

## Catalog of State Actions Agriculture and Waste Management (AW) Working Group

A catalog of state-level, GHG-reducing actions and policy options based on actions undertaken or considered by state, local and private actors.

### Key to Future Rankings of Options in the Tables that Follow:

Potential GHG Emission Reductions <u>1/</u>	Potential Cost or Cost Savings <u>1/ 2/</u>
<b>High (H):</b> At least 1.0 million metric tons (MMt) carbon dioxide equivalent (CO <sub>2</sub> e) per year by 2020 (~1% of current WA emissions)	<b>High (H):</b> \$50 per metric ton CO <sub>2</sub> e (tCO <sub>2</sub> e) or above
<b>Medium (M):</b> From 0.1 to 1.0 MMtCO <sub>2</sub> e per year by 2020	<b>Medium (M):</b> \$5-50/tCO <sub>2</sub> e
<b>Low (L):</b> Less than 0.1 MMtCO <sub>2</sub> e per year by 2020, or 1 MMtCO <sub>2</sub> e by 2050	<b>Low (L):</b> Less than \$5/tCO <sub>2</sub> e
<b>Uncertain (U):</b> Not able to estimate at this time	<b>Negative (Neg):</b> Net cost savings
	<b>Uncertain (U):</b> Not able to estimate at this time
<u>1/</u> Several measures may overlap in terms of emissions reductions and/or cost impacts. Estimates assume measures would be implemented independently from other measures.	
<u>2/</u> Costs are denoted by a positive number. Cost savings (i.e., “negative costs”) are denoted by a negative number.	

**Definition of “Priorities for Analysis”:**

- **High:** High priority options will be analyzed first.
- **Medium:** Medium priority options will be analyzed next, time and resources permitting.
- **Low:** Low priority options will be analyzed last, time and resources permitting.

**Notation of Options:**

\* **Options marked in bold an asterisk (\*)** indicate some of the related state actions that are approved or underway, as described further in the companion options description document. TWG members are encouraged to provide information on other relevant actions.

### Agriculture and Waste Management (AW)

Option No.	GHG Reduction Policy Option	Potential GHG Emissions Reduction	Cost per Ton	Other Considerations: Contribution to 2035/2050 goals, Job Creation, Fuel Imports, Externalities, Feasibility	Priority for Analysis	Notes / Related Actions in WA State
<b>AW-1 PRODUCTION OF FUELS AND ELECTRICITY IN AGRICULTURE</b>						
1.1	Expanded Use of Biomass Feedstocks for Electricity, Heat and Steam Production*					<p>Burning for electricity creates ash that requires further waste management. Application of Beyond Waste and sustainable principles to biomass materials requires systematic full cycle benefits.</p> <p>The 2006 Energy Independence Act established renewable portfolio standards.</p> <p>Related to F-1.1</p>
1.2	In-state Liquid Biofuels Production*					<p>Biomass for ethanol, methanol, or butanol may yield process system results where in non-fuel remainders become process system inputs for other valuable co-products. Current pyrolysis technologies have great potential for a balanced refinery system creating</p>

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						<p>liquid fuels and chemical feedstocks, energy recovery to drive the process and a char product for soils fertility applications</p> <p>WA passed into several requirements/incentives supporting an in-state biodiesel and ethanol industry Current biodiesel production in the State, 15 facilities on line or in serious planning/development, about 270.5 million gallons per year. Biodiesel sold at 35 stations in WA. Ethanol production is about 435 million gallons per year from seven facilities in the permitting/planning stage. There are four E-85 fueling stations in the State.</p> <p>Related to F-1.2</p>
1.3	Manure Digesters/Other Waste Energy Utilization*					<p>Methane as a source for turbine power is a low energy return process. With our relatively low electrical power rates and gasoline approaching \$3.50 a gallon, methane for internal combustion engines appears to be a much higher beneficial application.</p> <p>Three anaerobic digester</p>

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						projects were awarded state loans in 2006
<b>AW-2 AGRICULTURE – LIVESTOCK</b>						
2.1	Manure Management (handling and storage, and improve application methods; includes hobby-farm and pet waste)					There is a non-ag activity that is related regarding hobby farm and pet waste. King County documented the amount of hobby farm-produced organic waste and manure. There are also significant concerns about pet waste and water quality. I suspect that if calculations were done, pet waste might be a more significant factor than one would intuitively believe.
2.2	Changes in Animal Feed (optimize nitrogen for N <sub>2</sub> O reduction and/or use supplements to reduce CH <sub>4</sub> from enteric fermentation)					
2.3	Rotational Grazing/Improve Grazing Crops and/or Management					
<b>AW-3 AGRICULTURE – CROP PRODUCTION</b>						
3.1	Agricultural Soil Carbon Management					DNR and WESTCARB produced an inventory of terrestrial carbon sequestration opportunities in WA
3.2	Urban/Suburban Soil					Recent Actions in WA:

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	<p><b>Carbon Management:</b></p> <p>DESCRIPTION: The amount of carbon stored in urban/suburban soils can be increased by the adoption of practices such as deep incorporation of compost and other organics in soils undergoing development and the use of organic mulches in new and established landscapes. Other benefits include increased plant health and vigor, reduced need for irrigation, fertilizers and pesticides and less stormwater run-off.</p>					<p>Washington State Department of Ecology's <a href="#">Stormwater Management Manual for Western Washington</a> (WDOE website), used by local jurisdictions for stormwater design, now requires soil protection or restoration (Volume V, Chapter 5, BMP T5.13). A soil depth of 8 inches is required with 10% organics by weight for planting beds and 5% for lawns. For more information see <a href="http://www.soilsforsalmon.org/how.htm">http://www.soilsforsalmon.org/how.htm</a>.</p>
3.3	Nutrient and Water Management (includes non-agriculture landscape activities)					<p>Could separate in two options, with agriculture irrigation water conservation practices included under Water Management</p>
<b>AW-4</b>	<b>AGRICULTURE – LAND USE MANAGEMENT</b>					
4.1	Land Use Management that Promotes Grassland Cover (.e., convert cropland to grassland or prevent conversion of grassland to croplands)					
4.2	Preserve Open Space/Agricultural Land					

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<b>AW-5 AGRICULTURE – FARMING PRACTICES</b>						
5.1	Reductions In On-Farm Energy Use*					Renewable Energy System Cost Recovery (RCW 82.16.110) and Tax on Manufacturers or Wholesalers of Solar Energy Systems: provides incentives for the purchase of locally-made renewable energy products. Incentive payments are provided by electric utilities to customers generating renewable energy (i.e., solar, wind) on their property. The federal Energy Policy Act of 2005 provided several renewable energy incentives.
5.2	Organic Farming					
5.3	Programs to Support Local Farming/Buy Local					
<b>AW-6 WASTE MANAGEMENT – WASTE MANAGEMENT STRATEGIES</b>						
6.1	Advanced Recycling and Composting					Consider opportunities to develop products that come to market as systematically designed green materials used for a purpose and then d-cycled (taken apart and materials re-enter product streams as clean sources for other applications).
6.1 alternate	Significantly Expand					Under current state strategy

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(combines 6.1 and 6.3)	<p>Source Reduction, Reuse, Recycling and Composting</p> <p>DESCRIPTION: includes a broad range of actions, i.e., increase and expand existing programs, develop new programs, increase participation and recovery rates, expand infrastructure, reduce the toxicity and increase the recyclability of products, develop markets for recyclable materials, and encourage and utilize tools and techniques such as product stewardship, closed loop recycling and cradle-to-cradle manufacturing. Full implementation of the State's Beyond Waste Plan and incentives and partnerships with the private sector and local governments will be elements of implementing this action.</p>					<p>(see below), WA has already achieved a recycling and diversion rate of slightly over 47% in 2005.</p> <p>Recent Actions in WA:</p> <p>Department of Ecology issued the Beyond Waste plan in November 2004. It is a long-term strategy for systematically eliminating wastes and the use of toxic substances. For more information, see <a href="http://www.ecy.wa.gov/beyondwaste/about.html">http://www.ecy.wa.gov/beyondwaste/about.html</a>.</p> <p>Washington State Legislature recently passed two laws related to this activity:</p> <p>Washington's Electronic Products Recycling Law (2006) <a href="http://www.ecy.wa.gov/programs/swfa/eproductrecycle/">http://www.ecy.wa.gov/programs/swfa/eproductrecycle/</a> establishes a product stewardship system for the recycling of computers and televisions in 2009. HB 1024 <a href="http://apps.leg.wa.gov/billinfo/summary.aspx?bill=1024&amp;year=2007">http://apps.leg.wa.gov/billinfo/summary.aspx?bill=1024&amp;year=2007</a> passed in 2007. It phases out the use of</p>

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						Polybrominated Diphenyl Ethers which will reduce the toxicity of certain products in the future, making them more recyclable.
6.2	Promotion of Bioreactor Technology—clarified and moved to 7.4					
6.3	Source Reduction Strategies					
6.4	Resource Management Contracting					Contract system can reward desired outcomes. Benefits to local waste management include reduced need for fuel energy to haul material (see also 8.1). Systematic assessments can be used to create a resource model.
6.5	Waste Coal Recapture					
6.6	Prevent Landfilling of Unprocessed Organic Material  Alternate title: Divert organic waste from landfill disposal					One of the five major initiatives of Beyond Waste Plan  “Organics” is not limited to yard debris or food waste in the municipal solid waste stream and includes all biomass materials such as

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						landclearing, construction and demolition debris, wood waste, food waste, fabric, and paper (in some cases carbon-based plastics)
6.7	<p>Establish Local Reuse, Recycling/Processing and Organics Management Businesses and Facilities</p> <p>DESCRIPTION: Currently much of the State's waste is moved long distances by truck or train for disposal. Materials destined for recycling are also often transported long distances. Establishing local businesses and industries that can refurbish, remanufacture and process reusable and recyclable products and materials creates a market for those items and reduces the transportation GHG emissions related to long distance movement of waste and recyclables. Incentives and other actions can be taken to establish local markets and local businesses.</p>					
<b>AW-7</b>	<b>WASTE MANAGEMENT – LANDFILL GAS STRATEGIES</b>					
7.1	Flare Landfill Methane at non-NSPS (smaller) Sites					WA requires installation of gas collection systems and most use methane flares. Is

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						this option applicable in WA?
7.2	Methane & Biogas Energy Programs					Linked to Options 1.3 (Manure Digesters) but directed at municipal/industrial waste streams
7.3	Landfill Methane Energy Programs					<p>For anaerobic digesters to be added to an operating landfill, the landfill would also need a MRF to separate out the organic fraction. In WA, there has been a focus on developing collection programs that divert materials rather than building MRF facilities to process mixed waste.</p> <p>Other relevant technologies that can capture and use methane gas include microturbines or production of liquid biofuels.</p>
7.4	Promotion of Bioreactor Technology					<p>Refers to a in-landfill composting activity to achieve rapid stabilization of food, greenwaste, and paper-waste</p> <p>Bioreactor landfill approach works against source separation and processing of organics that are clean of other waste materials and</p>

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						contaminants.
<b>AW-8</b>	<b>WASTE MANAGEMENT – WASTEWATER ACTIVITIES</b>					
8.1	Energy Efficiency Improvements and Reduce Emissions from Equipment					There is an issue with emissions from trucks, trains and other equipment utilized to transport and process waste. Some examples of actions include reducing diesel emissions through techniques covered in the Transportation TWG and more waste industry specific actions. For instance, establishing weekly collection of organics and every other week collection of garbage and recyclables will likely result in GHG emission reductions and increased diversion of organics from landfilling.
8.2	Programs to Lower Waste Water Processing Needs					
8.3	Install Digesters and Turbines or Fuel Cells					see also comments for 7.3  Wastewater facilities across the state operate digesters to treat waste solids. There is large opportunity to create higher power outputs, upgrade digestion capability and facilities to higher efficiency gas generators.

