inventory of energy needs of the project and 3) incorporate mitigation and offsets to get down to zero <u>or</u> 4) it exceeds the threshold.	Does the Small Suburban Subdivision Project result in increased GHG emissions? Likely YES, the project could then use mitigation and offsets to bring itself below the threshold. Steps: 1) provide an inventory of GHG emissions generated by the project 2) provide an inventory of energy needs of the project and 3) incorporate mitigation and offsets to get down to zero <u>or</u> 4) it exceeds the threshold.	Does the 75- Acre DNR Timber Sale Project result in increased GHG emissions? Likely YES, the project could then use mitigation and offsets to bring itself below the threshold. Steps: 1) provide an inventory of GHG emissions generated within the project, 2) provide an inventory of energy needs of the project and 3) incorporate mitigation and offsets to get down to zero <u>or</u> 4) it exceeds the threshold.	Does the Port Expansion Project result in increased GHG emissions? Likely YES, the project could then use mitigation and offsets to bring itself below the threshold. Steps: 1) provide an inventory of GHG emissions generated within the project, 2) provide an inventory of energy needs of the project and 3) incorporate mitigation and offsets to get down to zero <u>or</u>	Does the Boxed Store Project result in increased GHG emissions? Likely YES, the project could then use mitigation and offsets to bring itself below the threshold. Steps: 1) provide an inventory of GHG emissions generated within the project, 2) provide an inventory of energy needs of the

		counting avoided? 2. Are GHG emissions more concrete at the project stage?				4) it exceeds the threshold.	project and 3) incorporate mitigation and offsets to get down to zero <u>or</u> 4) it exceeds the threshold.

Significance Threshold	Non-Project: County Comprehensive Plan	Rezone	Major Mixed Use Residential	Small Suburban Subdivision	75-acre DNR Timber Sale (not conversion)	Port Expansion	Boxed Store
Non-Zero Threshold							
<u>Option 1</u> Exceeding X-tons/unit or X tons/yr GHG emissions	Does the CP result in GHG emissions above the numerical threshold set for local jurisdiction? If YES, County must: 1) provide an inventory of GHG emissions generated within the planning area, 2) provide an inventory of energy needs of the planning area, and 3) develop a GHG Reduction Plan for the planning area that implements the GHG Emission Reduction to below the numerical threshold or adopt feasible reduction	Does the rezone result in GHG emissions above the x-tons/unit or x tons/yr threshold set for local jurisdiction? If YES, local jurisdiction must: 1) provide an inventory of GHG emissions generated within the rezone area, 2) provide an inventory of energy needs of the rezone area,	Does the mixed use residential project exceed threshold of 900 tpy? If YES, the project could then use mitigation to bring itself below the threshold. Steps: 1) inventory GHG emissions generated by project, 2) inventory energy needs of project, and	Does the small suburban subdivision project exceed threshold of 900 tpy? If YES, the project could then use mitigation to bring itself below the threshold. Steps: 1) inventory GHG emissions generated by project, 2) inventory energy needs of project,	Does the timber sale exceed threshold of xxx tpy? If YES, the project could then use mitigation to bring itself below the threshold. Steps: 1) inventory GHG emissions generated by project, 2) inventory energy needs	Does the Port Expansion Project exceed threshold of xxx tpy? If YES, the project could then use mitigation to bring itself below the threshold. Steps: 1)inventory GHG emissions generated by	Does the Boxed Store Project exceed threshold of xxx tpy? If YES, the project could then use mitigation to bring itself below the threshold. Steps: 1)inventory GHG emissions generated by project, 2) inventory

	measures to reach GHG reduction target and come below numerical threshold. Questions: 1. Given the difference in each local jurisdiction as to economics, population, resource lands, etc. would any numerical threshold would likely need to be set by jurisdiction or region?	and 3) develop a GHG Reduction Plan for the planning area that implements the GHG Emission Reduction to below the numerical threshold or adopt feasible reduction measures to reach GHG reduction target and come below numerical threshold. Notes: Difficult to establish appropriate emission threshold per ton for each type of non-project – any generic threshold could be challenged as not being based on actual impact..	3) if above 900 tpy threshold then provide onsite and offsite mitigation to reduce GHG emissions to below threshold.	and 3) if above 900 tpy threshold then provide onsite and offsite mitigation to reduce GHG emissions to below threshold.	of project, and 3) if above xxx tpy threshold then provide onsite and offsite mitigation to reduce GHG emissions to below threshold. Notes: This example shows the difficulty of establishing appropriate emission threshold per ton for each type of project – any generic threshold could be challenged as not being based on actual impact. Also not certain determining a threshold for every type of project is feasible or viable	project, 2) inventory energy needs of project, and 3) if above xxx tpy threshold then provide onsite and offsite mitigation to reduce GHG emissions to below threshold.	energy needs of project, and 3) if above xxx tpy threshold then provide onsite and offsite mitigation to reduce GHG emissions to below threshold.

Significance Threshold	Non-Project: County Comprehensive Plan	Rezone	Major Mixed Use Residential	Small Suburban Subdivision	75-acre DNR Timber Sale (not conversion)	Port Expansion	Boxed Store
Option 2 State GHG Reduction Requirements	The County would have to show its CP meets the state required reductions in order to be considered less than significant. The County must: 1) determine 1990 emissions, 2) its current emissions, and 3) its projected emissions reasonably attributable to county's land use decisions and internal government operations. 4) It then calculates the necessary reductions/net emissions to meet 50% below 1990 target by 2050 requirement. 5) Develop mitigation measures to meet target emissions level Any proposal that does not meet the reduction (net emissions) state levels,	The local jurisdiction would have to show the rezone meets the state required reductions in order to be considered less than significant. The jurisdiction must: 1) determine 1990 emissions, 2) its current zoning emissions, and 3) its projected emissions reasonably attributable to rezone 4) It then calculates the necessary reductions/net emissions to meet 50% below 1990 target by 2050 requirement. 5) Develop mitigation measures to meet target	The Project would have to show that it will meet the required reductions based on the average reductions needed from the 1990 emission levels from all GHG sources. The Project must: 1) determine 1990 emissions – this could be 1990 emissions for that sector, 2) its projected future emissions. 3) It then calculates the necessary reductions/net emissions to meet 50% below 1990 target by 2050 requirement. 4) Develop mitigation measures to meet target emissions level, or 5) Exceed threshold	The Project would have to show that it will meet the required reductions based on the average reductions needed from the 1990 emission levels from all GHG sources. The Project must: 1) determine 1990 emissions – this would likely be 1990 emissions for that sector, 2) its projected future emissions. 3) It then calculates the necessary reductions/net emissions to meet 50% below 1990 target by 2050 requirement. 4) Develop mitigation measures to meet target emissions level, or 5) Exceed threshold	The Project would have to show that it will meet the required reductions based on the average reductions needed from the 1990 emission levels from all GHG sources. The Project must: 1) determine 1990 emissions 2) its projected future emissions . 3) It then calculates the necessary reductions/net emissions to meet 50% below 1990 target by 2050 requirement. 4) Develop mitigation measures to meet target emissions level , or 5) Exceed	The Project would have to show that it will meet the required reductions based on the average reductions needed from the 1990 emission levels from all GHG sources. The Project must: 1) determine 1990 emissions 2) its projected future emissions . 3) It then calculates the necessary reductions/net emissions to meet 50% below 1990 target by 2050 requirement. 4) Develop mitigation measures to meet target	The Project would have to show that it will meet the required reductions based on the average reductions needed from the 1990 emission levels from all GHG sources. The Project must: 1. determine 1990 emissions 2. its projected future emissions . 3. It then calculates the necessary reductions/net emissions to meet 50% below 1990 target

	would be considered to have significant impacts on climate.	emissions level Note: This issue may be better/easier addressed within the local jurisdiction's GHG Reduction Plan – e.g., if the rezone is part of an approved GHG Reduction Plan it would not have a significant impact – and let specific GHG impacts of project be evaluated at the project level	The required reductions could be determined on a case-by-case basis as stated above. Alternatively, a state agency or local government could allocate the required reductions by project type.	The required reductions could be determined on a case-by-case basis as stated above. Alternatively, a state agency or local government could allocate the required reductions by project type.	threshold The required reductions could be determined on a case-by-case basis as stated above. Alternatively, a state agency or local government could allocate the required reductions by project type	emissions level, or 5) Exceed threshold The required reductions could be determined on a case-by-case basis as stated above. Alternatively, a state agency or local government could allocate the required reductions by project type Question: Does the Project measure emissions for entire operations or just emissions resulting from expansion	by 2050 requirement. 4. Develop mitigation measures to meet target emissions level, or 5. Exceed threshold The required reductions could be determined on a case-by-case basis as stated above. Alternatively, a state agency or local government could allocate the required reductions by project type.

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Significance Threshold	Non-Project: County Comprehensive Plan	Rezone	Major Mixed Use Residential	Small Suburban Subdivision	75-acre DNR Timber Sale (not conversion)	Port Expansion	Boxed Store
Option 3 Uniform % Based Reduction	The County would follow the same steps as option 2 except that the % threshold would be different than that set in state's recent legislation	The local jurisdiction would follow the same steps as option 2 except that the % threshold would be different than that set in state's recent legislation	The project would be required to meet a percent reduction target based on the average reductions needed from the business-as-usual emission from all GHG sources to be considered less than significant. (E.g., the threshold could be 15 tpy per residential unit (25% below BAU) and 50 tpy per 1000 sq. ft. retail (25% below BAU)). It would follow the same steps as option 2 except that the % threshold may be different than that set in state's recent legislation or it may be the same except not applied on a case by case basis but a standard for that project type	The project would be required to meet a percent reduction target based on the average reductions needed from the business-as-usual emission from all GHG sources to be considered less than significant. (E.g., the threshold could be 15 tpy per residential unit (25% below BAU)) It would follow the same steps as option 2 except that the % threshold may be different than that set in state's recent legislation or it may be the same except not applied on a case by case basis but a standard for that project type	The project would be required to meet a percent reduction target based on the average reductions needed from the business-as-usual emission from all GHG sources to be considered less than significant. It would follow the same steps as option 2 except that the % threshold may be different than that set in state's recent legislation or it may be the same except not applied on a case by case basis but a standard for that project type	The project would be required to meet a percent reduction target based on the average reductions needed from the business-as-usual emission from all GHG sources to be considered less than significant. (E.g., the threshold could be xxx tpy per xxx sq ft industrial (25% below BAU)) It would follow the same steps as option 2 except that the % threshold may be different than that set in state's recent legislation or it may be the same except not applied on a case by case basis but a standard for	The project would be required to meet a percent reduction target based on the average reductions needed from the business-as-usual emission from all GHG sources to be considered less than significant. (E.g., the threshold could be XXX tpy per sq. ft. commercial (25% below BAU)) It would follow the same steps as option 2

			that project type	except that the % threshold may be different than that set in state's recent legislation or it may be the same except not applied on a case by case basis but a standard for that project type.

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Significance Threshold	Non-Project: County Comprehensive Plan	Rezone	Major Mixed Use Residential	Small Suburban Subdivision	75-acre DNR Timber Sale (not conversion)	Port Expansion	Boxed Store
Option 4 Standard Threshold By Project Type/ By Economic Sector or by Region	Under this category, a threshold standard could be set for cities and counties based on the size/scale of the local jurisdiction. The County would then have to show its CP meets the threshold in order to be considered less than significant. The County must: 1. determine County emissions, and 2. its projected emissions reasonably attributable to county's land use decisions and internal government operations. 3. It then calculates the necessary reductions/net emissions to meet threshold requirement. 4. Develop mitigation measures to meet target emissions level Any proposal that does not	Under this category, a threshold standard could be set for type of the rezone. The local jurisdiction would then have to show rezone meets the threshold in order to be considered less than significant. The local jurisdiction must: 1 determine projected emissions reasonably attributable to rezone 2 It then calculates the necessary reductions/net emissions to meet threshold requirement. 3 Develop mitigation measures to meet target	Threshold would set the unit threshold based on number that would capture approximately 90 percent of the residential units and 90 percent of the office/commercial. (E.g., threshold set at 50 residential units; 30,000 sq ft office/commercial). Then if GHG emissions associated with 50 single-family residential units is 900 metric tons/yr, the residential threshold is 900 metric tons Similar approach for office/commercial with threshold being 30,000 square feet and GHG emissions associated with 30,000 sq ft If the project exceeds that size it would be considered to have a	Threshold would set the unit threshold based on number that would capture approximately 90 percent of the residential units. (E.g., threshold set at 50 residential units.) Then if GHG emissions associated with 50 single-family residential units is xxx metric tons/yr, the residential threshold is xxx metric tons If the project exceeds that size it would be considered to have a significant impact. The project could then use mitigation to bring itself below the emissions level of xxx tons for 50 residential units/ xxx tons for 30,000 sq. ft. office/commercial	Threshold would set the unit threshold based on number that would capture approximately 90 percent of the industry/forest sales. (E.g., threshold set at 70 acres) Then if GHG emissions associated with forest sale of 70 acres is xxx metric tons/yr, the threshold is xxx metric tons If the forest sale project exceeds that size it would be considered to have a significant impact. The project could then use mitigation to bring itself below the emissions level of xxx tons for forest sale	Threshold would set the unit threshold based on number that would capture approximately 90 percent of the industry If the project exceeds that Threshold standard it would be considered to have a significant impact. The project could then use mitigation to bring itself below the emissions level set for industry	Threshold would set the sq. ft. threshold based on number that would capture approximately 90 percent of the commercial. (E.g., threshold set at 30,000 sq ft commercial.) If the project exceeds that size it would be considered to have a significant impact. The project could then use mitigation to bring itself below the emissions level of 30,000 sq. ft. commercial

	meet the threshold (net emissions) would be considered to have significant impacts on climate.	emissions level Any proposal that does not meet the threshold would be considered to have significant impacts on climate.	significant impact. The project could then use mitigation to bring itself below the emissions level of 50 residential units/ 30,000 sq. ft. office/commercial

Significance Threshold	Non-Project: County Comprehensive Plan	Rezone	Major Mixed Use Residential	Small Suburban Subdivision	75-acre DNR Timber Sale (not conversion)	Port Expansion	Boxed Store
Option 5 Decision Tree	Emissions associated with a Comprehensive plan are assumed to have a significant impact unless one can arrive at a less-than-significant finding by: a. Demonstrating that a planning document is in compliance with State's goal or other accepted standard threshold (zero-threshold, uniform % reduction threshold, etc.). If meets threshold then less than significant, If not meet threshold	Emissions associated with a rezone are assumed to have a significant impact unless one can arrive at a less-than-significant finding by demonstrating: • That the rezone is exempt **OR** • That the rezone is on a Green List **OR**	Emissions associated with a mixed use residential project are assumed to have a significant impact unless one can arrive at a less-than-significant finding by demonstrating: • That the project is exempt **OR** • That the project is on a Green List **OR**	Emissions associated with a subdivision project are assumed to have a significant impact unless one can arrive at a less-than-significant finding by demonstrating: • That the project is exempt **OR** • That the project is on a Green List **OR** • That the project	Emissions associated with a timber sale project are assumed to have a significant impact unless one can arrive at a less-than-significant finding by demonstrating: • That the project is exempt **OR** • That the project is on a Green List **OR** • That the project	Emissions associated with a Port project are assumed to have a significant impact unless one can arrive at a less-than-significant finding by demonstrating: • That the project is exempt **OR** • That the project is on a Green List **OR** • That the project	Emissions associated with project are assumed to have a significant impact unless one can arrive at a less-than-significant finding by demonstrating: • That the project is exempt **OR** • That the project is on a Green List **OR** • That the project is consistent with

Significance Threshold	Non-Project: County Comprehensive Plan	Rezone	Major Mixed Use Residential	Small Suburban Subdivision	75-acre DNR Timber Sale (not conversion)	Port Expansion	Boxed Store
	then, County must mitigate/offset to below threshold -- Tier 2- MDNS If Tier 2 mitigation does not meet threshold then reach 3rd Tier mitigation measures. Third Tier involves more aggressive mitigation measures as well as offset purchases to meet threshold. If not mitigate/offset to threshold after the 3rd Tier, then EIS is needed.	• That rezone is consistent with local and regional jurisdictions' GHG Reduction Plan **OR** • That it meets accepted standard threshold (zero-threshold, uniform % reduction threshold, etc.). If meets threshold then less than significant, If not meet threshold then, County must mitigate/offset to below threshold -- Tier 2- MDNS If Tier 2 mitigation does not meet	• That the project is consistent with local and regional jurisdictions' GHG Reduction Plan **OR** • That the project meets accepted standard threshold (zero-threshold, uniform % reduction threshold, etc.). If meets threshold then less than significant, If not meet threshold then, County must mitigate/offset to below threshold -- Tier 2- MDNS If Tier 2 mitigation does not meet	is consistent with local and regional jurisdictions' GHG Reduction Plan **OR** • That the project meets accepted standard threshold (zero-threshold, uniform % reduction threshold, etc.). If meets threshold then less than significant, If not meet threshold then, County must mitigate/offset to below threshold -- Tier 2- MDNS If Tier 2 mitigation does not meet threshold then	is consistent with local and regional jurisdictions' GHG Reduction Plan **OR** • That the project meets accepted standard threshold (zero-threshold, uniform % reduction threshold, etc.). If meets threshold then less than significant, If not meet threshold then, County must mitigate/offset to below threshold -- Tier 2- MDNS If Tier 2 mitigation does not meet threshold then reach 3rd Tier	is consistent with local and regional jurisdictions' GHG Reduction Plan **OR** • That the project meets accepted standard threshold (zero-threshold, uniform % reduction threshold, etc.). If meets threshold then less than significant, If not meet threshold then, County must mitigate/offset to below threshold -- Tier 2- MDNS If Tier 2 mitigation does not meet threshold then reach 3rd Tier	local and regional jurisdictions' GHG Reduction Plan **OR** • That the project meets accepted standard threshold (zero-threshold, uniform % reduction threshold, etc.). If meets threshold then less than significant, If not meet threshold then, County must mitigate/offset to below threshold -- Tier 2- MDNS If Tier 2 mitigation does not meet threshold then reach 3rd Tier mitigation measures. Third Tier

Significance Threshold	Non-Project: County Comprehensive Plan	Rezone	Major Mixed Use Residential	Small Suburban Subdivision	75-acre DNR Timber Sale (not conversion)	Port Expansion	Boxed Store
		threshold then reach 3rd Tier mitigation measures. Third Tier involves more aggressive mitigation measures as well as offset purchases to meet threshold. If not mitigate/offset to threshold after the 3rd Tier, then EIS is needed.	threshold then reach 3rd Tier mitigation measures. Third Tier involves more aggressive mitigation measures as well as offset purchases to meet threshold. If not mitigate/offset to threshold after the 3rd Tier, then EIS is needed.	reach 3rd Tier mitigation measures. Third Tier involves more aggressive mitigation measures as well as offset purchases to meet threshold. If not mitigate/offset to threshold after the 3rd Tier, then EIS is needed.	mitigation measures. Third Tier involves more aggressive mitigation measures as well as offset purchases to meet threshold. If not mitigate/offset to threshold after the 3rd Tier, then EIS is needed.	mitigation measures. Third Tier involves more aggressive mitigation measures as well as offset purchases to meet threshold. If not mitigate/offset to threshold after the 3rd Tier, then EIS is needed.	involves more aggressive mitigation measures as well as offset purchases to meet threshold. If not mitigate/offset to threshold after the 3rd Tier, then EIS is needed.

Significance Threshold	Non-Project: County Comprehensive Plan	Rezone	Major Mixed Use Residential	Small Suburban Subdivision	75-acre DNR Timber Sale (not conversion)	Port Expansion	Boxed Store
Option 6 Alternative Decision Tree Approach	Emissions associated with a Comprehensive Plan are assumed to have a significant impact unless one can arrive at a less-than-significant finding by demonstrating: Tier 1: 1) Are all GHG emissions addressed in other regulatory requirement? If YES, then no SEPA analysis of emissions required. If NO, then: Those GHG emissions not addressed by a regulatory structure would undergo SEPA analysis. The County must: 1 determine County's remaining unaddressed emissions, and 2 its projected emissions reasonably attributable to county's land use decisions and	Emissions associated with a rezone are assumed to have a significant impact unless one can arrive at a less-than-significant finding by demonstrating: Tier 1: 1) Are all GHG emissions addressed by a Comprehensive GHG Reduction Plan or a regulatory structure (local, state, and federal requirements requiring reduction in emissions)? If YES, then no SEPA analysis of emissions required. If NO, then: Those GHG emissions not addressed by a	Emissions associated with a mixed use residential are assumed to have a significant impact unless one can arrive at a less-than-significant finding by demonstrating: Tier 1: 1) Are all GHG emissions addressed by a Comprehensive GHG Reduction Plan or a regulatory structure (local, state, and federal requirements requiring reduction in emissions)? If YES, then no SEPA analysis of emissions required. If NO, then: Those GHG emissions not addressed by a regulatory structure or a Comprehensive GHG Reduction Plan would undergo	Emissions associated with a suburban subdivision are assumed to have a significant impact unless one can arrive at a less-than-significant finding by demonstrating: Tier 1: 1) Are all GHG emissions addressed by a Comprehensive GHG Reduction Plan or a regulatory structure (local, state, and federal requirements requiring reduction in emissions)? If YES, then no SEPA analysis of emissions required. If NO, then: Those GHG emissions not addressed by a regulatory structure or a Comprehensive GHG Reduction Plan would undergo	Emissions associated with a 75 acre timber sale are assumed to have a significant impact unless one can arrive at a less-than-significant finding by demonstrating: Tier 1: 1) Are all GHG emissions addressed by a Comprehensive GHG Reduction Plan or a regulatory structure (local, state, and federal requirements requiring reduction in emissions)? If YES, then no SEPA analysis of emissions required. If NO, then: Those GHG	Emissions associated with a Port Expansion are assumed to have a significant impact unless one can arrive at a less-than-significant finding by demonstrating: Tier 1: 1) Are all GHG emissions addressed by a Comprehensive GHG Reduction Plan or a regulatory structure (local, state, and federal requirements requiring reduction in emissions)? If YES, then no SEPA analysis of emissions required. If NO, then:	Emissions associated with a boxed store are assumed to have a significant impact unless one can arrive at a less-than-significant finding by demonstrating: Tier 1: 1) Are all GHG emissions addressed by a Comprehensive GHG Reduction Plan or a regulatory structure (local, state, and federal requirements requiring reduction in emissions)? If YES, then no SEPA analysis of emissions required. If NO, then:

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Significance Threshold	Non-Project: County Comprehensive Plan	Rezone	Major Mixed Use Residential	Small Suburban Subdivision	75-acre DNR Timber Sale (not conversion)	Port Expansion	Boxed Store
	internal government operations. 3 It then calculates the necessary reductions/net emissions to meet threshold requirement. 4 Develop mitigation measures to meet target emissions level If the remaining emissions do not exceed the standard threshold determination a DNS would be issued for the project. If they do, go to Tier 2 MDNS Tier 2: 1) If remaining emissions exceed the threshold determination, then mitigate the remaining emissions to bring below the selected standard threshold. (MDNS) 2) If cannot reduce below the selected standard threshold, then to Tier 3	regulatory structure or a Comprehensive GHG Reduction Plan would undergo SEPA analysis. 2) Calculate the remaining emissions. If the remaining emissions do not exceed the standard threshold determination a DNS would be issued for the project. If they do, go to Tier 2 MDNS Tier 2: 1) If remaining emissions exceed the threshold determinatio n, then mitigate the remaining emissions to bring below the selected	SEPA analysis. 2) Calculate the remaining emissions. If the remaining emissions do not exceed the standard threshold determination a DNS would be issued for the project. If they do, go to Tier 2 MDNS Tier 2: 1) If remaining emissions exceed the threshold determination, then mitigate the remaining emissions to bring below the selected standard threshold. (MDNS) 2) If cannot reduce below the selected standard threshold, then to Tier 3	SEPA analysis. 2) Calculate the remaining emissions. If the remaining emissions do not exceed the standard threshold determination a DNS would be issued for the project. If they do, go to Tier 2 MDNS Tier 2: 1) If remaining emissions exceed the threshold determination, then mitigate the remaining emissions to bring below the selected standard threshold. (MDNS) 2) If cannot reduce below the selected standard threshold,	emissions not addressed by a regulatory structure or a Comprehensive GHG Reduction Plan would undergo SEPA analysis. 2) Calculate the remaining emissions. If the remaining emissions do not exceed the standard threshold determination a DNS would be issued for the project. If they do, go to Tier 2 MDNS Tier 2: 1) If remaining emissions exceed the threshold determination, then mitigate the remaining emissions to bring below the selected standard	Those GHG emissions not addressed by a regulatory structure or a Comprehensive GHG Reduction Plan would undergo SEPA analysis. 2) Calculate the remaining emissions. If the remaining emissions do not exceed the standard threshold determination a DNS would be issued for the project. If they do, go to Tier 2 MDNS Tier 2: 1) If remaining emissions exceed the threshold determination, then mitigate the remaining emissions to bring below the selected standard	Those GHG emissions not addressed by a regulatory structure or a Comprehensive GHG Reduction Plan would undergo SEPA analysis. 2) Calculate the remaining emissions. If the remaining emissions do not exceed the standard threshold determination a DNS would be issued for the project. If they do, go to Tier 2 MDNS Tier 2: 1) If remaining emissions exceed the threshold determination, then mitigate the remaining emissions to

Significance Threshold	Non-Project: County Comprehensive Plan	Rezone	Major Mixed Use Residential	Small Suburban Subdivision	75-acre DNR Timber Sale (not conversion)	Port Expansion	Boxed Store
	Tier 3: If need further aggressive mitigation or offsets to bring GHG emissions below the threshold, then apply to reach MDNS Tier 4: For projects unable to meet threshold after mitigation and offset, then EIS.	standard threshold. (MDNS) 2) If cannot reduce below the selected standard threshold, then to Tier 3 Tier 3: If need further aggressive mitigation or offsets to bring GHG emissions below the threshold, then apply to to reach MDNS Tier 4: For projects unable to meet threshold after mitigation and offset, then EIS.	Tier 3: If need further aggressive mitigation or offsets to bring GHG emissions below the threshold, then apply to to reach MDNS Tier 4: For projects unable to meet threshold after mitigation and offset, then EIS.	then to Tier 3 Tier 3: If need further aggressive mitigation or offsets to bring GHG emissions below the threshold, then apply to to reach MDNS Tier 4: For projects unable to meet threshold after mitigation and offset, then EIS.	threshold. (MDNS) 2)If cannot reduce below the selected standard threshold, then to Tier 3 Tier 3: If need further aggressive mitigation or offsets to bring GHG emissions below the threshold, then apply to to reach MDNS Tier 4: For projects unable to meet threshold after mitigation and offset, then EIS.	threshold. (MDNS) 2)If cannot reduce below the selected standard threshold, then to Tier 3 Tier 3: If need further aggressive mitigation or offsets to bring GHG emissions below the threshold, then apply to to reach MDNS Tier 4: For projects unable to meet threshold after mitigation and offset, then EIS.	bring below the selected standard threshold. (MDNS) 2)If cannot reduce below the selected standard threshold, then to Tier 3 Tier 3: If need further aggressive mitigation or offsets to bring GHG emissions below the threshold, then apply to to reach MDNS Tier 4: For projects unable to meet threshold after mitigation and offset, then EIS.
Possible Mitigation	Examples of Comprehensive Plan mitigation to reduce below threshold: • High-density developments that reduce VMT	Elements of rezone mitigation to reduce below threshold: Mitigation from	Elements of mixed use residential mitigation to reduce below threshold: Mitigation from	Elements of subdivision mitigation to reduce below threshold: Mitigation from	Elements of rezone Timber Sale to reduce below threshold: Mitigation from	Elements of Port Expansion mitigation to reduce below threshold:	Elements of Boxed Store mitigation to reduce below threshold:

Significance Threshold	Non-Project: County Comprehensive Plan	Rezone	Major Mixed Use Residential	Small Suburban Subdivision	75-acre DNR Timber Sale (not conversion)	Port Expansion	Boxed Store
	• Increase opportunities for public transit • Parking spaces for high-occupancy vehicles and car-share programs • Limits on parking • Transportation impact fees on developments to fund public transit service • Regional transportation centers where various types of public transportation meet • Energy efficient design for buildings, appliances, lighting, and office equipment • Solar panels, water reuse systems, and on-site renewable energy production • Methane recovery in landfills and wastewater treatment plants to generate electricity • Carbon emissions credit purchases that fund alternative energy projects • Preservation of open space/forest/carbon sink areas	Mitigation Group	Mitigation Group	Mitigation Group	Mitigation Group	Mitigation from Mitigation Group	Mitigation from Mitigation Group

I.4 (Draft) Sub-options for Addressing Significance in Statewide Standard, Framework, Safe Harbor, and Procedural Option

Significance threshold sub-options[9]	**Which projects would be significant?**	**As a Statewide Standard?** all decisions in law, Ecology rule or guidance **Decisions**[10]	**As a Framework?** some decisions set by Ecology, some by agencies[11] **Example**	**As a Safe Harbor?** Law or rule Agencies required to set a threshold **Example**
Zero				
Zero	Any non exempt proposal with emissions	D.1 nonexempt proposals with listed emission sources is "significant". D.2 emission sources D.3 methodology/formula for emissions and mitigation	Ecology rule or guidance D.1 Decisions available to agencies or set by Ecology: • D.2 or select portions of list, may incorporate Green list • D.3 or choose from a list	Agencies set: Any decision acceptable Set by Ecology D.1 through D.3, for agencies that do not set a threshold
Non-zero				
Opt 1. Exceeding 'x' GHG emission amount	All non exempt proposals exceeding one set number	D.1 threshold number D.2 emission sources D.3 methodology/formula for emissions and mitigation	Ecology rule or guidance: D.1 Decisions available to agencies or set by Ecology: • D.2 or select portions of list, may incorporate Green list • D.3 or choose from a list	Agencies set Any decision acceptable Set by Ecology D.1 through D.3, for agencies that do not set a threshold
Opt 2. Meet State GHG requirement	All non exempt proposals exceeding state GHG requirement using - a case-by-case fair share or - the county's allocated	D.1 GHG requirements determines the significance threshold for any non exempt proposal D.2 methodology/formula for translating the State GHG requirement for a specific proposal D.3 emission sources D.4 formula for calculating	Ecology rule or guidance: D.1 Decisions available to agencies or set by Ecology: • D.2 or choose from a list • D.3 or choose from a list • D.4 or select portions of list, may incorporate Green list	Agencies set Any decision acceptable Set by Ecology D.1 through D.4, for agencies that do not set a threshold

[9] All sub-options listed above could be in statute/rule or in guidance

Sub-options at the beginning of the matrix are less complex and less suitable for a framework approach. Later suboptions are more suitable for a framework approach.

[10] Mitigation and MDNS mitigation levels would likely be another decision covered.

[11] For those decisions listed as available to agencies or set by Ecology, Ecology would decide who makes those decisions →Ecology or other agencies.

Significance threshold sub-options[9]	**Which projects would be significant?**	**As a Statewide Standard?** all decisions in law, Ecology rule or guidance **Decisions**[10]	**As a Framework?** some decisions set by Ecology, some by agencies[11] **Example**	**As a Safe Harbor?** Law or rule Agencies required to set a threshold **Example**
	share	emissions and calculating mitigation		
Opt 3. Uniform Percentage-Based Reduction	Any project not achieving an "x" percentage reduction below business as usual	D.1 determine threshold using percentage based reduction approach D.2 percentage reduction amount D.3 formula/process for calculating a proposal's reduction percentage D.4 emission sources D.5 methodology/formula for emissions and mitigation	Ecology rule or guidance: D.1 Decisions available to agencies or set by Ecology: • D.2 or choose from a list of choices • D.3 or choose from a list • D.4 or select portions of list, may incorporate Green list • D.5 or choose from a list	Agencies set Any decision acceptable Set by Ecology D.1 through D.5, for agencies that do not set a threshold
Opt 4. Standard threshold by project type	Proposals exceeding the (>0) number set for their project type. Approach 1: based on market capture Approach 2: % based	D.1 project types D.2 determine threshold for each project type (residential, office, industrial) D.3 emission sources D.4 methodology/formula for emissions and mitigation by project type	Ecology rule or guidance: D.1 Decisions available to agencies or set by Ecology: • D.2 or choose within range set by Ecology • D.3 or select portions of list, may incorporate Green list • D.4 or choose from a list	Agencies set Any decision acceptable Set by Ecology D.1 through D.4, for agencies that do not set a threshold
	Approach 3: Proposals exceeding GHG emission amount adopted by local *(one variation of Approach 1 or 2)*		Ecology rule or guidance • D.1 set range for each project type (residential, office, industrial) Decisions available to agencies • D.2 choose threshold for each project type within range set by Ecology Decisions available to agencies or set by Ecology: • D.3. select list or portions of list, may incorporate Green list • D.4 methodology/formula for calculating emissions and mitigation by project type or choose from a list	Agencies set Any decision acceptable Set by Ecology D.1 through D.5, for agencies that do not set a threshold

Significance threshold sub-options[9]	**Which projects would be significant?**	**As a Statewide Standard?** all decisions in law, Ecology rule or guidance **Decisions**[10]	**As a Framework?** some decisions set by Ecology, some by agencies[11] **Example**	**As a Safe Harbor?** Law or rule Agencies required to set a threshold **Example**
	Approach 4: Proposals on the significant project-type list	D.1 project types exceeding emission threshold D.2 emission sources D.3 methodology/formula for emissions D.4 mitigation by project type	Ecology rule or guidance: D.1 may designate a range to choose from Options available to agencies or set by Ecology: • D.2 or select portions of list, may incorporate Green list • D.3 or choose from a list • D.4 or choose from a list	Agencies set Any decision acceptable Set by Ecology D.1 through D.4, for agencies that do not set a threshold
	Approach 5: Proposals exceeding a set size (rather than calculated GHG number)	D.1 size threshold by project type D.2 emission sources D.3 methodology for emissions and mitigation by project type	In rule or guidance: D.1 Options available to agencies or set by Ecology: • D.2 or select portions of list, may incorporate Green list • D.3 or choose from a list	Agencies set Any decision acceptable Set by Ecology D.1 through D.3, for agencies that do not set a threshold
Opt 5. Tiered approach with Decision tree	Proposals which exceed the threshold by all paths made available	D.1 paths which may be used D.2 process for applying paths D.3 thresholds for each path D.4 emission sources D.5 formula/methodology for emissions and mitigation for each path	In rule or guidance: D.1 D.2 Options available tor agencies or set by Ecology: • D.3 or choose from a range/list • D.4 or select portions of list, may incorporate Green list • D.5 or choose from a list	Agencies set Any decision acceptable Set by Ecology D.1 through D.5, for agencies that do not set a threshold

I.5 Analysis of Implications of Approaches for Statewide Consistency (Draft 9/26/08):

If there is a statewide standard, should it be established in statue, regulation or guidance?

Statewide Standard *Implications*	Statutory Requirement	Regulatory (SEPA WAC)	Ecology Guidance
Level of statewide consistency and applicant predictability	Fairly high – depending on level of guidance and implementation flexibility	Fairly high, could also depend/ change depending on additional requirements in SEPA rules	Medium – depending on ease of implementation, effectiveness of guidance and training
Level of flexibility for implementation and modification of standard	Low	Low	Medium-High
Risk of litigation	Depends on the actual standard, but would likely be litigated at state level with possible challenges to agencies at implementation stage when following the standard for specific SEPA proposals	Challenge would likely be focused on rulemaking, but could also include litigation with agencies at implementation stage.	Challenges would likely be directed at each agency when standards are set or specific proposals evaluated under SEPA
Risk of nullifying categorical exemptions	Statute might be able include a provision to address undermining "significance" issue for categorical exemptions in 197-11-800	Rules could possibly include a provision (need to double check on this) to address undermining exemptions in rule	Unknown, but some risk given GHG emissions have not been considered when setting exemption levels
Level of burden for agencies to implement standard	Depends on standard and available tools, guidance and training, but lower burden than setting own standard	Same as statutory	Depends on if agency follows the recommended standard
Level of guidance needed	High	High	High – perhaps higher in order to justify specific standard that would otherwise be justified in rulemaking or legislation.

If there is flexibility to set a local standard, should it be established in statute, regulation or guidance?

Flexible Local Standard *Implications*	**Statutory Requirement**	**Regulatory (SEPA WAC)**	**Ecology Guidance**
Level of statewide consistency and applicant predictability	Medium – depending on degree of flexibility and ease of implementation, effectiveness of guidance and training	Medium – depending on degree of flexibility and ease of implementation, effectiveness of guidance and training	Medium – depending on degree of flexibility and ease of implementation, effectiveness of guidance and training
Level of flexibility for implementation and modification of standard	Medium-low	Medium-low	High
Risk of litigation	Depends on the actual standard, but would likely be litigated at state level with possible challenges to agencies setting their specific standard	Challenge would likely be focused on rulemaking, but could also include litigation with agencies on setting their specific standards.	Challenges would likely be directed at each agency when standards are set or specific proposals evaluated under SEPA
Risk of nullifying categorical exemptions	Statute could possibly include a provision to address undermining "significance" issue for categorical exemptions in 197-11-800	Rules could possibly include a provision (need to double check on this) to address undermining exemptions in rule	Unknown, but some risk given GHG emissions have not been considered when setting exemption levels
Level of burden for agencies to implement standard	Depends on range of standards and available tools, guidance and training	Same	Same
Level of guidance needed	High	High	High – perhaps more in order to justify specific range of standards, this would otherwise be justified in rulemaking or legislation.

I.6 Project Emissions Thresholds Comparison

Name of Project	Description of Project	Estimated Project Emissions (MTCO2e/yr)	Allowable Emissions after a 15% Reduction	Allowable Emissions after a 30% Reduction	Allowable Emissions after a 50% Reduction	Allowable Emissions after a 80% Reduction	Allowable Emissions after a 90% Reduction	If set bright line of based on market capture of 90% (assuming CAPCOA #s here)**	Methodology of Estimate
California - Gateway Community Development Project D E I R	810 new residential units, approx. 25,950 sq. ft. of commercial space, and approx. 160,000 sq. ft. of open space	9,895	8,411	6,927	4,948	1,979	990	900	GHG emissions associated with the proposed project were calculated using the URBEMIS 2007 Version 9.2.0 model of the California Air Resources Board and trip generation data from the project traffic analysis. Most emissions come from heating and cooling water and from transportation. Also included are significant emissions from solid waste.
California - San Rafael Rock Quarry Amended Quarry Permit Draft E I R	Crush, sort, and stockpile earth and rock quarried from the site, dock and load barges with earth, sand, and rock quarried from the site, operate an asphalt batch plant, and load and weigh commercial trucks that export and transport material over Point San Pedro Road	36,871	31,340	25,810	18,435	7,374	3,687	900	(Mostly from offsite trucks and tugboats). Based on current emissions.
California - Keiser Park Draft E I R	Construct a recreation center, an aquatic center (with two swimming pools), three ball fields (two with soccer field overlays and one with lighting), restroom facilities, and two children's play areas	1,599	1,359	1,119	800	320	160	900	Master Plan CO2 emissions estimates were made using URBEMIS 2007 v.9.2.2 with trip generation data from the traffic report and other information from the project description
California - El Segundo Refinery -	Chevron is proposing modifications to an installation of new equipment at the El Segundo Refinery. Proposed	281,150	238,978	196,805	140,575	56,230	28,115	900	Most emissions in unmitigated scenario were for purchased electricity, a new boiler, and a tail gas unit incerator.

Name of Project	Description of Project	Estimated Project Emissions (MTCO2e/yr)	Allowable Emissions after a 15% Reduction	Allowable Emissions after a 30% Reduction	Allowable Emissions after a 50% Reduction	Allowable Emissions after a 80% Reduction	Allowable Emissions after a 90% Reduction	If set bright line of based on market capture of 90% (assuming CAPCOA #s here)**	Methodology of Estimate
Product Reliability and Optimization Project Draft EIR	modifications will occur in the No. 2 Crude Unit, No. 2 Residuum Stripper Unit, Minalk/Merox Unit, Waste Gas Compressors, Fluidized Catalytic Cracking Unit, Alkylation Unit, Vacuum Residuum Desulfurization Unit, ISOMAX Unit, Cogeneration Facilities, Railcar Loading/Unloading Rack, and improvements to electricity and water service systems. New process units include sulfur processing facilities (i.e., Sour Water Stripper, Sulfur Recovery Unit, and Tail Gas Unit), Vapor Recovery and Flare System, Water Treatment Facilities (i.e., reverse osmosis units and oxygen units and oxygen removal units), additional storage capacity, a new cooling tower, and hydrogen compression and transfer facilities. Before proposed mitigation:								Most emissions in the mitigated scenario are from a new cogeneration facility.
	After proposed mitigation:	193,910	164,824	135,737	96,955	38,782	19,391		
Hospital	King County - Average Sized In Patient Health Care Facility (241,000 square feet)	9,875	8,394	6,913	4,938	1,975	100		King County Worksheet. Very rough estimate only includes transportation of employees.
Lodge	King County - Average Sized Lodge (36,000 square feet)	534	454	374	267	107	53		King County Worksheet. Very rough estimate only includes transportation of employees.
Reading Woods	Demolish six buildings within an office and warehouse park in order to construct 202 housing units, 160 units of senior housing and assisted living	44,624	37,930	31,237	22,312	8,925	4,462	900	Included a GHG analysis, using the EQUEST model to compute direct and indirect CO2 emissions from stationary sources and the USEPA's COMMUTER

Name of Project	Description of Project	Estimated Project Emissions (MTCO2e/yr)	Allowable Emissions after a 15% Reduction	Allowable Emissions after a 30% Reduction	Allowable Emissions after a 50% Reduction	Allowable Emissions after a 80% Reduction	Allowable Emissions after a 90% Reduction	If set bright line of based on market capture of 90% (assuming CAPCOA #s here)**	Methodology of Estimate
	facilities, 16 townhouses, and 160,000 square feet of office space, and parking for 1,061 vehicles on a 24.8 acre site								model Version 2 to estimate changes in CO2 emissions due to roadway mitigation and traffic demand management measures.
Shoppe at Harrington Farms	Two phased development of approximately 113,000 sq ft supermarket, retail and a restaurant, in three separate buildings n a 24.8 in total utilizing approximately 113,000 square feet in suburban area. It will generate approximatey 7,281 new avg daiy trips	7,504	6,394	5,253	3,752	1,501	750	900	Direct and indirect carbon dioxide (C02) emissions from the proposed direct and indirect building sources were calculated using the Tech Environmental Energy Model. C02 emissions produced by the project-generated vehicle trips were analyzed using the EPA MOBILE 6.2 Source Emission Factor Model.
Lowe's Home Centers, Inc.	The project involves the redevelopment of a 16.3-acre parcel of commercial and industrial property to include a 15 1,000 sf Lowe's home improvement retail store with attached garden center. The project site is located across from the MBTA Quincy Adams Red Line station in Quincy.	6,418	5,455	4,493	3,209	1,284	642	900	In the analysis, the Proponent calculated GHG emissions from both mobile and stationary sources. The GHG emissions analysis evaluated the change in carbon dioxide (COz) emissions from project-related traffic and proposed building sources. Direct and indirect C02 emissions from the proposed building sources were calculated using the Tech Environmental Energy Model.
Westinghouse Redev't	The project involves 40 acres of mostly developed land. The site currently contains approximately 9 16,000 sf of development in the form of multiple warehouses, manufacturing buildings and surface parking for approximately 900 vehicles. The project includes the complete redevelopment of the project site with approximately 470,000 sf of retail and restaurant uses	9,526	8,097	6,668	4,763	1,905	953	900	Direct and indirect carbon dioxide (CO2) emissions from the proposed building sources were calculated using the EQUEST model. The Proponent evaluated the change in C02 emissions from project-related traffic and proposed buildinglenergy consumption sources for the 2007 Existing, the 201 2 No-Build, the 201 2 Build and the 2012 Build with Improvements Conditions.

Name of Project	Description of Project	Estimated Project Emissions (MTCO2e/yr)	Allowable Emissions after a 15% Reduction	Allowable Emissions after a 30% Reduction	Allowable Emissions after a 50% Reduction	Allowable Emissions after a 80% Reduction	Allowable Emissions after a 90% Reduction	If set bright line of based on market capture of 90% (assuming CAPCOA #s here)**	Methodology of Estimate
	(a net reduction of 446,000 sf) and 2,059 parking spaces								

** Under CAPCO, the quantitative threshold based on Market Capture (90& of projects/ 900 tpy) would capture residential dev't > 50 dwu; office space > 36,000 sq. ft.; retail space > 11,000 sq. ft.; supermarket > 6,300 sq. ft.; and small, medium, and large industrial.

Sources and Notes for Project Emissions Thresholds Comparison

Name of Project	Source	Notes:
California - Gateway Community Development Project D E I R	http://www.ceqamap.com/search_ghg.php?mode=view&action=view&id=1269	KC Worksheet estimates 11,985 MTCO2e/year for this project using multi-family units in a large building, including embodied emissions and not including the "open space".
California - San Rafael Rock Quarry Amended Quarry Permit Draft E I R	http://www.ceqamap.com/search_ghg.php?mode=view&action=view&id=1751	
California - Keiser Park Draft E I R	http://www.ceqamap.com/search_ghg.php?mode=view&action=view&id=1765	
California - El Segundo Refinery - Product Reliability and Optimization Project Draft EIR	http://www.ceqamap.com/search_ghg.php?mode=view&action=view&id=1786	
Hospital	http://www.metrokc.gov/ddes/forms/SEPA-GHG-EmissionsWorksheet-Bulletin26.xls	
Lodge	http://www.metrokc.gov/ddes/forms/SEPA-GHG-EmissionsWorksheet-Bulletin26.xls	
Reading Woods		
Shoppe at Harrington Farms	http://www.mass.gov/envir/mepa/pdffiles/certificates/051608/14222eenf.pdf	
Lowe's Home Centers, Inc.	http://www.mass.gov/envir/mepa/pdffiles/certificates/051608/14222eenf.pdf	The existing project site contains approximately 8 separate commercial and industrial buildings (approximately 159,000 sf total), approximately 377 surface parking, a 1,050 linear foot. The redevelopment project will involve the demolition of the approximately eight existing buildings and structures (15 1,000 sf total) and the construction of a new 124,216 sf Lowe's Home Improvement Store with a 29,926 sf garden center, 435 surface parking spaces, and new stormwater management infrastructure.
Westinghouse Redev't	http://www.mass.gov/envir/mepa/pdffiles/certificates/041808/14205eenf.pdf	

Letter to Co-Chairs from R. Preston Feight, Kenworth Truck Company, PACCAR

Letter to Co-Chairs from Senator Jerome Delvin, 8th Legislative District

- Exhibit A: Washington Trucking Associations and AAA Washington Minority Report
  - *Note: Exhibit A is located in Appendix 6 of the Transportation IWG Report (the Transportation IWG Report is CAT Report Appendix 4)*
- Exhibit B: Peer Review: Cost-Benefit Analysis of Washington Climate Advisory Team's Recommendations

KENWORTH®

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A DIVISION OF PACCAR

November 20, 2008

Mr. Jay Manning, Director
Washington Department of Ecology
PO Box 47600
Olympia, WA 98504

Ms. Juli Wilkerson, Director
Washington Department of Community Trade and Economic Development
PO Box 42525
Olympia, WA 98504

Dear Juli and Jay,

Kenworth was pleased to represent PACCAR as a participant in the 2008 Climate Action Team (CAT) and Transportation Implementation Working Group (TIWG). As a global corporation who leads by example on environmental issues, PACCAR embraces the opportunity to work with government agencies, critical stakeholders, and other industry participants to address climate issues. The 2008 CAT Report sets forth many most promising strategies that merit further consideration by the Governor and the Legislature. There are, however, several recommendations that we would like to clarify and expand our position on.

The trucking industry has proactively worked to make improvements in the performance of commercial vehicles to benefit the climate and the environment. While not included in the report we would like to share that the progress made has been significant. These include:

- 2002, 2004, 2007 and 2010 engine emissions programs that greatly reduce emissions, resulting in more than 10-fold reductions in nitrogen oxide and particulate matter since 1998
- New aerodynamic models that meet EPA SmartWay standards for fuel efficiency
- Many fuel efficient idle reduction technologies to maintain human in-vehicle comfort
- Alternative fuel vehicles (LNG) that reduce green house emissions
- Medium duty electric hybrid vehicles that significantly reduce fuel use and emissions
- Consultation with the US DOT on opportunities for appropriate fuel efficiency standards

In addition, Washington State is strongly encouraged to avoid regulations creating state-unique requirements, especially in the area of fuel standards and vehicle specifications. Regulations in these areas are best addressed on a national or even international level to create a uniform standard that will not penalize the State of Washington or companies working here.

In the area of commercial goods transportation, solutions in Washington State should include infrastructure and other investments for truck, rail and marine shipping to integrate the benefits of each transportation mode. The report does not cover the full spectrum of shipping alternatives as it focuses more on rail.

Finally, notable and measurable reductions in vehicle greenhouse gas emissions can be made by funding programs that stimulate research to bring clean, innovative technologies to market. Evaluation of these concepts should include "well-to-wheels", "net carbon balance" and "factory-to-store" calculations.

Thank you for including PACCAR in the 2008 Climate Action Team. It was a valuable program and we look forward to opportunities to work together again in a partnership with the State of Washington.

Sincerely,

R. Preston Feight

R. Preston Feight
Chief Engineer
Kenworth Truck Company

cc: Bill Ross, Ross and Associates

Washington State Senate

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November 18, 2008

Jay Manning, Director
Department of Ecology
PO Box 47600
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Julie Wilkerson, Director
Community Trade and Economic Development
PO Box 42525
Olympia, WA 98504

Dear CAT Team Co-Chairs:

Response from Senator Jerome Delvin

This Minority Response addresses the Washington Climate Advisory Team's report, *Leading the Way: Implementing Practical Solutions to the Climate Change Challenge*, released November, 2008 (CAT Report). The CAT Report boldly claims that it contains the "most promising" strategies and opportunities to reduce greenhouse gas (GHG) emissions affirmed in 2008 by Washington's Climate Action Team (CAT) for consideration by the Governor and the Legislature. Although I am a member of CAT, legislators are not signatories to the report. Even if legislators could sign on to the report, I would not, because I strongly disagree with many aspects of the report. This response highlights some of the areas where I disagree and is offered for consideration by the Legislature as it attempts to make informed decisions on these recommendations.

Transportation Recommendations Wrongly Focus on Restricting Mobility Instead of Offering Incentives for Cleaner Transportation Choices

I concur wholeheartedly with the Minority Report submitted to CAT by the Washington Trucking Association and AAA Washington (WTA/AAA Minority Report), attached hereto as Exhibit A. For example, WTA/AAA's Minority Report notes that the CAT Report focuses almost entirely on meeting short and long-term vehicle miles traveled (VMT) benchmarks, while failing to consider there are different categories of highway users: discretionary and non-discretionary. Non-discretionary users include the trucking industry and any business that provides goods and services that must use the highway system. Reducing VMT for non-discretionary highway users is not a viable option. WTA/AAA's Minority Report correctly recognizes that the CAT Report also

fails to detail and discuss the costs associated with reductions in GHG emissions and VMT or how to cover those costs. I concur with WTA/AAA's conclusion that it is not good public policy to make long-term funding and pricing recommendations to the Legislature without first thoroughly assessing their potential costs and impacts.

I also share in WTA/AAA's disappointment that the CAT Report's discussion on transportation recommendations focused on limiting mobility, instead of creating incentives for people to reduce travel or purchase hybrids and other more fuel-efficient vehicles.

CAT Recommendations Lack Cost/Benefit Analysis

A recent peer review of an earlier report published by CAT confirms that the most recent CAT Report suffers from the same fatal flaws as previous reports. The peer review, published by Beacon Hill Institute at Suffolk University in Boston, is entitled Peer Review: Cost-Benefit Analysis of Washington Climate Advisory Team's Recommendations" and is attached hereto as Exhibit B. The peer review states in part that the CAT's "cost savings estimates cannot be believed" because it fails to "quantify the monetary benefits of reduced carbon emissions." After analyzing the real costs and actual benefits, the Beacon Hill Institute estimates a true net cost of the CAT recommendations to be more than $4.2 billion.

Cap-and-Trade System Would Be Devastating for Economy

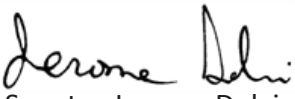
The CAT Report does not take a position on whether the Legislature should adopt the Western Climate Initiative's (WCI) cap-and-trade proposal, but does endorse the idea of the Legislature designing a market-based approach to reducing GHG emissions such as a cap-and-trade system. I would caution the Legislature against adopting a cap-and-trade system in Washington because it would impose significant economic hardship on the citizens of Washington while achieving virtually no real-world benefits. A cap-and-trade system will have absolutely no impact on global temperature, yet would take a tremendous negative toll on the economy through higher energy prices and job losses. In the current economic climate, we have to prioritize what we do and analyze the costs and benefits of policies. If the Legislature adopts a cap-and-trade system in Washington, my concern is that we will waste an extraordinary sum of money doing relatively little good.

Energy Policies Should Focus on Incentives for Energy Efficiency, Not Mandates

While the CAT Report recommends some incentive-based approaches for energy efficiency, it also recommends increased regulation to mandate energy efficiency. Incentives for energy efficiency should be given priority over mandates.

The CAT Report also lacks any discussion on future energy needs.

Signed,



Senator Jerome Delvin
8th Legislative District

Cc: Bill Ross
Enclosures

WASHINGTON POLICY CENTER

Improving lives through market solutions

POLICY BRIEF

Peer Review

Cost-Benefit Analysis of Washington Climate Advisory Team's Recommendations

by

The Beacon Hill Institute at Suffolk University

July 2008

Peer Review

Cost-Benefit Analysis of Washington Climate Advisory Team's Recommendations

by The Beacon Hill Institute at Suffolk University
July 2008

Executive Summary

Earlier this year, the Washington State Climate Advisory Team (CAT) published its report on the strategies and costs associated with their identified strategies for reducing Washington's greenhouse gas (GHG) emissions. Their analysis, which was not peer reviewed, suffers from a number of shortfalls which make it impossible for policymakers to use the information in the report in a meaningful way. A review of the CAT's report by Suffolk University's Beacon Hill Institute finds three significant flaws.

Findings

- The Climate Advisory Team report does not offer an apples-to-apples comparison of costs and benefits
- The report mistakes costs and benefits
- The report overcounts some benefits and ignores large economic costs

First, the report does not provide a basis for comparing costs and benefits of the strategy. For instance, the main benefit of the program is the reduction of greenhouse gas emissions, but nowhere is the benefit from these reductions quantified to allow a comparison to the costs. Policymakers are left with an apples-to-oranges comparison of dollars-to-GHG emissions. Without an estimate of the impact of those GHG emissions, such comparison is meaningless.

Additionally, the CAT did not analyze the economy-wide impacts of the taxes and regulations that are part of their strategy. By limiting the cost analysis only to the immediate impact rather than a full analysis of the opportunity costs, the estimated cost is lower than the CAT projects.

Second, the CAT misinterprets costs as benefits. One of the stated goals of the CAT is to create jobs. Jobs, however, are not a benefit but a cost. Paying one person to dig holes and another to fill them back would create two jobs. These jobs are a cost, not a benefit. The benefits are the value of what they have produced, not what it cost to create that value.

Third the CAT understates the true costs of its recommendations. While the analysis estimates projected costs of their proposed recommendations, they include benefits from those recommendations "and recent actions." By adding in the benefits of recent actions to those from proposed recommendations, their creative accounting turns a $2.1 billion cost into a $950 million benefit. Since policymakers are trying to determine the cost of new actions, adding benefits from previous actions is disingenuous.

The analysis also claims that many of the energy saving mandates would actually save more than the programs cost. The analysis does not, however, explain why such significant costs are currently being ignored by families and businesses. This would tend to indicate that the savings either do not exist or are much lower than anticipated. They do admit that the savings are a "major uncertainty" but pick a particular level of savings anyway and build that number in.

In short, the CAT report does not provide guidance to policymakers regarding the desirability of policies aimed at reducing greenhouse gas emissions. Its cost savings estimates cannot be believed and it fails to quantify the monetary benefits of reduced carbon emissions.

Introduction

In 2008, the Washington Climate Advisory Team (CAT) partnered with the Center for Climate Strategies (CCS) to create a report, *Leading the Way: A Comprehensive Approach to Reducing Greenhouse Gases in Washington State*.[1] The report estimates the economic costs and benefits of the CAT's greenhouse gas (GHG) mitigation recommendations.

The Beacon Hill Institute has previously reviewed the cost-benefit methodology employed by CCS in five other states, and found three serious problems:

1. CCS failed to quantify benefits in a way that they can be meaningfully compared to costs;
2. When estimating economic impacts, CCS confused costs with benefits; and
3. The estimates of costs left out important factors, causing CCS to understate the true costs of its recommendations.

The primary purpose of the CAT in 2008 is to "transform the comprehensive recommendations developed last year into a relatively small number of focused, refined, and effective set of actions that Governor Gregoire and the Washington Legislature can implement."[2] Unfortunately for Washington policy-makers, the same three problems the Beacon Hill Institute found in prior CCS work plague the CAT study, rendering it unsuitable for making any informed policy decisions.

In this brief document, we first summarize the main findings of the CAT report. We then briefly review problems one and two, before providing a more detailed analysis of the third problem. We also examine the individual cost and benefit assumptions made in the three programs CCS estimated to generate the greatest net cost savings.

[1] http://www.ecy.wa.gov/climatechange/CATdocs/020708_InterimCATreport_final.pdf
[2] http://www.ecy.wa.gov/climatechange/2008CATdocs/041808_CAT_Memo.pdf

The Climate Advisory Team Plan

The CAT report contains 45 recommended policy actions to reduce greenhouse gas emissions. These policy options are classified in five areas:

1) Agriculture and Waste
2) Energy Supply
3) Forestry
4) Residential, Commercial, and Industrial
5) Transportation

CCS facilitated and provided technical assistance in studying the five sectors. They estimate that, if fully implemented, CAT's recommendations would reduce Washington's GHG emissions to a level 17 percent below its 1990 level.

The CAT report implies that the implementation of these measures would result in a net cost savings for Washington. The CAT report individually quantifies costs for 26 of the 45 recommended options. Surprisingly CAT claims that 14 of these options would generate net cost savings. If all options were implemented, CAT estimates that the recommendations would save Washington nearly $950 million (in net present value terms) between now and 2020.

The estimated $950 million cost savings is not credible. The report grossly underestimates the true costs of implementing the policy options recommended by the CAT for GHG mitigation. As we show below, the cost-benefit methodology employed by CCS omits significant costs and frequently misconstrues certain costs to be benefits, causing them to underestimate the true costs of their recommendations.

Problem 1: CAT Fails to Quantify Benefits In a Way That Can Be Meaningfully Compared to Costs

A scientifically sound cost-benefit analysis should clearly spell out all of its assumptions, estimate the physical impacts that a particular policy change will have over time, and then estimate the present value, in dollars, of both the benefits and the costs of the physical impacts. On this basis, a study should be able to conclude whether a given policy change is expected to provide benefits in excess of its costs.

However, the CAT report fails to estimate the dollar value of the main intended benefit – reduced GHG emission. The authors are clear about this in the "Methods for quantification" memo (appendix K: p.1). Net GHG reduction is measured per million metric tons of carbon dioxide equivalent ($MMTCO_2e$). Only direct economic costs are quantified. Indirect, external, or society wide costs are not. Nowhere is the dollar value of metric tons of reduced GHG calculated.

However, without this information the CAT report is unable to provide a cost-benefit analysis at all. The goal, reduced GHG emissions, is measured in purely physical terms instead of in dollars. This precludes a comparison of the value of reduced GHG emissions to the costs associated with reducing the emissions.

Are the mitigation options desirable? For a cost-benefit analysis to provide any guidance in answering this question the CAT would need to compare the dollar value of reduced GHG emissions to the cost. Since they only quantify the physical benefits, we are left comparing reduced metric tons of GHG to dollars – essentially comparing apples and oranges.

Estimating a dollar value of reduced GHG emissions would require a number of steps. First, a full accounting of both societal costs and benefits from higher emissions would have to be constructed. Then the impact on these costs of the marginal changes in Washington's emissions would have to be estimated. Because Washington's GHG emissions are so small relative to the rest of the world's emissions it is quite possible that, even if there are large social costs associated with GHG emissions, no policy adopted by Washington would have any discernable impact on global climate change, and thus no benefits that could be assigned a dollar value.

Moreover, the CAT analysis does not address the opportunity costs or potential unintended consequences of its proposals. The opportunity cost of undertaking an activity is the highest valued alternative forgone activity. For example, the opportunity cost of attending college full-time is the wages forgone from not being able to work full time, as well as the leisure time lost from studying nights and weekends.

For example, the CAT report does not attempt to measure the opportunity cost of providing tax incentives to individuals and businesses to invest in energy conservation measures. The opportunity costs of this proposal would include lower tax revenue and forgone tax incentives for other activities, such as worker training or education. The CAT analysis should consider the benefits of these potential alternative uses of tax credits.

An unintended consequence is an outcome, both foreseen and unforeseen, that was not intended by an actor of a specific activity. A pertinent example is the federal incentives for ethanol production. The objective of the policy is to increase the portion of ethanol in motor fuels and reduce U.S. dependence on foreign sources of oil. A possible, yet debated, unintended consequence is the increase in the production of ethanol may have led to sharp increases in the price of corn, and subsequently strained the budgets of poor people. While it may be difficult to quantify these outcomes, the CAT analysis should make an attempt to at least identify these possible outcomes.

Astonishingly, the CAT finds that there would be net economic savings from their proposals even without quantifying the dollar value of their main intended benefit – reduced GHG emissions. They (incorrectly) find that their policies not only have no net cost, but instead actually generate economic savings for the state! However, these economic savings are not translated into impacts on meaningful state economic indicators, such as investment, employment, income and state Gross Domestic Product (GDP). Nevertheless, we analyze these claims below under problem 3.

Problem 2: When Estimating Economic Impacts, CAT Misinterprets Costs as Benefits

The CAT report routinely mistakes costs for benefits. Jobs in particular are erroneously viewed as benefits throughout the report. One explicit goal of the plan is to create a total of 25,000 clean energy sector jobs in the state by 2020 (p. 41). The CAT plan favorably estimates that it will exceed this goal and, if the mitigation options are fully implemented, that they would actually achieve 31,500 jobs by 2020 (p.

41). Similarly, after listing four programs that will have a total cost to the state of $5.4 billion, the CAT report notes that these costs do not account for "the economic benefits from job creation" (p.39).

However, jobs themselves are *not* a benefit; if they were, workers would be paying their employers for the privilege of working, rather than vice versa! It is the value created by performing those jobs that is the benefit, while doing the job is the cost an individual must pay to obtain a benefit.

An example should make this fact clear. Paying one person to dig holes and another person to fill them back in would create two jobs. These jobs are a cost. In this case, two people bore the cost in terms of hard work and time of digging and filling holes. Since, on net, no holes were created or destroyed no value was created. Society is, on net, poorer by the opportunity (cost) these two workers sacrificed to dig and fill holes.

Applied to the state of Washington, all of the clean energy jobs created by CAT are a cost. To figure out whether there is any net benefit, the CAT would have to compare the cost of the job to its benefit – the dollar value of the amount of clean air the job produces. But CAT never quantifies the dollar value of reduced GHG, so they have no scientific basis to conclude that these jobs provide net benefits. Instead the report resorts to mistakenly claiming that the jobs themselves are the benefit.

Problem 3: CAT Understates the True Costs of Its Recommendations

Although the CAT report does not estimate the monetary value of benefits (reduced GHG emissions), it does attempt to quantify the monetary costs of 26 of their policy recommendations, and it astonishingly finds a net cost of savings of nearly $950 million.

This finding – that mitigating GHG emissions amount to a free lunch – does not hold up under scrutiny. It is an artifact of the CAT report's unrealistic assumptions, incomplete listing of costs, and misleading accounting.

The report states "the CAT strategies ***and recent actions*** taken in Washington, for which both costs and emissions reductions could be assessed, could yield a net cumulative benefit of over $900 million by 2020" (p. 17, emphasis added). CAT quantifies not only the actions it recommends, but also actions the state has already taken. The difference is not trivial. Table 4 (p. 71) separates the present value of recent actions already taken by the state and those new actions CAT recommends. By their own estimates the new actions CAT recommends have a net cost of more than $2.1 billion! Meanwhile the CAT report estimates that the actions already taken in Washington have saved more than $3 billion. This is how the report arrives at nearly $950 billion in net cost savings from climate mitigation.

This accounting method is, at best misleading, and possibly intentionally deceitful. The policy question confronting the state is: what is the cost of new mitigation options? Whether new mitigation options are worth implementing depends on the benefits and the costs that these, and only these, options create – not the cost of these options plus savings existing programs already create. The CAT proposal should state that it proposes GHG mitigation options they estimate will have a net cost of more than $2.1 billion. To net this figure with actions already taken is disingenuous.

This is not the end of the problems with the CAT cost estimates. Even a $2.1 billion net cost grossly underestimates the true costs of their recommendations. The report claims that 14 of their

proposed mitigation options will generate net cost savings. But these estimates are derived from unrealistic assumptions and an incomplete listing of costs.

To highlight these shortcomings, we now examine in more detail three policies that, according to the CAT report, would generate the greatest net cost savings. The three policies, which CAT estimates will save Washington a total of more than $2.1 billion, are listed in Table 1, next to the net cost savings that CAT claims would result if each of the policies were implemented.[3]

Table 1. CAT Estimates of New Savings Due to Implementation of Selected Greenhouse Gas Emission Mitigation Measures

	Program title	Net Cost Savings to WA by 2020 ($ millions)
RCI - 10	More Stringent Appliance/Equipment/Lighting Efficiency Standards	1,075
RCI - 4	Energy Efficiency Improvements in Existing Buildings	529
RCI - 1	Demand Side Management Programs	498

Source: CAT report

RCI-10 More Stringent Appliance/Equipment/Lighting Efficiency Standards, and Product Recycling and Design

This option would attempt to advance programs to make new lighting, equipment, appliances, and consumer electronic products more energy efficient and more easily recyclable. Specific suggested programs include: developing minimum efficiency standards for televisions, lights, walk-in refrigerators and freezers, residential furnaces, commercial hot-food holding cabinets, and other electronic and electrical equipment; investing in research and development to promote LED and other highly efficient lighting technology; requiring the preferential procurement of Energy Star products when state funds are involved; and tax incentives to increase the sales and use of Energy Star products.

The billion plus dollars of net cost savings the CAT estimates this policy would produce are achieved through the avoided cost of electricity consumption. But if these cost saving estimates are correct, consumers already have every incentive to switch to these types of appliances, even if Washington does not adopt this mandatory policy. No coercive government program is necessary to get people to adopt technologies that are in their own self-interest to use. Companies have every incentive to advertise the possible energy savings to consumers and consumers will adopt these products once they are aware of the savings.

If the private benefits are really as large as CAT estimates, why are people not taking advantage of them already? If subsidies, additional incentives, and requirements are necessary to get people to use these products, then it is because the appliances have a net cost (not savings) associated with them without such subsidies. Either the program matters, in which case it imposes costs; or it is irrelevant, because the consumers would have made these changes anyway, in which case the policy generates no benefits. In either case, there is not the billion plus dollars in cost savings that the CAT report estimates.

[3] It is coincidental that these three policies sum to $2.1 billion and that $2.1 billion is also the amount the CAT should have reported that their mitigation options would cost by their own estimates.

The CAT cost savings estimate for this program also fails to deal with uncertainty. They explicitly state "According to experts, developing efficiency standards for televisions is proving to be especially challenging, so timing for capturing savings is a ***major uncertainty***" (Appendix H p. 62, emphasis added). Nowhere do they make any attempt to quantitatively deal with uncertainty. They simply pick one set of assumptions and forecast more than a billion dollars in savings. Given the uncertainty, a more responsible cost benefit study would have constructed multiple scenarios and attached a probability to each to estimate an expected value.

The failure to adjust for risk is not unique to this proposal. The CAT fails to forecast multiple scenarios and then adjust for their probability when looking at numerous speculative policies. All of the proposals are speculative in nature, but the uncertainty never makes it into the CAT's estimates. A more realistic approach to uncertainty would likely increase the net cost associated with the recommended mitigation options.

RCI-4 Energy Efficiency Improvement in Existing Buildings, with Emphasis on Building Operations

This policy is intended to provide incentives for improving resource efficiency of existing buildings through building operations, maintenance, and occupant behavior. Specific proposals include required efficiency upgrades when buildings are resold, support for energy efficient lending, an incentive program to encourage private businesses to hire more resource conservation managers, and tax incentives. The cost savings estimates from this program suffer from the same main problem that the appliance efficiency standards did. The predicted cost savings directly accrue to the consumers, so if these savings really exist they already have an incentive to take advantage of them.

A specific example may clarify this. This program would "Provide state tax incentives for building owners – public and private – to invest in cost effective energy conservation and measures" (Appendix H p. 31). If the measures are cost effective, no additional tax incentive is needed. Business owners would make greater profits by embracing energy efficiency. That is all the incentive they need. However, if an energy efficiency upgrade costs more to implement than it will save in avoided energy costs, then a tax incentive would be necessary. In this case the program would have a net cost, not a savings. Again, either the program matters and it has a cost, or it does not matter, because the business owners would have made the changes anyway, so there is no net cost or savings from the policy. Either way, there is not the $529 million in savings that the CAT report estimates.

RCI-1 Demand-Side Management Programs

This policy aims to create incentives to increase the investment in natural gas, propane, and fuel oil demand-side management programs. Specific options include subsidized energy audits for homeowners and businesses, consumer education, energy efficiency reinvestment funds to provide capital, low-cost loans, and incentive programs to encourage adoption of a variety of energy saving practices.

The forecasted gain from this program again results from money saved from improved energy efficiency in excess of the cost of making the buildings more energy efficient. This raises the same fundamental problem that arose with two prior programs: if the private benefits are really so large, why

are people not taking advantage of them already? If the savings are as great as the program estimates, consumers should already be making them. The various incentives are unnecessary. Either the program matters because consumers would not adopt these changes on their own, in which case the program imposes costs; or it is irrelevant because the changes would have been made anyway, in which case the policy generates no benefits. In either case, there is not the $498 million in cost savings that the CAT report estimates.

Conclusion

The CAT report provides zero guidance to policy-makers regarding the desirability of policies aimed at reducing greenhouse gas emissions.

- It fails to perform the most basic task of any cost-benefit analysis – quantifying both the costs and benefits in monetary terms so that they can be directly compared.
- The report does not address the opportunity costs or potential unintended consequences of its proposals.
- It finds net economic savings from many policies intended to reduce greenhouse gasses, even *without* counting the value of those reduced emissions.
- It fails to estimate the impact of the proposals on state wide economic indicators, such as investment, employment, incomes and state GDP.

In this peer review, we have briefly examined the cost-benefit assumptions for the three proposed policies forecast to generate the largest net cost savings. In each case we have found the analysis to be seriously flawed. Despite the CAT claim that these three programs have a net benefit of more than $2.1 billion, we can find no sound scientific basis for their claim. CAT's cost savings estimates are not just wildly optimistic; they are the product of a purely fictitious analysis.

CAT's accounting has to be adjusted to eliminate the costs of already taken actions. When considering the cost of only their newly proposed initiatives, CAT's own cost estimates change from a savings of nearly $950 million to a net cost of more than $2.1 billion. After eliminating the supposed savings from just the three biggest net cost saving proposals, analyzed above, the net cost of CAT's recommendations swells to more than $4.2 billion. CAT's cost (savings) estimates of other mitigation options suffer from similar problems, causing even a $4.2 billion cost to their overall package to understate the true cost.

For policy-makers, there is no worthwhile guidance in the CAT report. Its cost savings estimates cannot be believed, and it fails to quantify the monetary benefits of reduced carbon emissions. Thus policy-makers are left with no basis on which to judge the merits of the CAT report's recommendations for the mitigation of greenhouse gas emissions.

About the Author

The Beacon Hill Institute at Suffolk University in Massachusetts engages in rigorous economic research and conducts educational programs for the purpose of producing and disseminating readable analyses of current public policy issues to voters, taxpayers, opinion leaders and policy makers. The Beacon Hill Institute is a world-renowned learning and research center that develops and performs innovative economic and statistical analyses of current and emerging public policy issues. It aims to strengthen that function by: providing local, state, national and international research entities with state-of-the-art tools and economic analyses, partnering with a PhD granting department of economics, and expanding its reputation for providing objective analysis to examine and influence public policy. For more information visit www.beaconhill.org.

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