

**Transportation Technical Work Group
Summary List of Recommended High Priority Mitigation Options**

#	Mitigation Option Name	Status
T-0	New Funding Mechanisms	In Progress
T-1	Transit, Ridesharing, and Commuter Choice Programs	In Progress
T-2	State, Regional, and Local VMT and GHG Reduction Goals and Standards	In Progress
T-3	Transportation Pricing	In Progress
T-4	Promote Compact and Transit-Oriented Development	In Progress
T-5	Quantification of GHG Impacts of Transportation Plans, Programs, and Projects	In Progress
T-6	Improvements to Freight Railroads and Intercity Passenger Railroads	In Progress
T-7	Diesel Engine Emission Reductions and Fuel Efficiency Improvements	In Progress
T-8	Local Transportation Financing Tools and Bicycle and Pedestrian Infrastructure Improvements	In Progress
T-9	Transportation System Management	In Progress
T-10	Actions to Accelerate and Integrate Plug-In Hybrid Electric Vehicle Use	Ready for CAT review
T-11	Low Carbon Fuel Standard	Ready for CAT review
T-12	Zero Emission Vehicle Standards	In Progress

Mitigation Option T-0: New Transportation Funding Mechanisms

Mitigation Option Description

Our current system for financing transportation programs and projects faces many challenges. The primary revenue source for transportation in Washington is the gas tax. The gas tax has many of its own challenges, including: 1) it is largely obligated to a series of programs and projects over the next 10-15 years, 2) it will begin to yield declining revenues around the middle of the next decade, and 3) its spending is restricted to highway purposes only. In addition to the gas tax, we have a number of other revenue fees and taxes that fund a variety of other transportation programs and projects. Many of these sources, however, are either fully obligated or do not generate significant revenue. Cities, counties, and Public Transportation Benefit Areas are authorized by the state to fund transit programs through locally-approved sales and use taxes, and a number of communities have already exhausted their full local funding authorization. In order to adequately fund the maintenance and safety improvements necessary for the existing transportation system as well as fund many of the measures under consideration by the Climate Advisory Team to meet the Governor's stated objectives, Washington must develop additional, flexible, and reliable long-term funding mechanisms.

Mitigation Option Design

The state should undertake a serious analysis of the following revenue tools and act to implement a more stable, more flexible, more robust transportation financing system. The following tools should be assessed to both replace and/or augment existing funding tools.

The revenue tools to be considered shall include, but not be limited to, the following:

- Sales tax on gas
- Vehicle-miles-traveled or odometer tax
- Carbon / emissions tax
- Facility toll revenue
- Congestion / dynamic pricing revenue
- Parking fees
- Local Improvement Districts (LIDs)
- Transportation Benefit Districts (TBDs)
- Petroleum transfer fees
- Container / freight taxes

- Motor Vehicle Excise Taxes (MVET)
- Transit agency farebox revenue
- Public Transportation Benefit Areas (PTBAs)
- Employee head tax

Mitigation Option T-1: Transit, Ridesharing, and Commuter Choice Programs

Based on Transportation Catalog Option 5.2, 5.3, and 5.6

Mitigation Option Description

The goal of this set of activities is to have the state provide the leadership and resources necessary to help create a transit and ridesharing system that connects activity centers on both an intra- and an inter-regional basis. Success at meeting the overall emissions reductions goals for 2020, 2035, and 2050 will require that substantial reductions be made in emissions from personal transportation. This will require that the state develop a reliable funding system that allows for near-term success and long-term major investments with the flexibility to invest in any type of solution. The set of activities and investments represented here attempts to reflect the diversity of needs across the state: what works in dense urban areas will be different than what is effective in low-density suburban or rural areas. The transit capital, operating support, ridesharing and trip reduction strategies assembled allow for local needs to drive the process. This option is related to options T-4 and T-8.

Mitigation Option Design

Transit - Capital

- Park and ride capacity (new and expansion), Bus rapid transit, Vehicles, Passenger facilities (multi modal terminals, shelters)
- Technology improvements (real-time customer information, signal preemption.)
- Expansion of Operations and Maintenance facilities
- Pedestrian, bicycle, and bus stop accessibility and safety projects

Transit – Operating

- Provide operating support to local transit agencies,
- Improve access within and between centers,
- Provide new service for developing areas, Provide assistance to rural areas,
- Increase resources available to elderly and disabled population,
- Provide funding for promotion of use of transportation alternatives

Transit – Funding

- Increase Regional Mobility Grant state program from \$40 million per biennium to \$100 million per year,
- Increase funding to ensure the mobility of persons with special transportation needs

Provide funding for major investments in high capacity transit to match local and regional investments.

Ridesharing – Capital

- Meet vanpool fleet expansion needs of local service providers and provide funding for service and replacement of vans,
- Create and maintain a state of the art ridematching system,

Ridesharing – Operating

- Fund ongoing statewide promotions, including incentives to employers and individuals,
- Create statewide marketing program to promote carpooling through education and incentives,
- Fund incentives, including subsidized transit and vanpool fares for all State employees.

Ridesharing – Cost

- Increase annual state funding from \$8 million per biennium to \$15 million per biennium.

Commuter Choice – Operating

- Increase state CTR program statewide with emphasis on direct employer support, promotion, and incentives,
- Implement Growth and Transportation Efficiency Centers in all designated urban centers,
- Expand rideshare tax credit for employers that start employee incentive programs and retailers that reward customers who rideshare for shopping trips,
- Provide incentives to employers to allow telecommuting,
- Implement major initiative to reach travelers at the home end of the trip: mobility education for 600,000 households per year for 10 years. This approach is critical to creating change in low density residential and employment areas across the state.

Commuter Choice – Cost

- \$10 million for CTR, \$10 million for GTEC, \$6 million for residential programs

Goals:

- Increase transit trips and transit market share as indicated in the following table.
- Increase rideshare trips and market share as indicated in the following table.

	PSRC	Spokane	Tri-Cities	Vancouver	Rest of State
Transit					
2005 trips					
2005 mode share					
2020 trips (baseline)					
Goal: 2020 trips					
Goal: 2020 mode share					

Rideshare					
2005 trips					
2005 mode share					
2020 trips (baseline)					
Goal: 2020 trips					
Goal: 2020 mode share					

[For TWG consideration in developing goals – to be removed once goals are determined.]

PSRC Trips by Mode, 2006 and 2020 (from Destination 2030 modeling)

	Drive Alone	Shared Ride 2	Shared Ride 3+	Transit Walk	Transit Drive	Walk	Bicycle	Total
2006 Person Trips	5,851,354	2,697,817	1,822,719	318,278	35,161	970,768	114,858	11,810,954
2006 Mode Share	50%	23%	15%	3%	0%	8%	1%	100%
2020 Person Trips	7,099,716	3,291,994	2,237,011	486,370	50,011	1,191,066	145,547	14,501,714
2020 Mode Share	49%	23%	15%	3%	0%	8%	1%	100%

Source: PSRC Destination 2030 modeling

Timing: See above.

Parties Involved: Transit Agencies, State of Washington

Implementation Mechanisms

TBD

Related Policies/Programs in Place

TBD

Mitigation Option T-2: State, Regional, and Local VMT and GHG Reduction Goals and Standards

Based on Transportation Catalog Option 4.4 and 5.10

Mitigation Option Description

While new technologies and cleaner fuels are vital to reducing GHG emissions, as long as annual vehicle miles traveled (VMT) continues to grow, we'll never be able to meet the state's 2020, 2035, and 2050 goals. Reduction of vehicles miles traveled – through a partnership between the state, regional, and local level – is critical. Regional entities' and local governments' ability to achieve VMT reductions also depends a great deal upon other complementary policy tools considered in the CAT process.

In 2007 lawmakers passed legislation that committed the state to develop a plan to gradually reduce per capita VMT. Vehicle miles traveled is commonly used a primary predictor in GHG output. This option builds on that initial state action and would consist of the state establishing a schedule of targets for reducing statewide VMT and working alongside local governments or regional planning organizations to achieve those targets.

Mitigation Option Design

Goals:

1. Develop a statewide plan with targets to reduce annual VMT.
2. Apportion local/regional jurisdictions their responsibilities of that statewide plan.

The state should adopt a schedule of statewide VMT reduction targets, similar to the emissions reductions schedule in E.O. 07-02. The state would commit to a plan to reduce annual per capita VMT from W thousand VMT per capita currently, to X thousand VMT per capita by 2020, Y thousand VMT per capita by 2035, and Z thousand VMT per capita by 2050. (Actual numeric targets will be determined through the course of the Climate Advisory Team process.)

The per capita VMT reduction plan would be a partnership connecting the state, regional, and local levels. The state would design a plan that consists of both state actions and investments to achieve the targets. Significant state investment is anticipated and much of the attainment in VMT reduction is expected to result from other complimentary actions considered by the TWG.

After the state has committed to a schedule of per capita VMT reductions, the state will then apportion to RTPOs their responsibility in achieving that goal. Here, RTPOs would adopt a local vehicle miles reduction commitment in a low-med-high range. Local governments would adopt policies in their comprehensive plans that are consistent with

those commitments, and development and infrastructure decisions would have to be consistent with the VMT reduction plan. RTPOs would review local government transportation elements for consistency with the GMA and the regional transportation plan, as currently required. In concept, agencies would provide guidance, including a wide range of design treatments, approaches, and best practices to offer in order to reach the identified benchmark.

[For TWG consideration in developing goals – to be removed once goals are determined.]

Impact of Three Possible VMT per Capita Goals

	Baseline						2020 VMT Reduction Scenarios		
	1980	1990	2000	2005	2010	2020	10%	15%	1980 level
Annual VMT (millions)	30,990	43,934	53,319	55,584	60,311	74,279	66,851	63,137	55,736
Population (millions)	4.13	4.87	5.89	6.20	6.54	7.43	7.43	7.43	7.43
Annual VMT per person	7,499	9,028	9,046	8,958	9,219	9,994	8,995	8,495	7,499
On-Road Gasoline GHG emissions (MMtCO ₂ e)	N/A	20.41	24.48	24.97	26.46	29.36	26.4	25.0	22.0
Reduction from Baseline (MMtCO ₂ e):							2.9	4.4	7.3

Note: Scenarios assume GHG reduction directly proportional to VMT reduction.

Forecast Daily VMT per Capita in PSRC region

Region	1998	2010 BAU	2010 Plan	Change (Plan v. 1998)	2030 BAU	2030 Plan	Change (Plan v. 1998)
All PSRC	20.5	21.1	20.9	2.0%	20.9	19.9	-2.9%
Northwest King County	19.7	19.9	19.6	-0.5%	18.5	16.5	-16.2%
East King County	22.0	24.1	24.5	11.4%	24.2	25	13.6%
South King County	25.1	25.5	24.9	-0.8%	25.6	24	-4.4%
King County	22.3	23.1	22.9	2.7%	22.7	21.7	-2.7%
Kitsap County	13.9	15.6	14.2	2.2%	14.1	13	-6.5%
Pierce County	18.3	19.5	19.1	4.4%	20.5	19.1	4.4%
Snohomish County	20.5	19.8	20.2	-1.5%	19.7	19.8	-3.4%

Source: PSRC's *Destination 2030*, Appendix 8

Timing:

The legislature would adopt the statewide VMT targets in the 2008 legislative session. Agencies would develop guidance and best practices in 2008, with phased implementation at the local and regional level in 2009 and 2010. Early adopters could

receive incentive money from the state, and all jurisdictions would be given additional revenue authority for implementation.

Parties Involved:

State Legislature

CTED

DOT

Regional air quality control agencies

Cities and Counties

Regional Transportation Planning Organizations

Implementation Mechanisms

TBD

Related Policies/Programs in Place

TBD

Mitigation Option T-3: Transportation Pricing

Based on Transportation Catalog Option 5.7, 5.9, and 5.12

Mitigation Option Description

Growing traffic congestion, particularly in the urban areas of our state, causes reduced fuel efficiency and increases emissions of greenhouse gases as well as criteria pollutants. The way we pay for transportation influences our decisions on when, where, and how we travel – or don't travel. A major reason for congestion is that there is little relationship between how a person travels and the cost (personal, social, and environmental) of that travel. Pricing sets a direct economic relationship between the costs and benefits of when, where, and how a person travels; by doing so, pricing manages demand and increases the efficiency of the transportation system and reduce adverse environmental impacts. When variable costs of automobile travel are comparatively low, transit and ridesharing have difficulty competing.

Pricing works on the principle of supply and demand. Congestion occurs when demand is so high that the system can no-longer efficiently handle the amount of traffic. Roadway pricing introduces or expands the use of user fees linked to existing congestion conditions to manage demand. As demand increases for a facility or service, the cost for that facility or service increases. With a cost associated with the use of a facility, travelers begin to think and react more to when, where, and how they travel. Travelers will alter their travel, reducing the demand for the facility or service and thus enable it to operate at an efficient level. For example, peak-period pricing for air travel has become one of the most significant methods to balance supply and demand by encouraging travelers to alter their travel schedules. Other forms of transportation pricing work on similar principles, seeking to limit demand and maximize efficiency by sending more explicit price signals to users. While applying pricing to surface transportation is a recent development, pricing has been used successfully in other public service sectors such as water and electricity.

This option seeks to promote several forms of transportation pricing in both the near and longer term. Near-term options include:

- Expanded use of HOT (High Occupancy Toll) lanes
- Use of tolling to manage demand in selected corridors, including both dynamic and fixed tolling
- Start a mileage-based insurance pilot program
- Increases in parking prices and other forms of parking supply management

Longer-term options include:

- Implementation of system-wide dynamic roadway pricing in major urban areas
- Broad offering of mileage-based insurance throughout the state
- Exploration of mileage-based vehicle pricing, greenhouse gas emissions pricing and vehicle weight charges. As vehicles using alternative fuels, such as biofuels and electricity, become increasingly available, there will be a need to replace lost gas tax revenues. Additional sources of revenue should not discourage alternative fuels. Oregon is experimenting with mileage based revenue, but other systems need to be explored.

Funds generated by roadway pricing should be used to support alternative modes of regional transportation.

Mitigation Option Design

Near-term goals:

- Implement HOT lanes in SR 167 corridor as planned. Explore implementation of HOT lanes on I-405 and conversion of Puget Sound HOV system to HOT lanes.
- Use tolls to manage demand in SR 520 corridor and other corridors as appropriate (dynamic and fixed tolls).
- Expand King County mileage-based insurance pilot program to cover XXX vehicle owners by 2010.
- Implement 5% parking surcharge in the Puget Sound region (except Seattle, where a 5% parking tax took effect July 6, 2007). Increase to 10% by 2009.
- By 2010, ensure that 50% of employers who provide leased parking spaces to employees will offer parking cash-out.
- Develop or improve tools that can be used to evaluate pricing options.

Longer-term goals:

- By 2015, use dynamic pricing to manage demand on highway system throughout the Puget Sound region.
- By 2020, 50% of vehicles owners in state will be offered mileage based insurance.

Timing: See above.

Parties Involved: WSDOT, RTPOs, counties

Implementation Mechanisms

TBD

Related Policies/Programs in Place

- HOT (High Occupancy Toll) or Express Toll Lanes. In April 2008, WSDOT will begin operations of the first HOT Lane in the state. The SR 167 corridor is heavily congested, but has excess capacity in the HOV (High Occupancy Vehicle) Lane. The HOT Lane will allow non-HOV drivers to use the lane for a fee. The fee will be variable, changing based on the travel conditions and amount of capacity available in the HOT Lane. By managing the amount of vehicle in the lane through price, the HOT Lane will maintain transit, vanpool, and carpool travel times within the corridor, increase the efficiency of the lane, and increase vehicle efficiency.

WSDOT is exploring the use of HOT or Express Toll Lanes on I-405 as well as conversion of the existing HOV system within the Puget Sound.

- Corridor Pricing. The Lake Washington Urban Partnership proposal between WSDOT, King County, and the Puget Sound Regional Council are exploring the potential of tolling the SR 520 corridor, prior to construction, to test the use of tolling, technology, transit, and teleworking to reduce congestion within the corridor. King County, the Washington State Department of Transportation and the Puget Sound Regional Council have received a U.S. Department of Transportation Urban Partnership Grant that includes The Lake Washington Urban Partnership proposal.
- Mileage based insurance. King County is beginning a research project to test the potential for mileage based insurance with Unigard Insurance. The study will explore how insurance priced on when, where, and how you drive will influence driver behavior.
- PSRC recently conducted a pilot test of an in-vehicle taxi-like metering device to assess roadway user charges. This Traffic Choices Study involved 500 vehicles from more than 300 households.
- On July 6, 2007, the City of Seattle implemented a 5% parking tax. The tax will go up to 7.5% on July 1, 2008 and up to 10% on July 1, 2009. Drivers who rent parking stalls by the month, residential parking spots, and parking on city streets are not affected by the new tax.

Mitigation Option T-4: Promote Compact and Transit-Oriented Development

Based on Transportation Catalog Option 4.1

Mitigation Option Description

Ensure that growth management plans promote compact and transit-oriented development to reduce VMT and GHG emissions. Transportation is the single largest source of GHG emissions in Washington State and we will not achieve our goals without significant reduction to its share of the emissions. Washington has already taken steps to manage growth and development and has begun efforts to reduce VMT and GHG emissions through the adoption and implementation of the Growth Management Act and related legislation. But with significant growth projected across the state, we must improve and build upon these efforts. Compact and transit-oriented development and VMT and GHG emissions reductions are feasible and necessary.

Washington State adopted the Growth Management Act (GMA) in 1990-91. Washington's approach recognizes the state's diversity from urban to rural and east to west. The approach puts forward state goals and requires cities and counties in the more populated areas of the state to plan for future population growth, establish urban growth areas, ensure adequate infrastructure, protect environmentally critical areas, and preserve the best agricultural and forest land for resource production. City and county comprehensive plans required by the GMA are valid unless challenged through a regional system of hearings boards. Washington's approach seeks to protect the important quality of life of our state, regions, and local communities while providing for local and regional flexibility in how the goals are met. The mitigation option proposed below fits into this framework. It would provide new direction for reducing VMT and GHG emissions, using solutions consistent with the state's diverse geography and communities.

Mitigation Option Design

Goal: Develop and implement policies and strategies that include funding, incentives and restrictions to promote compact and transit-oriented development in urban areas.

These actions should be designed to reduce VMT and GHG emissions by X in 2020 and Y in 2050. (Note 1 describes how measurements will be developed.)

- Encourage compact development within urban growth areas by designating urban centers for employment, services and housing growth, increasing urban residential densities while assuring adequate services, and encouraging "brownfield" development. Careful consideration should be used in expansion of urban growth boundaries, and when appropriate, development should reflect a compact development pattern.

- Promote transit-oriented development, including requiring planning/zoning for transit-oriented development to accompany high capacity transit investments, and declaring transit-oriented development a highway purpose that reduces congestion on public roadways (similar to public transportation facilities legislation).
- Promote amenities (such as green streets, small plazas and gathering plazas, frequent retail stops, noise control ordinances) that make high density living more attractive and encourage walking and biking.
- Promote sufficient affordable housing opportunities in urban areas with convenient access to transit to match projected job type by sub area.

Timing: Amend the Washington State Growth Management Act and High-Capacity Transportation Systems Act in 2008. GMA implementation by cities and counties would be phased in through the regularly scheduled process for updating comprehensive plans, currently scheduled for 2011. In addition, when a high-capacity transportation plan has been adopted and funded, local governments will initiate changes to comprehensive plans and codes for transit-oriented development at all major station areas. Depending on the timing, these changes may need to be completed prior to the regularly scheduled updates. The state should provide cities and counties planning grants to carryout the new requirements.

Parties Involved:

State Legislature

CTED

Cities and Counties

Regional Transportation Planning Organizations

Transit Agencies

Developers

Environmental Organizations

Public Interest Organizations

Implementation Mechanisms

Overall:

Mitigation Option T-4: Promote Compact and Transit-Oriented Development fits within the framework of the state's Growth Management Act (GMA). In order to implement the growth and transportation planning proposals being considered by the Washington Climate Advisory Team, the GMA should be amended to add a climate change goal (such as a reference to the state's goal established in SB 6001). In addition, regional and local GHG emission reduction targets should be established.

Encourage compact development within urban growth areas that result in reduced VMT and GHG emissions:

The GMA requires cities and counties planning under the act to adopt county-wide planning policies as the framework for county and city comprehensive plans. An additional provision should be added requiring that the county-wide planning policies include defining and designating urban centers for employment, services and housing growth. The state should develop urban center guidelines that recognize the state's diversity, ranging from major metropolitan centers, suburban centers to rural towns. The new county-wide planning policies will be implemented by cities and counties through comprehensive plan updates. To assist with implementing these changes, the state should provide planning grants to cities and counties, as well as technical assistance and information transfer, to enable newly developing areas to benefit from the successes of other cities.

The GMA should establish average urban residential densities that recognize the state's diversity. Guidelines for contiguous urban areas and large cities should set densities sufficient to support frequent transit service (e.g. 10-15 minute headways), and should promote densities for smaller cities that reflect walkable patterns of historic rural towns (e.g. Enumclaw, Prosser, historic Ellensburg and Wenatchee). These guidelines will be implemented by cities and counties through comprehensive plan updates.

Provide incentives for brownfield development within urban growth areas, such as grants and technical assistance to help jurisdictions identify the extent of problems, define workable mitigation measures, and complete redevelopment plans.

Future urban growth boundary expansions should be carefully considered. In cases where expansion is deemed appropriate, the city or county comprehensive plan for this area must provide for a compact development pattern.

Promote transit-oriented development:

As part of planning for high-capacity transit, cities, counties and high-capacity transit agencies must develop and implement plans and codes that require transit-oriented development at all major station areas. High capacity-transit plans will identify station areas where transit-oriented development is encouraged. In those areas, local government comprehensive plans and codes will include specific provisions for transit-oriented development.

There needs to be additional funding opportunities for transit-oriented development. One opportunity is to use city street, county road, and motor vehicle funds by declaring transit-oriented development a highway purpose that reduces congestion. (This change builds on RCW 47.04.083.)

Encourage walking and biking:

This action would be implemented by Mitigation Option T-8: Local Transportation Financing Tools and Bicycle and Pedestrian Infrastructure Improvements.

Promote affordable housing opportunities in urban areas:

Housing targets set by counties should assure that the supply of low income housing enabled by land use plans and regulations reflects job growth by subregion, e.g. so that retail workers can live within an easy transit or bike commute to work.

Affordable housing opportunities should be integrated into transit-oriented development plans and projects.

Related Policies/Programs in Place

TBD

Mitigation Option T-5: Quantifying Greenhouse Gas Emissions from Transportation Projects

Based on Transportation Catalog Option 5.11

Mitigation Option Description

Transportation projects such as road expansion, land development impacting transportation systems, increasing public transit, bicycle lanes, sidewalks, other transportation modes, and infrastructure all influence the amount of greenhouse gas (GHG) pollution emitted from the transportation sector.

Current measurement tools need to be more comprehensive and accurate because the amount of GHG pollution emitted from the transportation sector and individual projects is influenced by more than just the project itself. Assumptions about how people will travel (e.g. walk, bus or in a single occupancy vehicle) will greatly influence the estimates of GHG emissions associated with transportation projects. As a result, the increased availability and quality of public transit, bicycle lanes, sidewalks, other transportation modes, and infrastructure also influence the amount of GHG pollution and need to be more accurately evaluated.

State and local agencies have influence over a number of decisions that affect these projects. Both in the transportation planning and the projects planning process, transportation agencies should be required to evaluate and provide information to decision-makers, including the public, about current and future GHG emissions associated with transportation system plans and projects. This is especially important for major transportation projects that include alternatives to capacity expansion such as HOV lanes or other options which reduce GHG emissions. Decision-makers need to be given information regarding impacts on emissions to allow for a more informed debate. Transportation projects such as transit and other alternatives to single occupant vehicles, bicycle lanes, sidewalks, and even new projects that permanently reduce congestion or create significantly shorter travel routes can reduce greenhouse gases; the greenhouse gas implications of these projects should also be presented to decision makers.

Mitigation Option Design

Calculating CO₂ emission associated with an individual transportation project is conceptually quite simple. However, in practice, this analysis can be quite complicated when analyzing multiple projects since transportation models often do not accurately predict impacts of land use and travel behavior, particularly from induced demand from road expansions.

In order to accurately predict CO₂ emissions associated with transportation projects, transportation planning agencies will need to evaluate and improve current models.

Specifically, transportation agencies need to improve model predictions by evaluating the impact of model assumptions such as:

- Changes in land use patterns and the resulting impact on citizen decisions regarding transportation modes. New research demonstrates that connecting neighborhood areas with sidewalks and other pedestrian-friendly options promotes walking over driving.¹
- Transportation agencies should consider the potential impact of induced demand associated with transportation projects.
- Assumptions about potential impacts of transportation projects on citizen decisions to use public transit, sidewalks, high-occupancy vehicle lanes, congestion pricing, etc.

In addition, transportation agencies should identify the uncertainties associated with the model assumptions and predictions, and indicate whether or not the models are likely to over-estimate or under-estimate pollution emissions. Estimates must be provided to public officials, decision-makers, and the public before selecting transportation improvement projects and options within selected projects. Finally, the long-term impact of the projects on traffic patterns, land use, and other considerations need to be incorporated into the analysis.

Goals: All significant transportation projects would be required to have an evaluation of their contribution to GHG emissions.

Timing: Metropolitan planning organizations could work with WADOT to start developing methods to evaluate GHGs from transportation projects immediately and be required to finalize the methods in a report to the Governor by 2009. Similarly, the State Environmental Policy Act (SEPA) could be amended by 2010 so that MPOs and transportation agencies would be required to conduct those evaluations for all “significant” transportation projects.

Parties Involved:

Implementation Mechanisms

TBD

Related Policies/Programs in Place

TBD

¹ Frank, L. *Reducing CO2 Emissions and Improving Air Quality in the Puget Sound Region: The Built Environment Potential*. Prepared for the Puget Sound Clean Air Agency, Seattle WA. June 2007.

Mitigation Option T-6: Improvements to Freight Railroads and Intercity Passenger Railroads

Based on Transportation Catalog Option 6.1 and 6.2

Mitigation Option Description

Significant expansion of dedicated rail corridors and improvements to freight rail and intercity passenger rail will allow the Washington State rail network to increase volumes and reduce vehicles on the road. Movement of passengers and freight by an efficient rail system decreases overall greenhouse gas emissions by 2-4 times as compared to movement by highway. Additional improvements to the rail system and equipment handling technologies can reduce direct emissions. A robust and efficient rail network is a cornerstone for sustaining a thriving economy under future carbon emission constraints and provides many social, economic, and environmental benefits.

Mitigation Option Design

In 2004, the Washington Public Ports Association released its “Rail Capacity Study” which detailed specific statewide improvements that will be necessary to meet future demands for freight and passenger rail. This report projected system needs to 2025 based on increases to freight movement and passenger transport using industry estimates and the Washington State Department of Transportation’s “Intercity Passenger Plan.” If all of these improvements are implemented, the system will be able to support both increased freight and passenger demands well within the practical capacity.

Several unique challenges face the design and implementation of these strategic improvements. Public funding would not likely be used to fund the majority of rail improvements, due to private ownership of the rail system. Rather, public funds would be used to incent private investments. This type of public private partnership would be used either to accelerate improvements or to help align improvement priorities more closely with public needs. A significant prerequisite, then, is to organize and prioritize the approximately 2 billion dollars worth of identified improvements in the Washington State rail system according to public needs, rates of growth, and system dependencies. This exercise would support the goals of this TWG priority item based on the underlying assumption that better rail service inherently leads to system-wide greenhouse gas reductions – reductions that occur when freight and passenger movement shifts to a mode that is much more efficient on a per-ton-mile basis.

Additionally, to satisfy the goals of the Governor’s Climate Initiative, improvements to the rail system or associated equipment that can have direct impacts on greenhouse gas emissions also need to be quantified. Existing technologies, such as anti-idle equipment, newer and more efficient locomotive engines, and hybrid equipment can add significantly to capital improvement costs. These added costs may not contribute to increased return

on capital and thus may only be weighed as public priorities to the extent they are assigned a specific value for their emission reduction potential. Likewise, investments in future technologies such as fully-electric equipment and electrified switch yards, require a distinct public commitment to funding emission reductions from hydrocarbon-based fuels.

Goals:

- Decrease inefficiencies and limitations in existing WA rail network by reducing bottlenecks and increasing storage. The efficiency of a rail network will be largely determined by its least efficient components. As these components are gradually improved, the overall system capacity will increase.
 - Using measures of “percent total capacity” and/or “percent of practical capacity” (50-60% of total capacity), increase overall rail system efficiency to X by 2020.
- Maximize the amount of freight that is moved by rail in order to decrease reliance on truck transport as freight volumes increase.
 - Overall freight rail volume will increase from X currently to Y by 2020. Railroad mode share of state surface freight movement will increase from X currently to Y by 2020.
- For intercity travel, shift passengers from road to rail.
 - Passenger rail volume on intercity and regional routes will increase from X currently to Y by 2020. Railroad mode share of intercity passenger movements will increase from X currently to Y by 2020.
- Standardize the use of anti-idle equipment and strategies on all locomotives and develop the use of fully-electric locomotives and rail support systems.
 - Locomotive idling will be reduced by X% by 2020. Locomotive fuel use will be reduced by Y gallons by 2020 as a result of new or retrofit electrically powered systems that would have previously use carbon-based fuels.

Timing: See above.

Parties Involved:

Implementation Mechanisms

TBD

Related Policies/Programs in Place

TBD

Mitigation Option T-7:

Diesel Engine Emission Reductions and Fuel Efficiency Improvements

Based on Transportation Catalog Option 1.3 and 1.4

Mitigation Option Description

Reduce diesel emissions and the use of diesel fuel in public and private sectors, both on- and off-road, through promotion of a variety of technologies that provide alternatives to diesel fuel use or greater efficiency in diesel fuel use. Based upon the Washington State Greenhouse Gas Emission Inventory, on-road diesels produced 8.1 million tons of CO₂eq in 2005.² Off-road diesels emitted 3.6 million ton of CO₂eq in 2005. This option also has the collateral benefit of improving air quality and reducing air toxics exposure.

Mitigation Option Design

Promote and fund technologies that provide alternatives to petroleum diesel fuel use and greater efficiency in diesel fuel use through continued implementation of effective existing state programs and support of new state programs. These programs include:

- Multi-sector technologies:
 - Broaden use of anti-idling technologies currently available but not widely used for locomotives, trucks and other diesel engines (Applicable sectors: freight, public and private fleets);
 - Engine rebuilds, repowers and replacements with more fuel efficient engines or add-on technologies (Applicable transportation sectors: ferries, freight, public and private fleets);
 - Technologies to reduce rolling resistance (such as single wide tires), low viscosity lubricants, weight reduction and improvements to aerodynamics (Applicable sectors: freight, public and private fleets);
 - Augment or replace petroleum fuel use with biodiesel, biogas, natural gas or other low carbon fuels (Applicable sectors: ferries, freight, ports, public and private fleets); and
 - Replace freight handling equipment with battery electric, hybrid or plug-in electric hybrid equipment (Applicable sectors: ports, freight).
- In addition to select technologies identified above, Washington State Ferries has the following opportunities to reduce fuel use on vessels:

² Draft Washington State Climate Advisory Team Greenhouse Gas Inventory and Reference Case Projections, 1990-2020. Center for Climate Strategies, Washington Department of Ecology and State of Washington Department of Community, Trade and Economic Development. July, 2007.

- Modify engine systems to enable ferries to run on fewer engines,
 - Install positive restraints to hold ferries steady during loading operations instead of keeping propellers rotating,
 - Upgrade shore power capabilities so diesel generators can be shut down when ferries are secured.
- **Supplement Existing Programs:** Where applicable, existing effective Washington State emission reduction programs for public fleets, such as those administered by the Washington Department of Ecology and the Puget Sound Clean Air Agency's Diesel Solutions program, and the Washington State Clean School Bus program will promote and fund the technological options listed above.

We need supplemental support of programs such as Puget Sound Diesel Solutions, EPA's National Clean Diesel Campaign, and the West Coast Collaborative, which targets diesel emission reductions and fuel savings in West Coast states, and the Washington State Ferries program to reduce fuel use and emissions in the vessel fleet.

- **New Programs:** We also need new programs to reduce private fleet diesel emissions and diesel fuel use. Successful examples include programs similar to California's Carl Moyer grant program or the Texas Emission Reduction Program. Options could include development of a second State Infrastructure Bank targeting low and no interest loans and revolving funds for private and public sector use to support scrapping of inefficient technology with more efficient technology.

Other options may include placing diesel emission reduction equipment and fuel use requirements into state and local government public construction contracts to leverage private fleet conversion or creating regulatory requirements to switch fuels and retrofit existing engines and equipment in various fleet sectors.

Goals: Targets and timetables for fuel use reduction and installation of diesel idle reduction equipment in the sectors identified above are presented below. Provide funding for grant and incentive programs to augment the current funding provided by the Legislature in the upcoming legislative session.

1. Broaden use of anti-idling technologies currently available but not widely used for locomotives, trucks and other diesel engines:
 - Public fleets: 50% of vehicles by 2015 with 100% beginning in 2020.
 - Private long haul fleets and other fleets: 25% of vehicles by 2015, 50% by 2020, 75% by 2035 and 100% by 2050.
2. Engine rebuilds, repowers and replacements with more fuel efficient engines or add-on technologies

- No goals are recommended. These are primarily applicable to marine and locomotive application. Although they have some limited potential, there is little information on which to base a goal.
3. Technologies to reduce rolling resistance (such as single wide tires), low viscosity lubricants, weight reduction and improvements to aerodynamics
 - Private long haul fleets: 50% of vehicles by 2015, 100% by 2020.
 4. Augment or replace petroleum fuel use with biodiesel, biogas, natural gas or other low carbon fuels
 - Public fleets: 100% biodiesel use (B100) by 2015
 - Private fleets: 25% B20 use by 2015, 75% B20 use by 2020 and 100% B20 use by 2035.
 5. Replace freight handling equipment with battery electric, hybrid or plug-in electric hybrid equipment
 - Battery: 10% of equipment by 2015, 25% by 2020, 50% by 2035
 - Diesel hybrids: 25% of equipment by 2015, 50% by 2020, reducing to 25% in 2035 and zero % in 2050 as they are replaced by plug-in hybrids.
 - Plug-in diesel hybrids: zero % in 2015, 10% by 2020, 25% by 2035 and 50% by 2050.
 6. Modify ferry engine systems to enable ferries to run on fewer engines
 - Complete modification for Jumbo Mk II ferries – 2007, save >600K gallons/year,
 - Complete modification for Jumbo Mk I ferries – 2008, save >140K gallons/year,
 - Complete modification for Super ferries – 2011, save >300K gallons/year
 7. Install positive restraints to hold ferries steady during loading operations instead of keeping propellers rotating.
 - Complete modification for prototype installation 2008 on two ferries/one terminal in 2008, save >XXX gallons/year
 - If determined to be a viable alternative, modify remaining vessels/terminals by 2020, save YYY gallons/year
 8. Upgrade shore power capabilities so diesel generators can be shut down when ferries are secured.
 - Complete assessment & develop upgrade plan 2007
 - Upgrade ferries & terminals by 2011, save ZZZ gallons/year

Timing: by 2015 with milestones in 2020, 2035 and 2050

Parties Involved: Washington State Legislature, Department of Ecology, Washington State Department of Transportation (Roadway, multi-modal and Ferry divisions), Department of Community Trade and Economic Development, the Puget Sound Clean Air Agency and other regional clean air agencies, City and County Governments, Non-profit groups like Cascade Sierra Solutions, US Environmental Protection Agency, US Department of Energy, Washington Trucking Association, Burlington Northern Santa Fe Railway, Ports, Associated General Contractors.

Implementation Mechanisms

TBD

Related Policies/Programs in Place

- Additional options and advanced technologies to reduce diesel emissions and diesel fuel use that are applicable to Washington ports are included in the Draft Northwest Ports Clean Air Strategy that can be found at:
http://www.maritimeairforum.org/news/NW_Ports_Clean%20AirStrategy_Draft.pdf

Mitigation Option T-8: Local Transportation Financing Tools and Bicycle and Pedestrian Infrastructure Improvements

Based on Transportation Catalog Option 5.4 and 5.5

Mitigation Option Description

To succeed, policy initiatives to reduce automobile use and promote compact communities must be accompanied by policies and funding to make it easier to walk, bike and use transit. There is a growing body of research demonstrating that communities with traditional neighborhood design, connected pedestrian and bicycle networks, available transit and a rich mix of uses are strongly correlated with decreased automobile use.³

One obstacle to success is that prior planning for local streets has often prioritized the movement and storage of cars over transit, walking and biking. Another obstacle is that local governments do not have sufficient funding resources to maintain basic street infrastructure and invest in transit, biking and walking.

This option proposes that the state explicitly prioritize funding for transportation facilities that support transit, biking and walking, as well as provide significant new taxing authority for local government to support these priorities. This would be accompanied by policies at the state and local level to require that projects are designed to encourage transit, biking and walking needs (e.g., “Complete Streets” policies and context sensitive design).⁴

Mitigation Option Design

The following policy and funding initiatives are recommended:

1. The state would adopt a “Complete Streets” policy for its spending supported by context sensitive design standards. Complete Street policies require that new streets, or streets undergoing major maintenance, be designed to accommodate all users.
2. The state requires local governments to adopt Complete Street policies for their spending, or provides substantial incentives to localities to do so, e.g, making

³ See LUTAQH Study (find cite). FrankL, Pivo G. Impacts of Mixed Use and Density on Utilization of Three Modes of Travel: Single Occupant vehicle, Transit, and Walking. TRB 1995; 1466: 44-52. – Key study supports Healthscape or LUTAQH

⁴ Cite to Seattle Resolution, and www.completestreets.org – WSDOT’s Context Sensitive Design Executive Order : <http://www.wsdot.wa.gov/ta/operations/localplanning/pdf/1028.pdf>

- state transportation grants to localities contingent on project consistency with Complete Street policies.
3. The state should rewrite its Highway Design Manual to require all new engineering and construction facilitate the safe, convenient movement of bicycles and pedestrians along and across all non-limited access corridors unless exceptional circumstances exist.
 4. In addition to making required ADA improvements, the state and local agencies should incorporate low cost safety solutions that improve conditions for bicycling and walking in maintenance projects like paving projects.
 5. The state should increase funding available for bicycle and pedestrian projects and programs to \$150 million in the near term (as recommended in Washington's Transportation Plan) and more in the long term, and expand the existing State Bicycle and Pedestrian Safety Program to include projects and programs that support safety and mobility.
 6. The state should also provide local governments with new taxing authority and more flexibility with cities share of gas tax to finance local improvements. If these taxes were based on vehicle usage (e.g., miles traveled or fuel used) or vehicle type (weight, EPA mpg), it could provide further incentives for users to choose more efficient vehicles, or shift their trips to less polluting modes. The goal would be provide sufficient funding for localities to build out their pedestrian and bicycle networks, invest in inviting streetscapes to accompany new development, and retrofit existing streets to prioritize transit, biking and walking. Similarly, local transit agencies should be granted additional voter-approved revenue sources
 7. The state should provide grants to localities to develop plans and policies to encourage transit, biking and walking, including public education, safety, engineering, and revisions to local land use policies. Land use changes could include requiring shower and bike storage facilities in new buildings, design requirements to promote a good walking environment, and designing new buildings to incorporate transit stops.
 8. The State should provide grants to local governments to identify and study the gaps in their bicycle and pedestrian infrastructure and determine how these gaps can be best filled by street-related improvements as well as those associated with other public right-of-ways (e.g., parks, inter-street links, specialized structures).
 9. The State should require or encourage RTPOs to quantify bicycle and walking mode share in order to allow tracking of progress of this mitigation option.

A number of local agencies, WSDOT, and FHWA have established the goal of increasing bicycling and walking to at least 15 percent of all trips, and simultaneously reducing the number of bicyclists and pedestrians killed or injured in traffic crashes by at least 10 percent. Currently, bicycling and walking account for 5 percent of all trips statewide and over 6 percent of work trips in urban areas.

Goals:

In the Puget Sound region, increase the bicycle and walking mode share for all trips from X% currently to Y% by 2020. [Alternatively: Increase the bicycle and walking mode share for commute trips from X% currently to Y% by 2020.]

In other Washington urban growth areas, increase the bicycle and walking mode share for all trips from X% currently to Y% by 2020. [Alternatively: Increase the bicycle and walking mode share for commute trips from X% currently to Y% by 2020.]

Timing: See above.

Parties Involved:

Implementation Mechanisms

TBD

Related Policies/Programs in Place

TBD

Mitigation Option T-9: Transportation System Management

Based on Transportation Catalog Option 5.1

Mitigation Option Description

Transportation System Management is an interactive approach that allows transportation agencies to actively manage the transportation system to increase the efficient operations of the system and gives users better options in choosing paths that best work for them. This approach incorporates increased system performance, reliability, and safety. The result will be reduced congestion, smoother flows, reducing idling, and allowing more efficient vehicle operation on our roadway networks, thereby reducing emissions of GHGs as well as other pollutants.

Effective Transportation System Management requires the development of specific benchmarks and goals that establish definite improvements to better move people and goods throughout the state, with associated funding packages and programs to accomplish them. The greater the efficiency in the movement of people and goods, the greater the greenhouse gas benefit and connection within our economic systems.

Mitigation Option Design

A successful Transportation System Management package will include funding and implementation of a broad array of driver communication, incident response systems, speed control, and other strategies that will reduce congestion on our existing network, in addition to expanding and connecting important pieces of the network to function better as a whole. While some of these strategies are applicable in urban areas only, others can be applied in both urban and rural areas, wherever there might be congestion, extra need for traveler information, or special conditions such as major construction or seasonal traffic issues.

This option involves the following strategies.

- **Active Traffic Management.** The real-time variable control of speed, lane movement, and traveler information within a corridor and can improve traffic flow in the corridors where it is applied, including:

Speed Harmonization/Queue Warning/Lane Control - the ability to smooth 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 shown to reduce both primary and secondary accidents, reducing non-recurrent congestion. It has also been found to reduce congestion, queuing, and improve throughput. Speed control

allows the highway to continue operating nearer to its highest throughput capacity as volumes increase.

Specific performance measure is “increase operating speed for congested areas”. Anticipated investment level to achieve it is medium.

Traveler Information and Dynamic Re-Routing - providing Traveler Information opportunities including travel 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.

Specific performance measure is “reduction of delay” (time) from one destination to another. Other measures may include how much time it takes to change signals across various jurisdictions/alter signal timing dynamically for city streets. Anticipated investment level to achieve it is medium.

Overall, benefits of Active Traffic Management are reduced overall delay, reduced idling, and fewer secondary accidents which will also reduce delay and idling. Again, anticipated investment level to achieve it is medium.

- **Reduce Speed Limit on Freeways and Highway.** Reducing speed limits to 55 miles per hour on freeways and highways will improve fuel economy for vehicles by an average of 10% for roadways currently posted at 70 mph and 3% for roadways currently posted at 60 mph. It will also reduce the number and severity of accidents that block/congest traffic due to improved driver reaction time.

The savings of greenhouse gas emissions will vary depending on the amount of law enforcement. Enforcement typically includes increasing the presence of officers/patrol vehicles and higher rates of ticketing high speed drivers. Additional enforcement may be possible through automated cameras with photo flash capability to electronically capture and fine speeding vehicles. The photo flash method of enforcement will need state legislative approval and program funding to accomplish.

Specific performance measure is “speed” and “number of tickets issued” compared with previous years adjusted for population. Results may include increase travel times which could result in fewer vehicle trips or a reduction in VMT (for example, a driver may say “I’m going shopping closer to home because it will take too long to get to the Mall”). Anticipated investment level to achieve is low to medium depending on enforcement mechanisms.

- **Traffic Management Center(s).** Provides 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.

Specific performance measures are how quickly problems are identified and responded to and restored to normal, “reduced idling time”, and “reduction of secondary accidents”. Major Washington urban areas already have some traffic management centers, but to accomplish the various strategies listed in this document,

further equipment and staffing investment is needed in coordination with state and local jurisdictions and link established management centers together. Anticipated investment level to achieve is low to medium.

- **Traffic Signal Synchronization.** The timing and operations 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.

Specific performance measurements are “delay” and “idle time”. Anticipated investment level to achieve is fairly low, though development of concurrent local jurisdiction support and coordination may raise the cost to medium.

- **Managed Lanes** are lane(s) which have special operational characteristics and restrictions that 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:

High Occupancy Vehicle (HOV) lanes – are lane(s) exclusively used by transit, vanpools, and vehicles with a minimum number of occupants (typically a minimum of two or three). Full funding for the completion of the system is needed. In addition, periodic re-examination of the system will allow for improved use by deciding which areas should be maintained at 2+ vehicle capacity vs other locations that would be better served with 3+ vehicle capacity requirements where demand is high and where further extensions of HOV facilities would best serve the traveling public.

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. An example is a direct access ramp that links a HOV lane to a park & ride facility.

Ramp Bypass Lane – A lane that provides priority bypass of ramp meters for vehicles.

Truck Only Lanes – a lane(s) exclusively used for trucks.

Transit Only Lane or Bus Ways – a lane(s) exclusively used for transit.

Green Lanes – a lane(s) exclusively used for vehicles which meet specified environmental impact levels.

Limited Access Highways – are highways with limited access points.

High Occupancy Toll (HOT) or Tolloed 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. This type of facility will need additional evaluation to assure a balance between social justice in the use of the lanes. Social justice may be achievable through use of the collected fees to go back into the system to improve transit service for low income areas, improvement areas with high traffic demand, and the overall transportation corridor that the HOT lane(s) serves.

Specific performance measure is “delay”, “average operating speeds”, “person through-put” and “VMT reduction” depending on facility type and improvement. Anticipated investment level to achieve is medium for conversion of existing lanes and high for construction of new lanes.

- **Pricing.** (Relates to Option T-3) The use of direct user fees (tolls) to manage demand on the transportation system. We recommend that strategies include a mix of the following options.

Fixed – the toll is fixed and may vary by vehicle class or other set distinguishers.

Time of Day Schedule – the toll varies by time of day, rising during set peak periods and lowering during non-peak periods.

Dynamic or Variable – the toll changes to maintain a set operation performance based on real time traffic conditions. As congestion builds, the toll increases to reduce demand. The toll will rise to the point where it begins to influence drivers decisions to use the facility at that time. Additionally, trend analysis can be used to augment real time data to anticipate congestion and proactively adjust tolls.

Electronic Tolling – Tolls are collected electronically at travel speed, no toll booths or delays. Tolls can be collected through electronic transponders installed in the car or by video license plate recognition.

Specific performance measure may include “delay”, “person-throughput”, “use/traffic counts during off-peak periods”. Anticipated investment level to achieve is high based on infrastructure needs to achieve.

- **Increase Incident Response opportunities** – detection, assistance, and clearing of incidents on the highway so as to assist travelers, increase safety, and reduce non-reoccurring delay caused by incidences. This strategy is best served on limited access roadways where it is hard for drivers to find an alternative route to their destinations. However, perhaps expand incidence response activities to high volume and accident prone local streets and major arterials if appropriate.

Specific performance measures are “response time to the scene”, “time needed to clear an incident”, “delay”, and reduced “idle time”. Anticipated investment level to achieve is low.

- **Improve Traveler Information** - providing 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.

Specific performance measure is “delay” and “speed/travel time”. Anticipated investment level to achieve is low.

- **Increase number of multi-modal connection points.** Co-location of bus, ferry vessel and light-rail terminals would encourage more walk-on passengers. Improved system of coordinating the different regional bus transit systems so that the transfer from one system to the other is seamless (this is an issue of scheduling and location of stops).

Specific performance measures are transit patronage/ridership, mode choice, travel times on transit, wait times between modes – overall outcome “reduced VMT”. Anticipated investment level to achieve is high due to increase trip frequency for bus services and other infrastructure development needs.

Note: this measure has a connection with land use decisions and accessibility of land uses to transit. So it potentially overlaps with options T-1, T-4, and T-8).

- **Efficiency in operation of all public ferries** Optimize efficiency in operations, scheduling and/ or varying vessel size based on demand at different times of the day on a route, as currently seen in bus system management. This includes identifying and implementing feasible changes in vehicle loading/unloading procedures, traffic lane configuration, off terminal signal management, sailing frequency and crossing time, and, vessel speed control/optimization to reduce GHG emissions. (This includes Washington State Ferries and WSDOT Eastern Region Ferry (Keller Ferry).

Specific performance measures are “delay” (gate times) and “total fuel consumption” by vessels. Anticipated investment level to achieve is medium to high.

Goals: Overall the goal of this option is to effectively implement a package of Transportation System Management strategies to reduce annual congestion delay and increase person and freight through-put as follows.

- In the PSRC region, reduce 2020 highway delay 76%, from 47,514,240 hours per year (1998 baseline) to 43,750,708 hours per year compared with no action scenarios (182,499,635 hours per year, no action).
- In other metropolitan areas in the state, reduce 2020 highway delay XX% compared with no action scenarios.
- In rural areas of the state, reduce 2020 highway delay to the extent possible (no numeric goal established).

Timing: Implementation of many of these strategies is already underway. Full implementation targeted for 2020.

Parties Involved: Application to freeways, US roadways, and State Roads (highways) involves a mixture of oversight by the Federal Highway Administration and others within US Department of Transportation like Federal Transit Administration, Washington State Legislature, and Washington State Department of Transportation

Roadway networks within unlimited access locations (for example city streets, county roads) are under the jurisdiction of City Councils, Mayors, Public Works Departments, County Councils, and County executives.

Ferry options involve Washington State Ferries/Washington State Department of Transportation and the Washington State Legislature, and appropriate labor unions.

Multi-modal options include rail operators, Washington State Ferries/Department of Transportation, transit agencies, city and county governments.

Implementation Mechanisms

At this time, the state is in the early stages of implementation on a number of system management options. WSDOT just started tolling on TNB and have two months worth of data on that. This session the legislature will consider the proposed actions for Urban Partnership grant on SR 520. In the near future, WSDOT will have the HOT lanes pilot on SR167.

Over the next two biennia, WSDOT will gather information and develop regional strategies to expand implementation. MPOs will be looking at implementation in their updates (PSRC's Destination 2030 update to follow changes recommend by Vision 2040.)

Possible funding mechanism includes the federal funding in Urban Partnership Grants. http://ops.fhwa.dot.gov/tolling_pricing/value_pricing/resources/documents/upa.htm

Related Policies/Programs in Place

Traveler information and ITS: <http://www.wsdot.wa.gov/NR/rdonlyres/0ECE7DB2-D955-4E0A-954B-1F55C220D5F8/0/GrayNotebookJun07.pdf#page=84>

<http://www.wsdot.wa.gov/NR/rdonlyres/0ECE7DB2-D955-4E0A-954B-1F55C220D5F8/0/GrayNotebookJun07.pdf#page=86>

Washington Transportation Plan: <http://www.wsdot.wa.gov/planning/wtp>

And the Highway System Plan: <http://www.wsdot.wa.gov/planning/HSP.htm>

System efficiency and tolling studies <http://www.wstc.wa.gov/Tolling/default.htm>

Mitigation Option T-10: Actions to Accelerate and Integrate Plug-In Hybrid Electric Vehicle Use

Based on Transportation Catalog Option 1.5

Mitigation Option Description

Plug-in hybrid electric vehicle technology (PHEV) offers one of the best opportunities to reduce transportation carbon dioxide emissions in a cost effective way. Smart integration of PHEVs into the electric power grid and into the transportation system can provide significant additional reductions. Coupling biofuels with PHEVs would further enhance the capability of PHEVs to lower GHG emissions.

The goal of this option is provide a set of actions that would accelerate the deployment of this technology, remove barriers to more rapid adoption, create initial incentives and provide for the integration of PHEVs with other systems, including the power system and the transportation system.

Mitigation Option Design

The Legislature provided initial funding for a Washington State PHEV pilot project, which could be expanded to design a more comprehensive set of measures to accelerate and integrate the deployment of PHEVs. This mitigation options would include the following actions:

- Achievement of a targeted percentage [to be determined] of plug-in hybrid electric vehicles on Washington state roads starting in 2010 and increasing to 2020. To help initiate and accelerate PHEV purchases, goals for Washington state agency fleet purchases and local government purchases of PHEVs would be set on an increasing schedule.
- Integration and coordination with electric utilities to ensure that recharging of PHEVs is accomplished at off peak times and in a manner that would also assist in the integration of intermittent wind power and other renewable power that is under other mandates. This would require testing and establishing standard communication protocols and technology, whether by power line communication, wireless, smart metering or combinations.
- Testing and deployment of Vehicle to Grid technology (V2G) that would potentially provide for power back to the grid at peak times and for ancillary services. Testing of use of PHEVs for back up storm power for individuals would also be tested.
- Integration with transportation system planning, such as the provision of recharging stations at park and ride lots, that would increase the all electric range

of PHEVs and potentially provide for “cash back hybrid” power services, as Federal Energy Commissioner Jon Wellinghoff has described. This would in turn provide for additional incentives for transit use.

- Integration with transportation pricing options, such as urban congestion pricing as mitigation for reduced gasoline tax revenues.

Goals: By 2020, PHEVs would account for 10% of light-duty VMT statewide.

Timing: Introduction of PHEVs would start in 2010 with 1% of light-duty VMT. Goal of 10% VMT achieved in 2020.

Parties Involved: State of Washington, Federal energy and transportation agencies, counties and cities, electric power utilities, biodiesel and biofuel farmers and manufacturers, transit agencies, Puget Sound Regional Council.

Implementation Mechanisms

TBD

Related Policies/Programs in Place

TBD

Estimated GHG Savings and Costs per MtCO_{2e}

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.4	1.4	MMtCO _{2e}
Net Present Value (2008-2020)	-	TBD	\$ Million
Cumulative Emissions Reductions (2008-2020)	0.8	9.1	MMtCO _{2e}
Cost-Effectiveness	-	TBD	\$/MtCO _{2e}

Data Sources: Lifecycle impact of PHEVs obtained from Argonne National Laboratory’s GREET model (v1.7), using Washington grid power mix.

Quantification Methods: The estimate of GHG emission reductions is based upon PHEVs accounting for a specified percentage of LDV VMT. A ramp-up period is estimated so that the 10% goal would be reached at the horizon year, 2020. A per mile emission reduction factor is applied to the portion of affected light duty vehicle VMT.

Vehicles that connect to the electricity grid, including plug-in hybrids and fully electric vehicles, can provide substantial per mile reductions in GHG emissions on a lifecycle basis. According to the GREET model (v1.7), a PHEV has 54% lower GHGs per mile than a conventional gasoline vehicle.

Key Assumptions:

- Program begins in 2010, first year of emissions reduction
- PHEV proportion of LDV VMT increases from 1% in 2010 to 10% in 2020

Contribution to Other Goals

Contribution to Long-term GHG Emission Goals (2035/2050): TBD

Job Creation: TBD

Reduced Fuel Import Expenditures: TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

Mitigation Option T-11: Low Carbon Fuel Standard

Based on Transportation Catalog Option 3.1

Mitigation Option Description

This option seeks to reduce GHG emissions by decreasing the carbon intensity of all passenger vehicle fuels sold in Washington. The Low Carbon Fuel Standard (LCFS) would require all fuel providers in Washington to ensure the mix of fuel they sell into the Washington market meet, on average, a declining standard for GHG emissions measured in CO₂ equivalent gram per unit of fuel energy sold. The State should regulate quality standards for low carbon fuels. Low carbon fuels include, but are not limited to, biodiesel, cellulosic ethanol, hydrogen, compressed natural gas, liquefied petroleum gas, electricity, and low carbon blends such as E10 or E85. The standard would be measured on a lifecycle basis in order to include all emissions from fuel production to consumption.

Fuel providers (defined as refiners, importers, and blenders of on-road vehicle fuels) will need to demonstrate on an annual basis that their fuel mixtures provided to the market met the low carbon standard. Options for compliance may include: blending or selling increasing amounts of lower carbon fuels, using previously banked credits, and purchasing credits from fuel providers who earned credits by exceeding the standard. Penalties for noncompliance will be determined during the implementation process.

Mitigation Option Design

Goal levels: Create a Low Carbon Fuel Standard for transportation fuels (gasoline and diesel) sold in Washington that would reduce carbon intensity of Washington's on-road vehicle fuels by at least 10 percent by 2020. In addition the reduction standard and program timing, the following issues should be addressed in creating the program:

- Credit Generation and Trading
- Lifecycle Model and Boundary Conditions

Timing: Following design period, program would be implemented prior to 2020. Fuel providers would be required to meet 10% reduction standard no later than 2020.

Parties Involved: Fuel providers, State Department of Ecology, State Department of Community, Trade and Economic Development, State Department of Agriculture

Compliance Pathways: The Low Carbon Fuel Standard does not specify any particular fuel or vehicle technology. The table below shows three possible compliance scenarios that would meet the standard for gasoline in California. As envisioned in California, much of the reduction in passenger vehicle fuel carbon intensity would be met by increasing ethanol use.

Low Carbon Fuel Standard Compliance Scenarios for California

Scenario Number-->	1	2	3
<i>Total Petroleum Displaced by Low-Carbon Fuels (B gal)</i>	3	3.1	3.2
<i>Low-Carbon Fuels</i>			
Total Ethanol Demand (B gal)	2.7	3.8	4.7
Number of Flex Fuel Vehicles (millions)	3	6	8.5
Number of Plug-in Hybrids (millions)	4.1	1.7	0
Number of Hydrogen Fuel Cell Vehicles (millions)	0.5	0.5	0.2

Source: Office of the Governor (State of California), "The Role of a Low Carbon Fuel Standard in Reducing Greenhouse Gas Emissions and Protecting Our Economy." White Paper. January 8, 2007. <http://gov.ca.gov/index.php?/fact-sheet/5155/>

The table below shows lifecycle ("well-to-wheels") GHG impacts of various biofuels options.

Estimated Biofuel Impacts on GHG Emissions

Fuel/Technology	Blend	Feedstock	Reduction (grams of GHGs per mile)*
Ethanol	E10	corn	1.5%
Ethanol	E10	cellulosic	7.2%
Ethanol	E85	corn	17.6%
Ethanol	E85	cellulosic	83.2%
Biodiesel	B20	soy	9.9%
Biodiesel	B20	canola	11.2%
Biodiesel	B20	palm	12.0%
Biodiesel	B100	soy	53.9%

* Ethanol reductions estimated relative to gasoline; biodiesel reductions estimated relative to diesel fuel.

Actual reductions depend on many factors in the production, distribution, and use of fuels.

Sources: GREET v1.7 outputs; (S&T)² Consultants, *Sensitivity Analysis of GHG Emissions From Biofuels in Canada*, 2006.

Implementation Mechanisms

A Governor's Executive Order would initiate the process for development of the LCFS, followed by a detailed report and rule-making proceedings that would involve consultation before implementation. The appropriate state agencies will undertake a study to develop the framework for the Low Carbon Fuel Standard. Once the study is completed, it would be introduced to the State's legislative proceedings, at which point the appropriate state agency will conduct public hearings on the proposal. Once adopted, an appropriate state agency will initiate a rule-making proceeding, establishing and implementing the Low Carbon Fuel Standard.

The LCFS is market-based and performance-based, allowing averaging, banking and trading to achieve lowest cost and consumer-responsive solutions. A LCFS is also fuel neutral where fuel providers will choose which fuels to sell and in what volumes. This provides flexible options for compliance including: blending or selling increasing amounts of lower carbon fuels, using previously banked credits and purchasing credits from fuel providers who earned credits by exceeding the standard.

Fuel providers, defined as refiners, importers, and blenders of passenger vehicle fuels, would demonstrate on an annual basis that their fuel mixtures provided to the market met the target by using credits previously banked or purchased. Providers that exceed the performance target for the compliance period will be able to generate credits in proportion to the degree of over performance and quantity of fuel provided. These credits can be used for future use or sold to other regulated fuel providers. Penalties for noncompliance will be determined during the implementation process.

Related Policies/Programs in Place

State policies and programs

- In 2003, the Legislature passed four bills that provide various tax incentives to encourage the development, distribution, and sale of biodiesel and ethanol fuels.⁵
- In 2005, Governor Gregoire signed Executive Order 05-01 (superseding Executive Order 04-06), Establishing Sustainability and Efficiency Goals for the State Operations. Executive Order 05-01 directs agencies to reduce petroleum use 20% (state agency fuel use is about 36 million gallons per year) in the operation of state vehicles and privately owned vehicles used for state business by September 1, 2009. By that date standard diesel must be replaced with 20% biodiesel blend and as soon as practical, agencies must begin using a minimum 5% bio-blend.
- In 2006, the Legislature adopted the Fuel Quality Standards Act establishing minimum renewable fuel content requirements and fuel quality standards.⁶ Beginning November 30, 2008, fuel suppliers must ensure a minimum of 2% of total annual diesel and 2% of total annual gasoline sold in the state must be biodiesel or ethanol. The law allows those numbers to be increased to 10% mandated ethanol and 5% mandated biodiesel, if in-state production supports higher levels.
- The 2006 Legislature established the Energy Freedom Program in the Department of Agriculture and appropriated \$17 million for the Energy Freedom Loan Program to develop a viable bioenergy industry, promote research and development in bioenergy sources and markets and to support an agriculture industry to grow bioenergy crops.⁷

Federal policies and programs

- Under the 2005 federal Energy Policy Act (EPACT), approximately 5% of gasoline sales will be replaced by ethanol nationally by 2012.

⁵ Chapter 261, Laws of 2003 (HB 1240); Chapter 63, Laws of 2003 (HB1241); Chapter 17, Laws of 2003 (HB 1242); Chapter 64, Laws of 2003 (HB 1243).

⁶ Chapter 338, Laws of 2006 (ESSB 6508) available at <http://www.leg.wa.gov/pub/billinfo/2005-06/Pdf/Bills/Session%20Law%202006/6508-S.SL.pdf>.

⁷ Chapter 171, Laws of 2006 (E3SHB 2939) available at <http://www.leg.wa.gov/pub/billinfo/2005-06/Pdf/Bills/Session%20Law%202006/2939-S3.SL.pdf>. The Energy Freedom Program was subsequently amended by Chapter 348, Laws of 2007.

Estimated GHG Savings and Costs per MtCO₂e

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.7	3.0	MMtCO ₂ e
Net Present Value (2008-2020)	-	N/A	\$ Million
Cumulative Emissions Reductions (2008-2020)	1.3	18.4	MMtCO ₂ e
Cost-Effectiveness	-	N/A	\$/MtCO ₂ e

Data Sources: Lifecycle impact of biofuels obtained from Argonne National Laboratory's GREET model (v1.7) (in order to estimate GHG reductions resulting from existing policy).

Quantification Methods: The estimate of greenhouse gas emissions reductions from the low carbon fuel standard is based upon a 10% reduction in carbon intensity of on-road gasoline and diesel fuel. A ramp-up period is estimated so that the 10% goal would be reached at the horizon year, 2020. The estimated GHG savings reported is reduced by an amount that represents the effect of existing biofuels policies in Washington. In particular, it is assumed that the Fuel Quality Standards Act of 2006 would result in 10% mandated ethanol and 5% mandated biodiesel. Thus, as shown in the table below, one quarter of the 2020 reduction in fuel carbon intensity would be attributable to existing policy and three quarters would be attributable to the LCFS.

Net Savings Calculation

Policy	2020 GHG Reduction (MMtCO₂e)
LCFS 10%	4.0
Existing Biofuels Policy	1.0
Net LCFS	3.0

Key Assumptions:

- Program starts in 2010, first year of emission reduction
- Program reaches 10% carbon intensity reduction goal by 2020
- Program applies to all on-road vehicles, “replacing” current gasoline and diesel fuel.

- Existing policy accounts for:
 - 5% biodiesel market share in 2020, blended as B20.
 - 10% ethanol market share in 2020 (less current share of 0.9%), blended as E10; ethanol feedstock assumed to be 100% corn in 2010, shifting to 25% cellulosic / 75% corn in 2020

Mitigation Option T-12: Zero Emission Vehicle (ZEV) Standard

Not in original Transportation Catalog

Mitigation Option Description

The Zero Emission Vehicle (ZEV) standard is a component of the California vehicle emission standards. It is a technology-forcing regulation that requires large vehicle manufacturers to produce zero emitting vehicles. The expected technology is either battery electric or fuel cell vehicles. The standards are phased to allow technology development and have been periodically adjusted to provide needed time and flexibility. Currently, the fully phased-in requirements are:

- In 2018, 16% of vehicles produced for CA must be ZEVs or partial ZEVs (PZEVs).
- Large numbers of efficient partial ZEVs can be substituted for the “true” ZEVs.
- In 2018, 1.7% of the vehicles produced must be “true” ZEVs
- Under the substitution ratios, in 2018, 43% of the fleet will be ZEVs, partial ZEVs or alternative technology PZEVs (conventional or plug-in hybrids).

The ZEV requirements are separate from the Pavley GHG standards and can be adopted in Washington regardless of the fate of California’s GHG standards. ZEV requirements were first developed to reduce ozone pollution. They are not part of California’s recent GHG standards. They can be adopted even if California’s GHG standards are overturned in court.

Mitigation Option Design

Goals: Washington would adopt the ZEV standards.

Timing: ZEV standards adopted by 2010.

Parties Involved: Department of Ecology

Implementation Mechanisms

TBD

Related Policies/Programs in Place

- The 2005 legislature adopted the California vehicle emission standards for use in Washington, ESHB 1397.
- In response to opposition by the auto manufacturers and dealers, the legislature did not enact the ZEV component of the CA standards.

- The combination of the Washington’s commitment to a GHG reduction strategy and the promise of new battery technologies that could enable zero emission vehicles and partial zero emission vehicles could be the catalyst to overcome the previous opposition.
- Large automakers are embracing the new developments in battery technology. Ford and California Edison just agreed to a multi-million dollar effort to “figure out how to commercialize plug-in hybrids”. GM has a target of producing a plug-in hybrid electric vehicle by 2010.
- Washington is the only one of the 11 opt-in states that does not have ZEV.

Estimated GHG Savings and Costs per MtCO₂e