

# Abstract of DRAFT Actions to Reduce Greenhouse Gases

October 13, 2004

This abstract lists the draft actions recommended by the Governor's Advisory Group on Global Warming. The full report is at [http://www.energy.state.or.us/climate/Warming/Draft\\_Intro.htm](http://www.energy.state.or.us/climate/Warming/Draft_Intro.htm)  
Recommendations fall within seven action areas:

- **Integrating Actions (IA)**
- **Energy Efficiency (EE)**
- **Electric Generation and Supply (GEN)**
- **Transportation (TRAN)**
- **Biological Sequestration (BIOSEQ)**
- **Materials Use, Recycling and Waste Disposal (MW)**
- **Government Operations (GOV)**

Also included is a graph that shows the cumulative, sequential reductions that would result from the proposed actions as subtractions from the "business as usual" approach.

Specific actions are identified with an abbreviation denoting the action area and a number for easy reference. Actions are also grouped as Category I or Category II as follows:

**Category I: Significant Actions for Immediate State Action.** These actions promise significant greenhouse gas savings (usually greater than or equal to 0.25 million tons/year of CO<sub>2</sub> or equivalent savings); are technically feasible today; and are the most cost-effective first actions to be taken.

**Category II: Other Immediate Actions.** These actions make sense for the State to undertake immediately. In most cases the greenhouse gas savings are less significant, but costs are also proportionately lower and many actions are cost-effective now.

## INTEGRATING ACTIONS TO REDUCE GREENHOUSE GASES

The three recommended Integrating Actions described in this section are crosscutting and affect the six other action areas. In order to slow and then reverse greenhouse gas (GHG) emissions, it is essential to have a long-term focus.

Action IA-1 recommends goals that provide a long-term context for all other draft actions. The goals extend out 50 years.

IA-2 recommends that the Governor continue the work this group has begun. This includes appointing a successor group that could oversee implementation of global warming actions, develop adaptation actions; and develop additional actions to reduce GHGs.

IA-3 recommends the Oregon University System develop a research strategy for technologies and techniques to reduce GHGs and adapt to climate change. This would allow Oregon to foster new industries and would help Oregon's economy.

<b>Integrating Actions</b>	
	<b>CATEGORY I – SIGNIFICANT ACTIONS FOR IMMEDIATE STATE ACTION</b>
<b>IA-1</b>	<b>Recommend the Governor adopt near-term, intermediate and long-term greenhouse gas emissions goals for Oregon.</b>
<b>IA-2</b>	<b>Urge the Governor to renew the charter of the Advisory Group on Global Warming (or a successor body) to continue the Advisory Group’s unfinished agenda.</b>
<b>IA-3</b>	<b>The Oregon University System should develop strategic and targeted research, development and demonstration (RD&amp;D) programs for greenhouse gas reduction technologies.</b>

## **ENERGY EFFICIENCY ACTIONS TO REDUCE GREENHOUSE GASES**

**Issue:** For the past twenty years and more, Oregon has had successful energy savings programs for electricity, natural gas and petroleum users. These have included incentive programs and building codes. Even so, significant savings remain to be captured, and new technologies create opportunities for still more savings. Petroleum and natural gas use emits CO<sub>2</sub> and other greenhouse gases directly. Almost half of the electricity used in the Oregon is met by coal and gas-fired generation that emit greenhouse gases (GHG).

**Solutions:** To reduce emissions, Oregonians will need to use all energy more efficiently. Oregon’s incentive and building code programs need to be reviewed and upgraded, based on concerns over global warming.

*Generation mix affects efficiency saving. In the table below, column three shows estimated CO<sub>2</sub> savings in million metric tons (MMT) through 2025. Column four asks if the action is cost-effective(C/E) - yes (Y) or no (N) - to the consumer over the action’s lifetime. (This does not include whether it is cost-effective considering the projected effects of global warming.) The following estimates assume displaced generation at a 50-50 mix of gas-fired and coal-fired generation. Refer to the graph on page 8 for the cumulative impact of measures..*

<b>Energy Efficiency Actions</b>			
	<b>CATEGORY I: SIGNIFICANT ACTIONS FOR IMMEDIATE STATE ACTION</b>	<i>MMT CO<sub>2e</sub> 2025</i>	<i>C/E?</i>
<b>EE-1</b>	<b>Meet the Northwest Power and Conservation Council (NWPCC) goal of implementing cost-effective electricity efficiency measures for electric users and an equivalent goal for natural gas users.</b>		

	<b>EE-1a: Expand and coordinate electric incentive programs for Investor-Owned Utilities (IOUs).</b> Coordinate Oregon Department of Energy (ODOE), Energy Trust of Oregon (ETO), consumer-owned utility (COU) efficiency programs; 2005 assessment; legislation to amend Residential Energy Tax Credit (RETC).	3.20	Y
	<b>EE-1b: Upgrade building codes on a 3-6-year cycle.</b> (Add building commissioning and increase enforcement funds)	0.52	Y
	<b>EE-1c: Amend building codes to set minimum space and water heating/cooling standards.</b>	0.09	Y
	<b>EE-1d: Adopt state appliance efficiency standards.</b> (requires legislation)	0.41	Y
	<b>EE-1e: Advocate with Bonneville Power Administration (BPA) and Oregon COUs to meet NWPCC goal.</b>	1.24	Y
	<b>EE-1f: Support Oregon Public Utility Commission (OPUC) actions to evaluate NW Natural/ETO and ODOE natural gas incentive programs.</b> (Coordinate programs; conduct an assessment in 2005 to see if it is possible to double the base goal of 4.6 TBtu per year in energy savings)	0.24-0.48	Y
	<b>EE-1g: Advocate with OPUC for Avista and Cascade to meet gas energy savings goals comparable to NW Natural</b>	0.05	Y
	<b>EE-1h: Advocate for federal equipment and appliance efficiency standards.</b>	0.40	Y
	<b>EE 1i: Strengthen state marketing of energy efficiency and incentive programs; initiate Governor's Awards</b>		Y
	<b>SUB-TOTAL FOR EE-1</b>	6.15-6.39	
	<b>CATEGORY II: OTHER IMMEDIATE ACTIONS</b>		
<b>EE-2</b>	<b>Support OPUC and COU efforts for modified rate designs</b> (to reflect daily and seasonal peak demand)	0.16	Y
<b>EE-3</b>	<b>Support OPUC initiatives for Gas Fuel Switching Programs</b> (residential electric water heaters and commercial oil boilers)	0.10	Y
	<b>TOTAL ALL EE ACTIONS</b>	6.41-6.65	

## **ELECTRIC GENERATION AND SUPPLY ACTIONS TO REDUCE GREENHOUSE GASES**

**Issue:** Oregon electricity supplies, once nearly all renewable (hydro), are now over 40 percent from coal and another 8 percent from natural gas. Both emit CO<sub>2</sub> and other greenhouse gases (GHG) in combustion (although gas has lower emissions).

**Solutions:** To reduce greenhouse gas emissions, we must use all energy more efficiently, while meeting new load growth and replacing existing fossil fuel generation with energy efficiency and generation that does not produce greenhouse gases.

*In the table below, column three shows estimated CO<sub>2</sub> savings in million metric tons (MMT) through 2025. Column four ask: Is the action cost-effective (C/Y), yes (Y) or no (N), to the consumer over the action’s lifetime? (This does not include whether it is cost-effective considering the projected effects of global warming.) A question mark means that estimates of cost-effectiveness are uncertain and more analysis is needed. Because actions interact, CO<sub>2</sub> savings cannot be added. Refer to the graph on page 8 for the cumulative impact of measures.*

<b>Electric Generation And Supply Actions</b>			
	<b>CATEGORY I: SIGNIFICANT ACTIONS FOR IMMEDIATE STATE ACTION</b>	<b>MMT CO<sub>2</sub>e 2025</b>	<b>C/E?</b>
<b>GEN-1</b>	<b>Increase the renewable content of electricity.</b>	0.80	Y
<b>GEN-2</b>	<b>Develop a greenhouse gas allowance standard for delivered energy.</b>	At least 7.0*	?
	<b>GEN-2a Develop an Oregon Renewable Portfolio Standard (RPS) or expanded public purpose charge as an alternative to Gen 2 above (e.g., have new renewable meet 25% of 2025 load).</b>	7.00	?
<b>GEN-3</b>	<b>Support Oregon PUC's review of rules and tariffs for renewable and combined heat and power (CHP) facilities.</b>	0.54	Y
<b>CATEGORY II: OTHER IMMEDIATE ACTIONS</b>			
<b>GEN-4</b>	<b>Encourage state government to purchase renewables (“1% for renewables” in new buildings or 20% of energy purchases).</b>	0.08	N?
<b>GEN-5</b>	<b>Advocate for specific federal policies or legislation (Re: CO<sub>2</sub> legislation and U.S. Dept. of Energy and EPA policies).</b>	varies	varies
<b>GEN-6</b>	<b>Advocate with BPA to support Oregon’s renewables measure (renewable funding, transmission and integration services, and other policies for renewables).</b>	varies	varies

\* Assumes carbon constraint at least equal to an RPS of 25 percent.

## **TRANSPORTATION ACTIONS TO REDUCE GREENHOUSE GASES**

**Issue:** One-third of Oregon’s GHG emissions are from vehicle exhaust. Cost-effective opportunities to reduce these emissions are available, particularly in urban areas.

**Solutions:** Two categorical solutions are: (1) to reduce greenhouse gas emissions from consumption of fossil fuels by displacing conventional combustion engines with hybrid, electric and other technological/fuel options; (2) to guide land use choices, especially in Oregon’s urban areas, toward more efficient choices including higher densities, transit options, mixed-use neighborhoods, apartment and common wall dwelling designs.

Refer to the graph on page 8 for the cumulative impact of measures..

<b>Transportation Actions</b>		<b>Reductions in Greenhouse Gas Emissions in MMTCO<sub>2</sub>E</b>	<b>C/E</b>
<b>CATEGORY I: SIGNIFICANT ACTIONS FOR IMMEDIATE STATE ACTION</b>		2025	
<b>TRAN-1.</b>	<b>Convene an interim working group to recommend a proposal for the Governor, Environmental Quality Commission and the Legislature to adopt emission standards for vehicles.</b>		
	<b>TRAN-1a: Adopt Low Emission Vehicle (LEV II) Emission Vehicle Standards.</b>	0.24	Y
	<b>TRAN-1b: Adopt CO<sub>2</sub> Tailpipe Emission Standards (per California AB 1493 “Pavley” standards).</b>	> 6.0	Y
<b>TRAN-2.</b>	<b>Integrate land use and transportation decisions with GHG consequences.</b>	0.40	Y
<b>TRAN-3.</b>	<b>Promote biofuel use and production.</b>	1.0	Y
<b>CATEGORY II – OTHER IMMEDIATE ACTIONS</b>			
<b>TRAN-4.</b>	<b>Review and enhance state tax credits and local incentives for citizens purchasing high efficiency vehicles.</b>	-	?
<b>TRAN-5.</b>	<b>Incorporate GHG emission impacts into transportation planning decisions.</b>	-	Y
<b>TRAN-6.</b>	<b>Expand “Transportation Choices Programs” and “Travel Smart Pilots.”</b>	-	Y
<b>TRAN-7.</b>	<b>Adopt state standards for high efficiency/low rolling resistance tires.</b>	0.12	Y
<b>TRAN-8.</b>	<b>Reduce GHG emissions from government fleet purchase and vehicle use.</b>	-	Y
<b>TRAN-9.</b>	<b>State and local governments should switch to “clean diesel” fuel and vehicle purchases, retrofits.</b>	0.10	Y
<b>TRAN-10.</b>	<b>Adopt state and local incentives for high efficiency vehicles.</b>	-	Y
<b>TRAN-11.</b>	<b>Set and meet goals for reduced truck idling at truck and safety stops.</b>	-	?
<b>TRAN-12.</b>	<b>Set up traffic flow engineering “Best Practices.”</b>	0.08	
<b>TRAN-13.</b>	<b>Set and meet goals for freight (truck/ail) transportation efficiency; achieve this through equipment, coordination, and land use.</b>	-	?
<b>TRAN-14.</b>	<b>Establish consumer awareness education link to transportation choices.</b>	-	Y
	<b>TOTAL</b>	<b>7.84</b>	

(-) Symbol denotes savings of less than .0001, or unable to be estimated.

# BIOLOGICAL SEQUESTRATION ACTIONS TO MITIGATE GREENHOUSE GASES

**Issue:** Carbon dioxide is sequestered (captured and stored) in trees, soils and other biomass. Human activities can release this carbon or increase sequestration.

**Solution:** To increase sequestration or reduce emissions for forest and other lands Oregonians need to maintain and increase good land use practices.

*Because actions interact, CO<sub>2</sub> savings cannot be added. . Refer to the graph on page 8 for the cumulative impact of measures.*

<b>Biological Sequestration Actions</b>			
	CATEGORY I – SIGNIFICANT ACTIONS FOR IMMEDIATE STATE ACTION	MMT CO <sub>2</sub> e 2025	C/E?*
BIOSEQ- 1	Reduce wildfire risk by creating a market for woody biomass from forests.	3.2	Y
BIOSEQ-2	Consider GHG effects in farm and forest land use decisions.	0.6	Y
BIOSEQ-3	Increase forestation of underproducing lands.	0.5	Y?
	CATEGORY II: OTHER IMMEDIATE ACTIONS		
BIOSEQ-4	Expand the application of water-erosion reducing practices for cereal production.	0.2	Y?
BIOSEQ-5	Leverage the Conservation Reserve Program (CRP) to expand reserved acreage.	0.2	N?
BIOSEQ-6	Establish a municipal street tree restoration program.	less than 0.1	N

*\* Cost-effective to consumer over measure lifetime? (This does not include whether it is cost-effective considering the projected effects of global warming)*

## MATERIALS USE, RECOVERY AND WASTE DISPOSAL ACTIONS FOR REDUCING GREENHOUSE GASES

This discussion evaluates actions relative to a common baseline and independent of other measures. The table below lists the measures that are recommended by the Advisory Group. A few of the measures in Figure 3 have been restated by the Governor’s Advisory Group. The state’s “solid waste management hierarchy” (ORS 459.015) ranks the preferred order of waste management options as follows:

1. Prevention/reuse
2. Recycling

3. Composting
4. Energy recovery
5. Landfilling

Information sources used to evaluate specific measures include waste composition studies, existing policy documents and feasibility studies, reports from evaluation of existing programs in Oregon and elsewhere, and in some cases, estimates informed by professional judgment.

Because measures interact, CO<sub>2</sub> savings cannot be added. Refer to the graph on page 8 for the cumulative impact of measures.

<b>Materials Use, Recovery And Waste Disposal Actions</b>			
<b>CATEGORY I – SIGNIFICANT ACTIONS FOR IMMEDIATE STATE ACTION</b>		<b>Reductions in GHG Emissions in MMTCO<sub>2</sub>E</b>	<b>C/E?*</b>
		<b>2025</b>	
<b>MW-1</b>	<b>Achieve the waste generation and recycling goals in statute.</b>	<b>5.2</b>	<b>Y</b>
<b>MW-2</b>	<b>DEQ should develop guidance to clarify alternative final cover performance at larger landfills: Demonstrate control of gas emissions comparable to geomembrane cover.</b>	<b>0.53</b>	<b>N</b>
<b>MW-3</b>	<b>Provide incentives for larger landfills to collect and burn minimum percentage (65 percent to 80 percent) of methane generated.</b>	<b>@ 65 percent: 0.47 @ 80 percent: 0.88</b>	<b>N</b>
<b>CATEGORY II – OTHER IMMEDIATE ACTIONS</b>			
<b>MW-4</b>	<b>Provide incentives to increase salvage of reusable building materials.</b>	<b>0.02</b>	<b>Y</b>
<b>MW-5</b>	<b>Increase the “Bottle Bill” redemption value from 5-cents to 10-cents <u>and</u> expand the “Bottle Bill” to all beverages except milk, including juice, water, liquor, wine, tea and sports drinks; and consider alternative redemption methods.</b>	<b>0.05</b>	<b>?</b>
<b>MW-6</b>	<b>Develop statewide recovery infrastructure for consumer electronics waste, with shared responsibility among producers, retailers, NGOs, and government.</b>	<b>0.03</b>	<b>?</b>
<b>MW-7</b>	<b>Change land use rules to allow commercial composting on land zoned High Value EFU (exclusive farm use).</b>	<b>less than 0.01<sup>†</sup></b>	<b>Y</b>
<b>MW-8</b>	<b>Increase public awareness to discourage on-site burning of garbage, especially fossil-carbon materials.</b>	<b>0.02</b>	<b>Y</b>
<b>MW-9</b>	<b>Continue landfill regulation with additional reporting and analysis.</b>	<b>Unknown</b>	<b>Y</b>
<b>MW-10</b>	<b>Evaluate methane emissions from closed landfills and options to reduce such emissions.</b>	<b>Unknown</b>	<b>?</b>

\* Cost-effective to consumer over measure lifetime? (This does not include whether it is cost-effective considering the projected effects of global warming). **Measures with savings 0.25 MMT CO<sub>2</sub>e or more in 2025 are Priority I Measures.**

<sup>†</sup>Actual reductions over time could be several times higher than shown, depending on the measure and the details of implementation. Most of the greenhouse gas benefit of these measures is associated with reducing methane generation at landfills; for the dry landfill that accepts most of the

Metro area's waste, methane generation occurs up to 150+ years following disposal, so the majority of emissions offsets occur after the 2015 and 2025 time horizons of this project.

## GOVERNMENT OPERATIONS ACTIONS TO REDUCE GREENHOUSE GASES

GOV-1	State agencies should use their agency Sustainability Plans as the tool for agencies' dynamic involvement in GHG reductions. Operational activities in the areas of electricity, natural gas, transportation, waste and water will be the focus for reduction opportunities.
GOV-2	Through a collaborative effort, the departments of Energy, Environmental Quality and Administrative Services should develop a process to educate agency personnel about opportunities for GHG reductions including how to set goals and calculate GHG reductions.

## CUMULATIVE SUMMARY OF ALL ACTIONS TO REDUCE GREENHOUSE GASES

Emissions are expressed as million metric tons of carbon dioxide-equivalent (MMT CO<sub>2</sub>E) in the left vertical axis from 1990 through 2025.

**Historic and Forecast Greenhouse Gas Emissions in Oregon and Estimated Cumulative Reductions from All Measures in Sequence**

