DEPARTMENT OF
ECOLOGY
State of Washington

Path to a Low-Carbon Economy

An Interim Plan to Address Washington's Greenhouse Gas Emissions

December 2010
Publication no. 10-01-011

Publication and Contact Information

This report is available on the Department of Ecology's website at
www.ecy.wa.gov/biblio/1001011.html

For more information contact:

Climate Policy Group
P.O. Box 47600
Olympia, WA 98504-7600
Phone: 360-407-7000

Washington State Department of Ecology - www.ecy.wa.gov

o Headquarters, Olympia	360-407-6000
o Northwest Regional Office, Bellevue	425-649-7000
o Southwest Regional Office, Olympia	360-407-6300
o Central Regional Office, Yakima	509-575-2490
o Eastern Regional Office, Spokane	509-329-3400

To ask about the availability of this document in a format for the visually impaired, call the Executive Offices at 360-407-7000. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

Path to a Low-Carbon Economy

Washington's Interim Plan to Address Greenhouse Gas Emissions

By
Justin Brant
And
Janice Adair

Climate Policy Group
Washington State Department of Ecology
Olympia, Washington

This page is purposely left blank

Table of Contents

List of Tables and Figures

Table

Figures

I. Executive Summary

Global climate change is the economic and environmental issue of our lifetime. The science is clear that we must move forward quickly to reduce greenhouse gas (GHG) emissions in order to mitigate its effects. Without action, climate change will negatively affect nearly every part of Washington's economy through changes in temperature, sea level, and water availability.

In 2008, the Legislature put into law the state's GHG emissions reduction limits first adopted by Governor Gregoire in Executive Order 07-02. Washington must reduce emissions to:

- 1990 levels by 2020.
- 25 percent below 1990 levels by 2035.
- 50 percent below 1990 levels by 2050.

The Legislature also required the Departments of Ecology and Commerce to:

> Track progress toward meeting the emission reductions established in this subsection, including the results from policies currently in effect that have been previously adopted by the state and policies adopted in the future, and report on that progress.
>
> By December 31st of each even-numbered year beginning in 2010, the departments shall report to the governor and the appropriate committees of the senate and house of representatives the total emissions of greenhouse gases for the preceding two years, and totals in each major source sector. The department shall ensure the reporting rules adopted under RCW 70.94.151 allow it to develop a comprehensive inventory of emissions of greenhouse gases from all significant sectors of the Washington economy.[1]

This report, along with the state's required biennial GHG inventory, satisfies that requirement.

In summary, total GHG emissions in Washington for 2008 were 101.1 million metric tons carbon dioxide equivalent (CO_2e), 9 percent more than 1990 emissions. Ecology projects that the policies the state has already implemented to reduce GHG emissions will result in relatively constant emissions between now and 2020. Unfortunately, this means that the state is not on track to meet its statutory reduction limit for 2020 and beyond.

Developing GHG reduction Strategies

In December 2008, Ecology and Commerce laid out plans to reach the statutory 2020 reduction limit. These recommendations were centered on implementing the emissions trading program designed by the Western Climate Initiative. That program is a market-based system that sets a limit on GHG emissions and allows the market to determine strategies to reduce emissions at the lowest cost to the economy. The 2008 plan also laid out a number of other policies to reduce GHG emissions based on the recommendations of the Climate Action Team. The Climate Action Team was a stakeholder group tasked with developing a suite of policies to reduce emissions in all sectors of Washington's economy.

[1] Codified as RCW 70.235.020.

Since the publication of that report, many of the policies laid out by the Climate Action Team have either been fully or partially implemented, as summarized in Appendix 2. But, after debate at the state and federal level, lawmakers have not implemented the centerpiece of the 2008 Comprehensive Plan: an economy-wide emissions trading program.

When the 2009 Washington Legislature did not adopt the emissions trading program, Governor Gregoire issued Executive Order 09-05 to direct Ecology and other agencies to continue working to address climate change with other state and federal partners.

Executive Order 09-05 directed Ecology to:

- Continue to work with six other Western states and four Canadian provinces in the Western Climate Initiative to develop a regional emissions reduction program design.
- Advise the federal government and Washington's congressional delegation on designing a national program that reflects state priorities.
- Work with large GHG emissions sources in the industrial and electricity sectors to develop emission reduction strategies.
- Work with businesses and interested stakeholders to develop recommendations on emission benchmarks for use in voluntary or regulatory programs to reduce GHG emissions.
- Work with TransAlta to reduce emissions from the company's coal-fired power plant near Centralia by more than half.
- Work with DNR to develop a forestry offset program and other financial incentives to promote continued carbon sequestration in the forestry industry.
- Evaluate a Low-Carbon Fuel Standard as a mechanism to reduce carbon emissions from the transportation sector.
- Join with Washington Department of Transportation (WSDOT), other West Coast states and the private sector to make alternative fuels, including electricity for plug-in vehicles, available along the West Coast highway and adjoining metropolitan centers.
- Working with the larger regional transportation councils, develop regional transportation plans that will increase transit options, and reduce greenhouse gas emissions.
- Address the impacts of climate change, including rising sea levels and the risks to water supplies.

As directed by the Governor, Ecology has completed a number of the tasks outlined in the Executive Order. The Department:

- Worked with the large emissions sources in the state, gaining a greater understanding of the sources of emissions and the opportunities to reduce emissions in the industrial and electricity sectors. Lack of capital and an uncertain regulatory environment were identified as the major barriers to implementing emissions reduction projects at these sources.

- Ecology released a White Paper outlining the major questions and data issues that must be addressed in developing GHG benchmarks for use in regulatory or voluntary emissions reduction programs. This White Paper is the most comprehensive look at this issue to date, and serves as a reference for other state and federal jurisdictions as they move forward with benchmarking of GHG emissions.
- The WCI released its Detailed Program Design in July 2010, laying out a roadmap for the five jurisdictions implementing the regional emissions trading program designed by WCI. Even though Washington is not pursuing implementation of the regional emissions trading program, the state continues to fully participate in WCI as it develops a portfolio of climate action to advance the transition to a low-carbon economy. The agreement signed by the Governors and Premiers that created the WCI committed the participants to work collaboratively to promote renewable energy, increase energy efficiencies, and advocate for national policies that reflect the unique needs of the jurisdictions.
- WSDOT developed a new model to project statewide vehicle miles traveled and, with Ecology, analyzed the potential emissions reductions opportunities in the transportation sector.
- WSDOT is working with local jurisdictions and the Department of Commerce to build an extensive electric vehicle charging infrastructure along the length Interstate 5 and within the Puget Sound region. Federal grants totaling more than $22 million will fund the construction of between 1500 and 2000 electric vehicle charging stations over the next two years.

These tasks have given us a greater understanding of GHG emissions in the state and the potential to reduce those emissions. However, a number of tasks from the Executive Order have not yet been completed and will continue into 2011, including:

- Ecology has completed a technical and economic analysis of a Low-carbon Fuel Standard. Our analysis identified a number of questions that we will continue to assess before making a recommendation to the Governor on whether or not we believe Washington should implement such a program.
- Negotiations with TransAlta have developed a framework agreement to transition the state's only coal-fired power plant to cleaner fuel sources by 2025. Discussions will continue with utilities and other sources to identify financing options.
- WSDOT will work with the larger regional transportation organizations in the state to develop regional plans to reduce vehicle miles traveled in the most populated areas of the state.
- Ecology and other agencies will release our climate change response strategy in December 2011. We will recommend strategies to adapt to and prepare for the effects of climate change and identify resource needs, additional research and monitoring, and highlight ways to effectively increase public awareness of climate change.

In addition to these activities, a number of other processes are ongoing in 2011 that will help develop a portfolio of strategies to reduce GHG emissions.

- The Department of Commerce is updating the State Energy Strategy. Reducing GHG emissions is one of the principles guiding that process. By December 2011, Commerce will release the revised energy strategy. The strategy will be the result of an extensive analytical process and will feature a fully integrated strategy coordinated among all state agencies and other energy policy stakeholders.
- Ecology will implement federal rules regulating GHGs from large stationary sources under the U.S. Clean Air Act.
- Ecology will receive the first data from the federal GHG Reporting Rule, giving us better information on major emission sources.
- The Utilities and Transportation Commission will begin implementing new programs designed to remove any barriers to electric and gas utilities implementing all cost-effective energy efficiency measures as part of ongoing rate case development for individual utilities.
- Ecology will continue to coordinate with all state agencies to reduce their emissions as required under SB 5560 and develop strategies to move the agency towards carbon neutrality.

Given all of the ongoing processes related to reducing GHG emissions, rather than provide specific recommendations on additional steps the state should take as required under RCW 70.232.040, we are providing this Interim Plan summarizing recent work to reduce emissions and adapt to the effects of climate change.

Ecology, along with the Departments of Commerce and Transportation, expects to provide an integrated plan to put the state on a path to a low-carbon future and a green economic recovery in 2011.

II. Introduction

"Climatic effects of pollution: Carbon dioxide is being added to the earth's atmosphere by the burning of coal, oil and natural gas at the rate of 6 billion tons a year. By the year 2000 there will be about 25% more CO_2 in our atmosphere than at present. This will modify the heat balance of the atmosphere to such an extent that marked changes in climate, not controllable through local or even national efforts, could occur. Possibilities of bringing about countervailing changes by deliberately modifying other processes that affect climate may then be very important."

President Lyndon Johnson's Science Advisory Panel, 1965

Since 1965, when President Johnson received the above caution, the global carbon dioxide (CO_2) concentration in the atmosphere has increased 23 percent. This is a result of the uncontrolled release of greenhouse gases (GHGs) from man-made sources, such as burning fossil fuels. The outcome is significant warming of global atmospheric and ocean temperatures. According to a recent report by the National Oceanic and Atmospheric Administration (NOAA), each of the last three decades has been warmer than the one preceding it.[2]

Climate change poses a significant threat to Washington's environment and economy. Warming temperatures have caused a significant decrease in spring snowpack throughout the world. In Washington, changes in snowpack will continue to decrease summer water availability, increasing the competition among water users for an already scarce resource.

Human-released CO_2 is also being absorbed by the oceans. This causes changes to ocean chemistry that lead to increased acidity in the oceans. Washington's oceans are particularly susceptible to acidification, which may already be affecting Hood Canal, Willapa Bay, and Grays Harbor. More acidic ocean water may harm marine organisms, mainly those that form shells. Some of these threatened marine creatures are an important component of the food web, supporting larger species such as herring, salmon, and whales. Ocean acidification also poses a threat to Washington's commercial shellfish industry.

If GHG emissions continue unchecked, changes in Washington's temperature, water availability, and sea-level will exacerbate current environmental problems and create new ones. According to *The Washington Climate Change Impacts Assessment* compiled by the University of Washington Climate Impacts Group, Washington can expect its average temperature to increase 3.2 degrees by 2040.[3] The temperature increase will cause many changes, including:

- Significant decrease in spring snowpack in the Cascades leading to changes in the timing of stream-flow in sensitive watersheds, like the Yakima River.
- Increased sea-level in Puget Sound will threaten the Ports of Seattle and Tacoma, as well as other low-lying areas.
- Warmer and dryer summer weather will double or triple the average annual area burned by forest fires.

[2] National Oceanic and Atmospheric Administration, *State of the Climate in 2009*. Available at http://www.ncdc.noaa.gov/bams-state-of-the-climate/2009.php.
[3] For additional information, see http://cses.washington.edu/db/pdf/wacciaexecsummary638.pdf.

- Increases in stream temperature will likely reduce the quality of salmon habitat, stressing an already endangered species.

Washington's climate leadership

Under Governor Gregoire, Washington has become a leader in addressing the challenges posed by climate change.

To affirm our state's commitment to reduce emissions, the 2008 Legislature passed E2SHB 2815. This bill put into law the state's GHG emissions reduction targets first adopted by Governor Gregoire in Executive Order 07-02.[4] Washington must reduce emissions to:

- 1990 levels by 2020.
- 25 percent below 1990 levels by 2035.
- 50 percent below 1990 levels by 2050.

The Legislature also required the Departments of Ecology and Commerce to:

> Track progress toward meeting the emission reductions established in this subsection, including the results from policies currently in effect that have been previously adopted by the state and policies adopted in the future, and report on that progress.
>
> By December 31st of each even-numbered year beginning in 2010, the departments shall report to the governor and the appropriate committees of the senate and house of representatives the total emissions of greenhouse gases for the preceding two years, and totals in each major source sector. The departments shall ensure the reporting rules adopted under RCW 70.94.151 allow it to develop a comprehensive inventory of emissions of greenhouse gases from all significant sectors of the Washington economy.[5]

This report, along with the state's required biennial GHG inventory, satisfies that requirement.

To reach these goals, our state has adopted a portfolio of policies aimed at reducing energy use and emissions throughout Washington's economy.[6] Many of our policies are designed to improve energy efficiency and increase the use of renewable energy, saving Washington's citizens money and creating green jobs. In fact, a recent study finds Washington is one of only 12 states where the number of green jobs both exceeds the national average and grew more than 1 percent each year between 1998 and 2007.[7]

[4] Codified as RCW 70.235.020.
[5] Codified as RCW 70.235.020.
[6] For additional information, see *Washington Policies to Reduce GHG Emissions* in Appendix 2.
[7] The Pew Charitable Trusts, *The Clean Energy Economy*. Available at http://www.pewcenteronthestates.org/uploadedFiles/Clean_Economy_Report_Web.pdf.

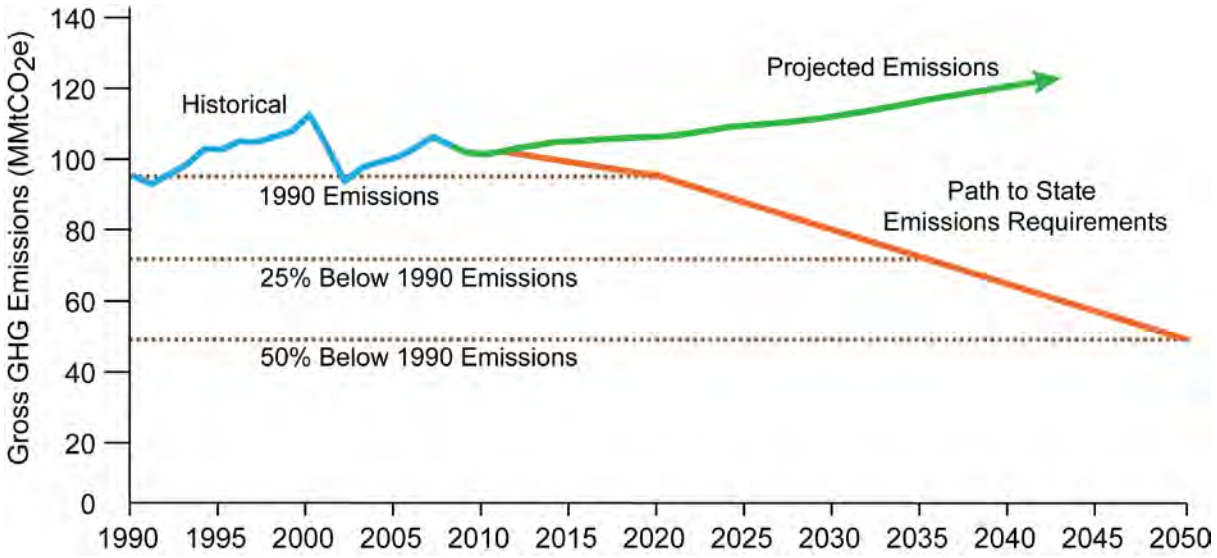


Figure 1: Historical and Projected Washington Greenhouse Gas Emissions. (Source: Washington Greenhouse Gas Emissions inventory, 1990-2008 and Washington Greenhouse Gas Emissions Projections, 2009-2035)

This report updates the 2008 Comprehensive Plan that laid out a series of policies that would enable the state to reach our statutory GHG emissions limits.[8] Together with our updated state emissions inventory in Appendix 1, it satisfies the requirement for the Departments of Ecology and Commerce to report state GHG emissions and our progress toward meeting the statutory GHG reduction limits to the Governor and Legislature every two years.[9]

Much has happened over the past two years since the publication of the last report on climate policy. We have entered the largest economic recession since the Great Depression, causing pain for all Washingtonians as well as state and local government budgets. As part of the economic stimulus package to create jobs, the Obama Administration invested billions of dollars into clean energy and energy efficiency in Washington and around the country. The U.S. Environmental Protection Agency (EPA) determined GHGs endanger public health, and it has moved to reduce emissions from vehicles and stationary sources using its existing regulatory authority.

But, after debate at the state and federal level, lawmakers have not implemented the centerpiece of the 2008 Comprehensive Plan; an economy-wide cap-and-trade program. Without an economy-wide policy such as this, we must work sector-by-sector to develop a portfolio of policies that work together to reduce emissions. However, Ecology does not believe each sector should be required to reduce emissions consistent with its proportionate share of emissions. Instead, we must work to identify the lowest-cost and most easily implemented reduction strategies.

This report represents an interim plan from the Washington Departments of Ecology, Commerce, and Transportation (WSDOT). It is a summary of the ongoing processes the three agencies will use to develop a suite of policy recommendations that, if implemented, will put the state on a path to a low-carbon future. Once complete, the agencies will continue to work to align the state's environmental, energy, and transportation planning and policies to meet both the short- and long-term statutory GHG emissions limits.

[8] 2008 Comprehensive Plan, available at http://www.ecy.wa.gov/climatechange/2008CompPlan.htm.
[9] RCW 70.235.020.

Washington's 2008 greenhouse gas emissions

In 2008, Washington's GHG emissions were about 100 million metric tons carbon dioxide equivalent ($MMtCO_2e$), an 8.5 percent increase over 1990 (shown in Figure 1). Eighty-five percent of Washington's emissions are produced by burning fossil fuels to produce energy (Figure 2). The transportation sector continues to dominate state GHG emissions. Significant emissions also come from the combustion of fossil fuels to produce electricity, and fossil fuels used by industrial sources and to heat and cool homes and businesses. The other 15 percent of emissions are released directly to the atmosphere from waste management, agriculture, and industrial processes.[10]

SECTOR	1990	2005	2008	2020	2035
Transportation	39.0	44.9	45.3	44.9	46.7
Electricity Consumption	16.9	18.9	19.1	18.4	20.4
Industrial Combustion	11.8	11.3	11.9	11.8	9.4
Residential/Commercial Combustion	6.8	8.4	9.1	9.1	9.8
Fossil Fuel Industry Fugitive	0.5	0.8	0.7	0.7	0.7
Industrial Processes	9.6	4.1	5.6	7.9	13.6
Waste Management	2.4	3.7	3.9	5.2	7.3
Agriculture	5.9	6.3	5.9	6.0	6.2
Total Gross Emissions	**92.9**	**98.2**	**101.1**	**104.0**	**114.1**

Table 1: Washington Gross Greenhouse Gas Emissions (Million Metric Tons CO2e). Data for 1990, 2005, and 2008 are calculations, while data for 2020 and 2035 are projections.

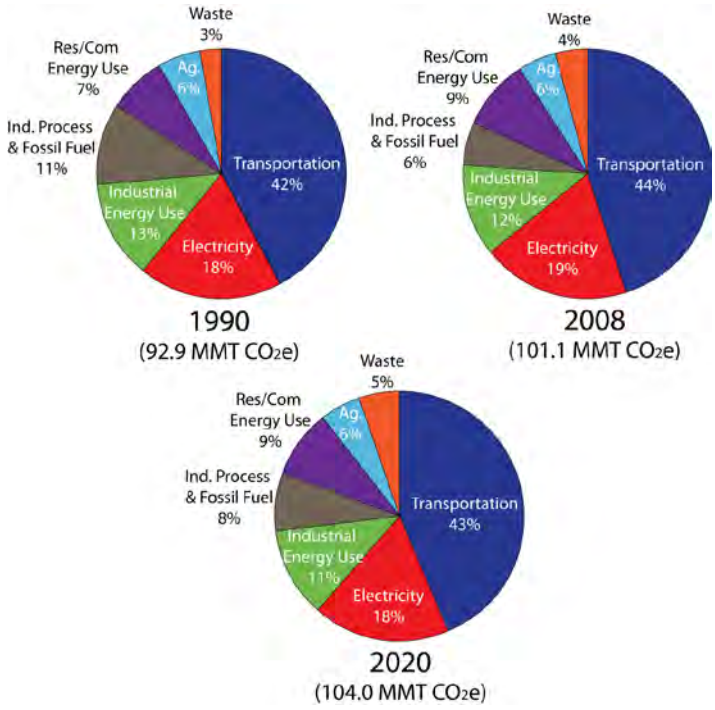


Figure 2: Gross GHG Emissions by Sector for Washington. (Source: Washington Greenhouse Gas Emissions inventory, 1990-2008 and Washington Greenhouse Gas Emissions Projections, 2009-2035)

[10] For additional information, see *the 2008 Washington GHG Inventory* in Appendix 1.

Total Washington emissions dropped 2 percent between 2007 and 2008, the first decrease since 2002. The emissions drop in 2002 was caused mostly by the permanent shutdown of the state aluminum industry, as well as the recession from the dot-com bubble.

The most recent drop in emissions was caused by a combination of many factors, including new state and federal policies, the continued shift of the state's economy, and the beginning of the current economic downturn. While Gross State Product (GSP), which measures the total size of the state economy, grew 2 percent between 2007 and 2008, energy-intensive sectors, such as industrial production, construction, and the transportation industry, shrunk in 2008 as consumers began to slow their spending and the housing market declined.[11] Less energy-intensive sectors, like the service industry and health care, continued to grow in 2008.

The recession's effects on the resource and manufacturing sectors amplified a historic shift in the state economy to commercial activity based on software, biotech, and other less energy-intensive businesses. As a result, emissions per dollar of GSP fell almost 4 percent to the lowest levels since the state begin quantifying GHG emissions. And per capita GHG emissions decreased after five years of little or no change.

Projecting state GHG emissions

Over the past six years, the state has implemented a number of policies to reduce emissions and build our green energy economy. In our current GHG inventory, we are beginning to see emissions reductions from some of these policies, although we expect much larger emissions reductions in the future from continued full implementation of these policies. Some examples of the policies already working to reduce emissions are:

- The federal Renewable Fuel Standard (RFS) which requires certain volumes of ethanol consumption in motor vehicles reduced Washington's gasoline consumption by approximately 65 million gallons in 2008.
- Incentives for sales of hybrid and electric vehicles have made Washington one of the top markets in the country for high-efficiency vehicles.
- Early adoption of the California Clean Cars efficiency standards led to adoption of similar standards at the national level.
- The Northwest Power and Conservation Council estimates Northwest utilities invested $298 million in energy efficiency in 2009, reducing energy equal to the amount used by about 145,000 homes.
- In 2009, WSDOT's Commute Trip Reduction (CTR) program removed nearly 28,000 vehicles from the road every weekday morning by encouraging commuters to use alternatives to single occupancy vehicles (SOV). This reduced the number of vehicle miles travelled (VMT) by 62 million for the year.
- From 2005 to 2010, Washington went from a state with no wind power production to the fifth-largest producer in the nation, with projects capable of generating more than 1,900 megawatts of power. This is enough energy to power over 1 million Washington homes.

[11] Bureau of Economy Analysis Regional Economic Accounts, available at http://www.bea.gov/regional/index.htm.

As a result of state and federal policies in place right now, Ecology projects that Washington's 2020 emissions will be only 3 percent higher than 2008 emissions (Figure 1). Over the same time period, the state's population is expected to increase 14 percent. Maintaining emissions on this path will require the continued full implementation of all policies in the state.[12]

Figure 3 compares this report's emissions projection with the one developed by Ecology in 2007.[13] In 2007 we predicted emissions would grow at a much faster rate than we do now. This is due to two major factors. First, in 2007 we did not include all of the policies we have implemented to reduce emissions as in our current projection. Second, the 2007 projection was based on economic growth data prior to the recession. The recession has reduced emissions over the past few years, and has changed our expectation of future economic growth rates.

While it is important to acknowledge actions the state has already taken to stabilize emissions, this projection suggests the state will not meet its 2020 statutory emissions limit without taking additional actions to reduce emissions.

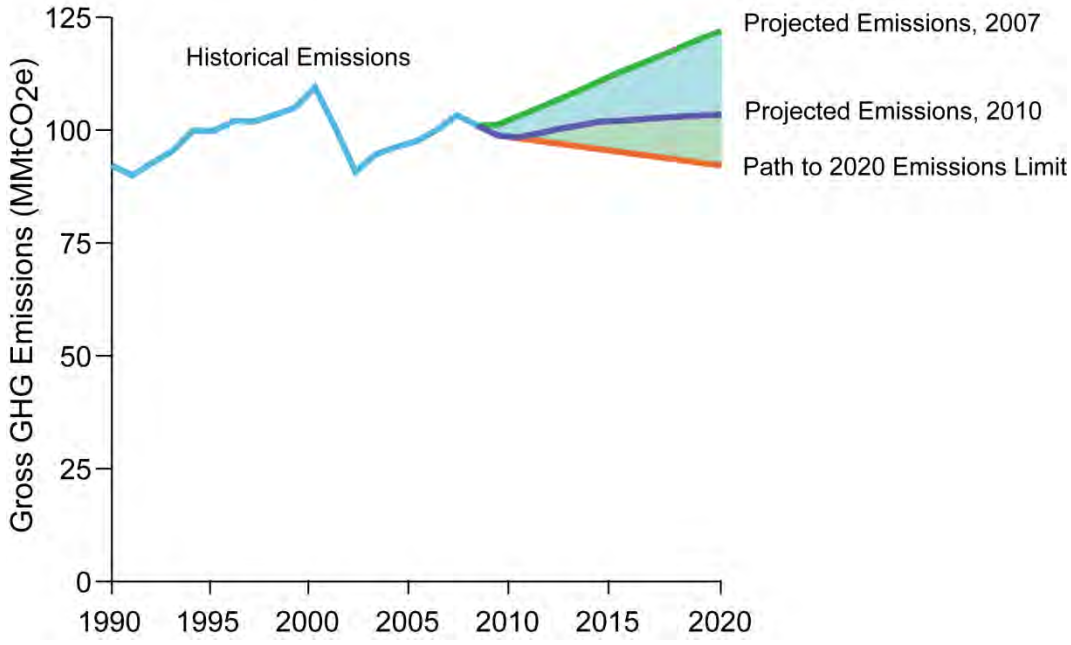


Figure 3: Comparison of 2007 Business as Usual emissions projections with current emissions projection.

[12] For additional information, see *Washington GHG Emissions Projections* in Appendix 3.
[13] *Washington State Greenhouse Gas Emissions Inventory and Reference Case Projections, 1990-2020*, available at http://www.ecy.wa.gov/climatechange/docs/WA_GHGInventoryReferenceCaseProjections_1990-2020.pdf.

III. Developing a Path Forward

Washington is at a crossroads. Because neither the state nor the federal governments have adopted a comprehensive approach to address climate change, the state must develop a larger portfolio of policies in order to reach its statutory emissions limits in 2020 and beyond.

A number of processes currently under way will help Ecology, the Department of Commerce (Commerce), and the Department of Transportation (WSDOT) work together to develop a suite of policy recommendations to reduce emissions throughout Washington's economy. Our state's policies must take into account the current economic and budget crisis faced by the state.

Below is a summary of Washington's current activities to further understand the sources of GHG emissions and develop new policies and strategies to reduce them. As many of these processes will continue during 2011, Ecology, and our state agency partners, must wait until their completion to develop our detailed state emissions reduction strategy for the 2012 legislative session and beyond.

Understanding the sources of GHG emissions

The first step in developing targeted policies to reduce emissions is a better understanding of the sources and drivers of GHG emissions. Ecology and the U.S. Environmental Protection Agency (EPA) have established programs for GHG reporting from large emissions sources.

In 2010, the Legislature and Governor Gregoire approved legislation to align Washington's GHG reporting requirements with EPA rules.[14] This required Ecology to restart its GHG reporting rule-making process, initially started in 2008.

The EPA reporting rule applies to facilities that emit 25,000 metric tons CO_2e or more each year, as well as all facilities in certain source categories.[15] Most facilities are required to begin reporting emissions for calendar year 2010 by March 31, 2011. EPA will share emissions reporting information from these facilities with Ecology.

In addition to those facilities who must report to EPA, the proposed state reporting rule will apply to:

- Facilities that emit at least 10,000 metric tons of GHGs annually in Washington.
- Suppliers of liquid motor vehicle fuel, diesel fuel, or aircraft fuel that sell product that will emit at least 10,000 metric tons of carbon dioxide annually in Washington when consumed.

These facilities and suppliers will begin reporting 2012 emissions in 2013. Washington reporters will use the EPA methodologies for reporting emissions and report via the EPA's online reporting tool. Ecology adopted the final rule on December 1, 2010.[16]

[14] The rule will establish a new chapter, WAC 173-441.
[15] For additional information, see http://www.epa.gov/climatechange/emissions/ghgrulemaking.html.
[16] For additional information see, http://www.ecy.wa.gov/programs/air/globalwarm_RegHaze/GreenHouseGasreporting_rule.html.

Executive order 09-05

In 2009, Governor Gregoire directed Ecology and other agencies to continue working to address climate change with other state and federal partners by issuing Executive Order 09-05.[17]

2020 collaboration

The 2020 Collaboration was a project where Ecology worked with willing members from the industrial and electricity sectors to better understand their GHG emissions and identify strategies and actions to reduce those emissions. As directed by Governor Gregoire, Ecology completed three tasks during the year-long project:

1. Provide each facility in Washington we believe produces 25,000 metric tons or more of CO_2e a year with our best estimate of that facility's annual GHG emissions.
2. Provide each facility indentified as producing more than 25,000 metric tons or more CO_2e annually with their proportionate share of GHG emissions reductions necessary to achieve the state's emissions limit by 2020.
3. Ask participating stakeholders for their recommendations on strategies and actions to meet the 2020 target – and identify incentives needed and barriers encountered to moving forward with reduction projects.

Using available data sources, Ecology identified approximately 60 facilities in the state that emitted at least 25,000 metric tons of carbon dioxide equivalent in 2007[18] (This list of facilities may not be complete since mandatory reporting to both EPA and the Ecology has not yet begun.) Once we supplied our emissions estimate, Ecology staff worked with interested facilities to refine the annual emissions estimate.

Ecology then provided each facility with their individual proportionate share of GHG emissions reductions in early 2010. We used the proportionate share reduction number for planning purposes only. Ecology believes that the best approach to reduce emissions in Washington will be to implement the most cost-effective emissions reductions throughout the state economy rather than requiring specific reductions from individual facilities. However, for this exercise it was important to provide facilities with a specific number in order to frame our discussion of emissions reduction opportunities.

We then asked facilities to provide us with strategies and actions they might use to reach their proportionate share of reductions and any barriers or incentives that would enable them to realize those reductions.

Identifying strategies and actions for a lower carbon future

Most participating facilities identified reduction opportunities that will require significant capital investment. The strategies identified were centered on energy efficiency, fuel switching, and process improvements.

[17] For additional information, see http://www.ecy.wa.gov/climatechange/2009EO.htm.
[18] The list of facilities is available on-line: http://www.ecy.wa.gov/climatechange/docs/2020collab_facilitylist.pdf.

We also received input from facilities on the barriers they face in implementing these projects. Broadly speaking, the barriers fall into several categories:

- Lack of capital funding: corporate policies often call for short return-on-investment periods. This makes it difficult for facility managers to fund projects with payback periods of several years or more.
- Regulatory hurdles: stakeholders expressed concerns that permitting for projects is expensive and time consuming.
- Uncertainty about government policy, legislation, and regulatory action: The federal government is pursuing several rules that will impact investments in GHG emissions reducing technologies. These policies make planning and budgeting at the facility level more challenging in the short term.
- A need for proven technology: Carbon capture and storage is not yet a proven carbon reduction strategy. Until it is, businesses are more likely to invest in technologies and strategies that are tested and proven to be effective.
- Concern about emissions and production leakage: Carbon reduction policies should consider the competitive business environment and avoid shifting emissions and the production of goods to others states or countries.

Stakeholders also submitted their ideas for incentives that would encourage investment in GHG reduction projects. In general, industrial stakeholders recommended:

- Creating grants or loan guarantees for facilities to carry out upgrades.
- Developing an early action program or a GHG offsets registry.
- Expediting the permitting process for projects that result in direct GHG reductions.
- Treating biomass and biomass residues as carbon neutral.
- Recognizing the important contributions of recycling, sustainably managed forests, and wood and paper products that store (sequester) carbon for long periods.
- Developing new markets for forest and biomass residuals.

Ecology will continue to engage with industrial facilities on identifying and implementing GHG reduction projects. Part of this will be to foster a stronger partnership between facilities and existing energy efficiency service providers. This includes the WSU Energy Extension Program, Impact Washington, and the Department of Commerce. Energy efficiency service providers can help facilities understand their energy use and develop opportunities to reduce it. These providers can also help facilities understand the grants and incentives available to them for implementing energy efficiency projects.

Reducing emissions from the electricity sector

As part of the 2020 Collaboration, Ecology also worked with large electricity utilities. As with industrial facilities, we provided utilities we believe emit more than 25,000 metric tons CO_2e to produce the electricity they sell to customers in Washington with our estimate of their emissions and their proportionate share of GHG emissions reductions.

The estimates were based on electricity consumed in the state and did not include purchases of BPA electricity (which markets most of the hydropower produced by on the Columbia River). Once we provided our emissions estimate, three investor-owned utilities (Avista, Pacificorp, and Puget Sound Energy) provided general feedback on the GHG estimates as well as barriers to achieving additional GHG reductions in the electricity sector.

- Washington's existing power plant emissions performance standard (EPS) and renewable performance standard (RPS) are likely to increase the state's reliance on natural gas plants as more renewable energy resources are added to comply with the RPS. This can occur when natural gas plants are needed to back up intermittent renewable resources such as wind.
- The expected growth in the electric vehicles market will likely increase demand for electricity which could increase emissions from electricity while decreasing transportation emissions.
- There are a number of regulatory and permitting barriers to increasing the use of biomass as a renewable power source.
- It is difficult to plan in the midterm when the future use of the only coal-fired power plant in the state, the TransAlta facility near Centralia, is undetermined.
- Due to the uncertain policy landscape in terms or regulating and reducing GHG emissions, it is challenging for utilities to estimate the cost of operating in a low carbon economy.
- Meeting multiple compliance requirements in a multi-utility structure that is regional (not state based) is an on-going challenge.

The discussions with the utilities provided a chance to have detailed conversations on GHG estimates as well as longer-term challenges to achieving GHG reductions in this sector. Many of these challenges are being addressed by Commerce in its Energy Strategy and the work of the Utilities and Transportation Commission, which is outlined later in this chapter.

Benchmarking GHG emissions

The Governor's Executive Order directed Ecology to study using GHG benchmarks in voluntary or regulatory programs to 1) reduce GHG emissions; and 2) identify challenges and options for moving forward on benchmark development with other state and federal partners. A GHG benchmark is an objective indicator of efficiency to assess and compare GHG emissions performance across facilities, or against a common standard or best practice.

Our analysis of GHG benchmarking resulted in a white paper titled *Issues and Options for Benchmarking Industrial GHG Emissions (June 30, 2010).*[19] This report is being used by other state and federal agencies as they study benchmark development.

[19] For additional information, see full Benchmarking Report in Appendix 4.

Key findings of the white paper include:

- **The availability of comprehensive production, energy, and emissions data would greatly assist development of greenhouse gas benchmarks.** However, federal data will not be available until mid-2011 at the earliest, and state data will not be available until 2013.
- **Developing meaningful benchmarks will require national GHG performance data**. Washington has only a handful of facilities in key industrial sectors, and many of our facilities have higher performance than those in other regions.
- **Resolving key issues in benchmark development depends on the policy context.** Even if they rely on similar underlying data, benchmarks developed for voluntary, cap-and-trade, or regulatory policy approaches may differ significantly.

The Executive Order also directed Ecology to develop benchmarks for selected industries or activities by 2011. Ecology will not be able to do this work due to the current budget restraints.

Evaluating a low-carbon fuel standard

The Governor's Executive Order 09-05 directed Ecology to assess whether a Low-carbon Fuel Standard (LCFS) would be a good option to help meet Washington's statutory GHG emissions limits. An LCFS is a requirement that oil producers and distributors replace a percentage of fossil fuels with "low-carbon" fuels. Low-carbon fuels include electricity, natural gas, biodiesel, or lower carbon gasoline - including cellulosic ethanol and hydrogen. An LCFS is considered "fuel neutral" in that the producer/distributor can choose any or all of these fuels based on their own business model and costs.

An LCFS is currently in place in California and British Columbia; Oregon is developing one. In addition, eleven Northeastern and Mid-Atlantic States and six Midwestern states are considering an LCFS.

Over the past year, Ecology staff conducted a thorough technical and economic analysis of an LCFS.[20] The results of that analysis found that an LCFS would reduce covered transportation GHG emissions by up to 12 percent above the policies the state currently has in place. It would also provide a clear, long-term market for biofuels, electricity, and other alternative fuels in the state and promote investment in the infrastructure to deliver the low-carbon fuels of the future to Washington consumers.

The Office of Financial Management worked with Ecology on an economic analysis of a LCFS for Washington[21]. It found that a Washington LCFS will have a small effect on Washington's economy. This effect can either be positive or negative, depending on the method used for compliance and fuel price assumptions used. The largest positive economic effects occur when large quantities of low-carbon fuels are produced in Washington, while small negative effects occur when in cases with few electric vehicles when all low-carbon fuel is imported from out of state. Washington's biodiesel fuel industry believes an LCFS would enable them to operate at full capacity and probably add jobs and economic output through increased state and local taxes.

[20] For additional information, see http://www.ecy.wa.gov/climatechange/fuelstandards.htm.
[21] http://www.ecy.wa.gov/climatechange/docs/fuelstandards_09272010_econimpact.pdf

While, Ecology staff conducted a thorough technical analysis, the agency has not yet developed a recommendation on whether or not the state should move forward with an LCFS. Several questions have been raised – such as the availability of ethanol and biodiesel in the later years of the program and market penetration of electric vehicles – where the agency is seeking better clarification or understanding. In addition, there are legal challenges to portions of California's LCFS whose implications we need to more fully understand. Finally, the agency wants to engage with the other states that are developing or analyzing an LCFS to ensure our collective understanding of the issues are as complete as possible.

Reducing vehicle miles traveled

The transportation sector is the largest source of GHG emissions in Washington. To address these emissions the Legislature adopted benchmarks for reducing per-capita vehicle miles traveled (VMT).[22] In addition to reducing VMT, transportation sector emissions can also be reduced by:

- Operating the transportation system more efficiently.
- Advancing vehicle technology.
- The use of lower-carbon fuels.

Section 2(a) of Executive Order 09-05 directed WSDOT to analyze VMT in the state and to:

- Estimate current and future statewide levels of VMT.
- Evaluate potential changes to the VMT benchmarks as appropriate to address low- or no-emission vehicles.
- Develop additional strategies to reduce GHG emissions from the transportation sector.

WSDOT worked collaboratively with an Executive Order Working Group to complete this work.[23] Members of the group included representatives from Ecology and Commerce, the state's four largest Regional Transportation Planning Organizations, local government, environmental organizations and businesses. The group guided the work by providing input into the analysis process and discussing its findings.

Updating the state VMT estimate

The statutory VMT benchmark established a business-as-usual VMT baseline of 75 billion for 2020. This baseline was based on the February 2008 VMT forecast, and serves as the basis for the per capita VMT reductions in 2020, 2035, and 2050.

Over the past year WSDOT developed a more accurate method to project statewide VMT based on a combination of economic and population variables.[24] As with all projection methods this new model is most accurate at predicting near-term VMT (within two to four years) and less accurate beyond four years.

---

[22] Codified as RCW 47.01.440

[23] For additional information, see *Governor's Executive Order 09-05 Washington's Leadership on Climate Change Report on 2(a)* in Appendix 5.

[24] For additional information, see http://www.wsdot.wa.gov/NR/rdonlyres/380A1F61-EC09-478D-990C-4AA9B9292AFE/0/VMTForecastWorkGroupSummaryMay2010final.pdf.

According to this new method, WSDOT now projects total statewide VMT in 2020 to be 66 billion, 12 percent lower than the 2008 estimate. WSDOT will update the VMT forecast annually each June. In addition, WSDOT believes that basing a statutory reduction on a forecast, as done by the current benchmarks, is problematic. Forecasts are adjusted annually while the forecasted figure in statute is not.

Changes to VMT benchmarks

If very low-emission or no-emission vehicles become a large share of the vehicle fleet, or low carbon fuels become more prevalent, there may be less need to reduce VMT as part of the state's strategies to reduce emissions from the transportation sector. Ecology, with assistance from WSDOT, assessed the practicality of low-carbon fuels and the feasibility of a Low-carbon Fuel Standard for Washington. WSDOT, Ecology, and Commerce examined the market penetration of alternative vehicles and fuels to complement WSDOT's VMT benchmark analysis.

WSDOT recommends that the VMT benchmarks not be changed at this time to address low- or no-emission vehicles, as their future penetration rate is highly uncertain. In the coming years, the VMT benchmarks may need to be reassessed for numerous reasons including more rapid market penetration of low-emission vehicles than expected, better VMT estimates and data, and/or the implementation of regional or national policies to reduce GHG emissions.

Additional strategies to reduce emissions from the transportation sector

In 2008, the Climate Action Team's Transportation Implementation Working Group and the Land Use and Climate Change Advisory Committee identified a number of transportation and land use strategies to reduce GHG emissions from the transportation sector.[25] Building on this work, WSDOT reviewed national research that identified additional reduction strategies and evaluated their effectiveness in reducing emissions. WSDOT then applied this information in a scenario analysis to evaluate the possible reductions from different combinations of strategies.

WSDOT's analysis suggests that there is no "silver bullet" and major contributions from all available options will be needed to reduce emissions from on-road transportation.

WSDOT's analysis suggests that implementing combinations of aggressive transportation emission reduction strategies can achieve roughly a 10 percent reduction in total statewide GHG emissions compared to the 2050 baseline. Implementing many of these strategies would require changes in policy, funding, and authority, and also assumes ambitious improvements in vehicles and fuels. WSDOT did not assess the political or financial feasibility of implementing the strategies.

WSDOT will continue this work under Section 2(b) of Executive Order 09-05, which directs the agency to take the next steps to apply the information developed over the past year and work with the Puget Sound Regional Council, Spokane Regional Transportation Council, Southwest Washington Regional Transportation Council, and Thurston Regional Planning Council to "cooperatively develop and adopt regional transportation plans that will, when implemented, provide people with additional transportation alternatives and choices, reduce GHG and achieve the statutory benchmarks to reduce annual per capita vehicle miles traveled in those counties with populations greater than 245,000."

[25] For additional details, see final report at http://www.ecy.wa.gov/climatechange/2008CATdocs/IWG/tran/110508_transportation_iwg_final_report.pdf

By December 2011, WSDOT is instructed to report on which of the Regional Transportation Planning Organization have developed, or are developing, plans with GHG strategies; which strategies appear to have the greatest potential to achieve the VMT benchmarks; and what policy or funding issues need to be resolved to ensure implementation.

Transition of Centralia coal plant

The Governor's Executive Order 09-05 directed Ecology to negotiate an agreement with the TransAlta Corporation to apply the state's GHG emission performance standards[26] to its coal-fired power plant near Centralia, WA, by no later than December 31, 2025. The plant is the largest single source of GHG emissions in the state.

Applying the state's emissions standards would require replacing coal with cleaner sources of electrical energy. Reaching an agreement to replace coal would provide certainty of a large reduction in GHG emissions, at less cost than many other reduction alternatives. It would also help ensure a stable regional power grid during the transition, and help maintain local family-wage jobs.

Over the last year, Ecology, in collaboration with other state agencies, developed a proposal to replace the coal plant with a combination of natural gas and renewable energy (likely wind) facilities. The proposal would be implemented in three phases, to begin in 2012 and be completed by 2025. The agreement would require authorization by the Legislature.

The agreement would require market financing to implement, likely to include long-term sales of electrical power during the transition period. The company, with active support from the state, is currently working on ways to finance the agreement, including work with electrical utilities that might be able to help with the transition.

Forestry

The Governor's Executive Order directed Ecology, in consultation with the Department of Natural Resources, to develop recommendations for forestry offset protocols as well as other financial incentives for forestry and forest products.

The 2010 Forest Carbon Workgroup (Workgroup) was created by the Departments of Ecology and Natural Resources to build on the work of the 2008 Forest Sector Carbon Workgroup.[27]

This group included broad representation from large- and small-forest landowners, the environmental community, tribes, and local governments.

The 2010 Workgroup devoted its efforts to three topics: Forest carbon considerations in avoiding forest land use conversion; incentives to reward forest landowners for providing ecosystem services, including carbon storage and improvement of forest health; and features of forest carbon offset protocols and registries that are appropriate for use by forest offset project

[26] Codified as RCW 80.80.040(1).
[27] *Forest Sector Workgroup on Climate Change Mitigation: Final Report (2008)* is available at http://www.ecy.wa.gov/climatechange/2008FAdocs/11241008_forestreportversion2.pdf

developers in Washington State. The 2010 Workgroup reached consensus on some but not all of the recommendations summarized below.[28]

Workgroup consensus recommendations

Transfer of development rights (TDR)
The Workgroup continues to endorse the recommendation of the 2008 Forest Carbon Workgroups related to TDR. In addition to TDR, the Workgroup recommends attention be given to other mechanisms that account appropriately for the value of forest carbon storage and for leakage of development pressure to other areas.

Legislation on TDR and infrastructure financing
In light of the need to incentivize cities to create TDR programs, the Workgroup recommends support for legislative action to link infrastructure financing with TDR.

On-site cluster development
The Workgroup recommends further examination of positive examples of cluster development, including planned unit developments, and ways to improve their conservation outcomes, generation of carbon benefits, and integration of rural character.

Incentives for forest health treatments
The Workgroup recommends further attention be given to analyzing a range of specific forest health incentive funding sources, that public education about the broad public benefits of forest health and fire hazard reduction treatments be strengthened, and that eligibility criteria for treatments and an efficient administrative system be developed.

Payment for ecosystem services (PES)
The Workgroup reached near consensus on general features of a PES system, which recognizes the value of practices above regulatory requirements; employs flexible contract lengths in a tiered system; provides a price premium for *stacking* of multiple services such as carbon storage, water quality, and biodiversity; and streamlines monitoring and verification requirements. Such a system would be separate from a carbon offset credit market system. Prices and specific practices would be set through use of a reverse auction, in which landowners submit bids for acceptable prices for practices to produce specified ecosystem services. The Workgroup further recommends carefully designed surveys of landowners and the general public to gather data used to design and implement a pilot PES project in a real geographic area.

Workgroup non-consensus recommendations

Payment for Ecosystem Services
The Workgroup did not achieve consensus on the minimum level of ecosystem services that would qualify for payments. Some members believe that any increments of ecosystem services beyond that provided by compliance with existing regulations should be eligible for market participation and that the market would determine what gets paid for and how much. Other members believe that a minimum threshold level of service provision is necessary to efficiently

[28] For additional information, see *2010 Forest Carbon Workgroup: Final Report* in Appendix 6.

use scarce conservation financial resources. One member believes that incentive payments should be available for ecosystem services at a level provided by basic compliance with existing regulations.

Forest carbon offset protocol/registry for Washington
In keeping with the intent of E.O. 09-05, a subgroup of the Workgroup was formed to discuss this topic, although one Workgroup member dissented from creation of this subgroup. Midway through its period of work, the full Workgroup discussed whether it should recommend that Washington State participate in a regulatory cap-and-trade program such as the regional Western Climate Initiative (WCI), as a basis for establishing a market for forest carbon offset credits. As a result of lack of agreement evident in that discussion, only the forest landowner representatives subsequently continued the protocol/registry discussion and offered non-consensus recommendations. The Workgroup report includes statements from both the forest landowner caucus and the environmental caucus on the topics of a Washington-specific forest carbon offset protocol and a Washington-specific forest carbon offset registry.

Updating the state energy strategy

In the spring of 2010, the Washington State Legislature passed Engrossed Second Substitute House Bill 2658 (E2SHB 2658), which called for the state to implement a comprehensive energy planning process. The Department of Commerce was directed to lead this effort. The last state energy strategy was adopted in 1993, with the most recent update focusing exclusively on electricity completed in 2003.

Under the legislation, Commerce will develop analytical tools and resources to support an ongoing planning process based on high quality and unbiased analysis. Commerce provided the Legislature with an update and interim recommendations in December 2010, and will complete a full state energy strategy revision by December 2011.[29]

E2SHB 2658 declares that a successful State Energy Strategy must balance three goals:

1. Maintain competitive energy prices that are fair and reasonable for consumers and businesses and support our state's continued economic success.
2. Increase competitiveness by fostering a clean energy economy and jobs through business and workforce development.
3. Meet the state's obligations to reduce greenhouse gas emissions.

The interim recommendations released in December 2010 complement the work of other agencies and build on current state energy policies.[30] These will allow Commerce to act immediately in strengthening and expanding existing efforts. The policy proposals also recognize the state’s current financial situation, which will severely limit the ability of Governor and Legislature to provide any new energy incentives through direct funding or new taxes. The December 2011 full revision will be based on a much more extensive analytical process and will

[29] For additional information, see http://www.commerce.wa.gov/site/1327/default.aspx.
[30] For additional information, see *Energy Strategy Update* in Appendix 7.

feature a fully integrated strategy coordinated among all state agencies and other energy policy stakeholders.

Federal Clean Air Act and EPA

In 2011 Washington will begin regulating some GHG remissions under the federal Clean Air Act as require by the U.S Environmental Protection Agency (EPA). These rules are the initial result of the finding in Massachusetts v. EPA in 2007. In that case, the U.S. Supreme Court found GHGs to be a pollutant under the federal Clean Air Act. The Court directed the EPA to determine if these gases posed a threat to public health and welfare, and further directed that if EPA found such endangerment, it had a duty to regulate them.

In 2009, EPA issued its Endangerment Finding.[31] EPA found that elevated concentrations of the six GHGs in the atmosphere – carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) – endanger both public health and public welfare of current and future generations. It also found that combined emissions of GHG from new motor vehicles and new motor vehicle engines are contributing to GHG buildup in the atmosphere, and thus to climate change.

EPA issued its GHG vehicle tailpipe standards in 2009. The federal Clean Air Act requires regulation of sources that emit a regulated pollutant. Thus, once EPA regulated the emissions of GHGs from mobile sources, the Act required the agency to regulate GHGs from stationary sources as well. EPA's reporting rule does not trigger this requirement because the mere act of reporting levels of emissions does not result in the emission being a "regulated pollutant" under the Act.

EPA laid out a process to phase in regulation of GHG emissions from large stationary sources. In implementing this program Ecology will be able to work with new and remodeled facilities to ensure that the Best Available Control Technology for GHGs is installed at these facilities, help to reduce future GHG emissions from some large sources.

EPA amended its Prevention of Significant Deterioration (PSD) program to include greenhouse gases in 2009. This permitting program applies to new and modified major sources that are located in areas that meet air quality standards. At the same time, the agency issued its Tailoring Rule to "tailor" the emission thresholds that trigger stationary source permitting to better fit GHGs. For other air pollutants, the thresholds that trigger coverage under the PSD program are 100 and 250 tons per year. EPA recognized that these thresholds were far too low for greenhouse gases. The tailoring rule increases the threshold for coverage under the PSD program to 75,000 and 100,000 tons per year. PSD permitting applies to new and modified sources only.

The tailoring rule also amends the Title V Air Operating Permit Program. Beginning in 2011, sources already required to obtain a Title V permit (i.e., newly constructed or existing major sources for a pollutant other than GHGs) must include its GHG gas emissions when applying for, revising, or renewing its Title V permit[32].
The rule phases permitting requirements in three steps:

[31] For additional information, see http://www.epa.gov/climatechange/endangerment.html.
[32] Title V permits are designed to improve compliance by clarifying all of the permit holder's legal requirements.

Step 1 (January 2, 2011 – June 30, 2011)
In the first six months of the program, EPA will only require GHG regulation at sources that are already subject to the PSD permitting program because of emissions of pollutants other than GHGs.

Projects that will increase GHG emissions by 75,000 tons CO_2e per year more of total GHGs will need to determine the Best Available Control Technology (BACT) for their GHG emissions. EPA recently released guidance for states on implementing this program.[33]

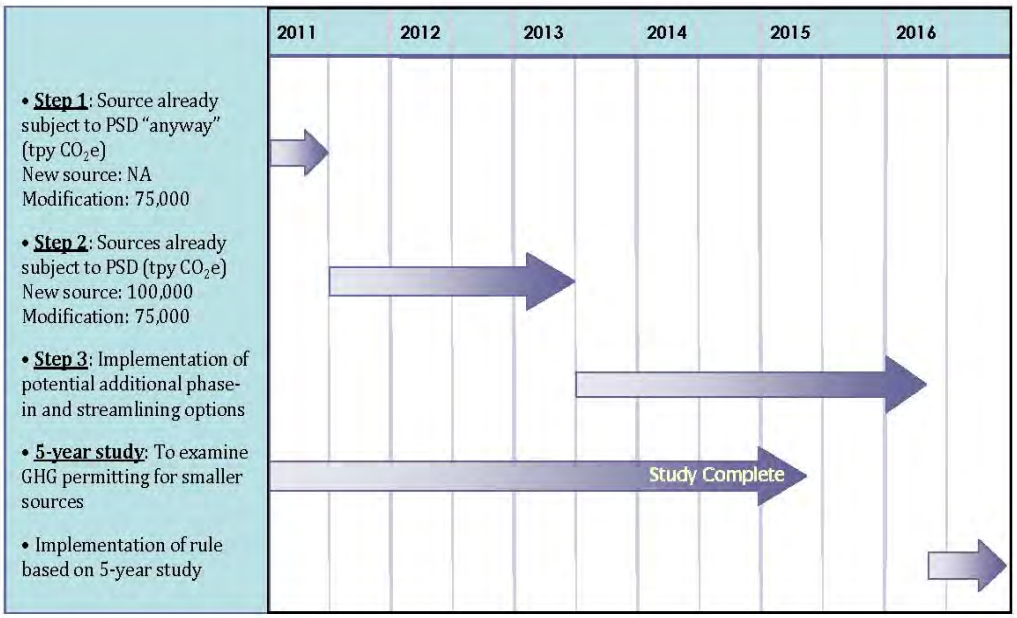


Figure 4: Permitting timeline under the EPA Tailoring rule (courtesy of EPA).

Step 2 (July 1, 2011 – June 30, 2013)
In Step 2, PSD permitting requirements will cover new construction projects that emit GHG emissions of at least 100,000 tons CO_2e each year or more – even if they do not exceed the permitting thresholds for any other pollutant. Modifications at existing facilities that increase annual GHG emissions by at least 75,000 tons CO_2e will also be subject to permitting requirements, even if they do not significantly increase emissions of any other pollutant.

Step 2 will also include coverage under the Title V operating permit requirements. Sources that emit, or have the potential to emit, at least 100,000 tons CO_2e per year will be subject to Title V permitting requirements.

Step 3 will consist of a study of smaller sources to examine appropriate GHG permitting of additional sources.

Ecology is in the process of amending air quality rules to reflect all of these federal requirements.
Chapter 173-400 WAC (General Regulations for Air Pollution Sources) has been revised to include the Prevention of Significant Deterioration requirements. These revisions will take effect

[33] For additional information, see http://www.epa.gov/nsr/ghgpermitting.html.

on January 1, 2011. Chapter 173-401 WAC (Operating Permit Regulation) is being amended to capture the Title V requirements. Ecology anticipates adopting revisions to both of these rules by the end of 2010.

Alternative transportation fuels

Washington renewable fuel standard

As explained in the section of this report on the low carbon fuel standard, biodiesel and ethanol are both low carbon fuels. However, even if Washington were to adopt an LCFS, the majority of GHG emissions reductions would not take place until after 2020, as the LCFS phases in slowly over a ten-year period. In the meantime, Washington already has a Renewable Fuel Standard (RFS) requirement that biodiesel must represent at least 2 percent of annual diesel fuel sales in the state.[34] Unfortunately, the RFS is not functional and sales of biodiesel currently account for less than 1 percent of all diesel fuel sold.

The biodiesel requirement applies to total diesel sold in the state, with no requirement for any individual company to comply. This has made the RFS unenforceable. As a first step toward realizing the GHG emissions reduction benefits of biofuels, we recommend changing the state RFS so each gallon of diesel fuel sold in Washington must contain at least 2 percent biodiesel. This small change would make the RFS enforceable, and ensure diesel sold in Washington contains the minimum renewable fuel content envisioned by the Legislature when it amended the Motor Fuel Quality Act in 2006.

Getting ready for electric vehicles

Automakers plan to begin large-scale sales of electric vehicles and Plug-in Hybrid Electric Vehicle (PHEVs) Washington in late 2010. The all-electric Nissan Leaf debuted in Puget Sound and other select U.S. markets in December. The PHEV Chevy Volt is expected in early 2011. To get Washington ready for electric vehicle deployment, the state is actively working to develop and build the necessary infrastructure. The state is also working to foster the right regulatory environment to speed the transition to electric vehicles. Ongoing work includes:

- Between 1,500 and 2,000 charging stations for electric will be built around the Puget Sound region over the next two years. Installation of both public and private vehicle charging stations is being funded by a series of federal grants totaling more than $22 million.
- The Washington State Department of Transportation (WSDOT) is using an American Recovery and Reinvestment Act grant to install eight to ten fast-charging stations along the Interstate 5 corridor as part of the West Coast Green Highway Initiative.[35] When completed, these stations will allow someone to drive Interstate-5 (I-5) the length of Washington in an electric vehicle. Washington will be the first state on the West Coast to fully electrify I-5. WSDOT is also planning to expand the program on Interstate 90, over the Cascade Mountains to Ellensburg.
- The Washington Utilities and Transportation Commission (UTC) is reviewing the regulatory environment for commercial and private electric vehicle charging stations.

[34] Motor Fuel Qualify Act, Codified as RCW 19.112.
[35] For additional information, see http://westcoastgreenhighway.com/.

The UTC will recommend legislation to clarify that it will not regulate such charging stations as utilities and will continue its examination of the regulatory issues raised by at-home charging as the PHEV market grows.

Utilities and Transportation Commission

Promoting conservation

The Utilities and Transportation Commission (UTC) recently conducted an inquiry on regulatory mechanisms to encourage electric and gas utilities to meet or exceed their conservation targets.[36] Specifically, the UTC examined whether to adopt policies, such as decoupling mechanisms,[37] to address declines in utility revenue due to conservation. The UTC held a series of work sessions and reviewed extensive, detailed comments submitted by a variety of stakeholders including investor-owned utilities, consumer and environmental advocates, and state agency representatives. The UTC issued a statement on November 4, 2010, articulating its policy on the following options:

1. **Limited decoupling** would allow a gas utility to recover the "lost margin" attributable to its conservation efforts, both programmatic and educational.
2. **Full decoupling** would allow a utility to recover revenue declines from any cause, including conservation and the effects of weather. In addition, in the case of higher sales volumes, this "found margin" would be returned to ratepayers.
3. **Direct incentive mechanisms**, such as those authorized by the Washington Energy Independence Act for use by the UTC, could reward a utility for acquiring cost-effective conservation in excess of its conservation target or for meeting the target earlier than required by law.

UTC endorses limited decoupling for regulated gas utilities. It will consider authorizing proposals for this mechanism in situations where gas use by a utility's customers drops over time from the expected use determined by the UTC when setting rates. Authorization will be conditioned upon the utility's achievement toward its conservation target. The UTC's policy statement outlines the requisite elements to be included in a rate case filing proposing a limited decoupling mechanism.

The UTC will consider full decoupling mechanisms for electric and gas utilities, and, like limited decoupling proposals, approval will be conditioned upon achievement of utilities' conservation targets. The requirement for a utility to file a general rate case when requesting a full decoupling mechanism and other criteria for approval for this type of mechanism are also set forth in the UTC's policy statement.

Finally, the UTC articulated its policy that an electric utility proposing a direct incentive mechanism must do so in conjunction with its biennial filing required by the Energy Independence Act in which the utility sets its conservation target.[38] For a utility providing both electric and gas service, proposals for incentives for gas should be filed at the same time as those

[36] For additional information, see *UTC Policy Statement* in Appendix 8.
[37] Utility revenues are conventionally tied to sales volumes. Decoupling is generally defined as a mechanism to reduce a utility's disincentive to encourage conservation by breaking the link between energy sales and revenue.
[38] Codified as RCW 19.285.040.

for electricity. For gas-only utilities, incentives should be proposed in a request for a general rate case.

Achieving renewable portfolio standards

The UTC also undertook an inquiry in 2010 into the regulatory treatment of utility acquisitions of renewable energy resources. This work is currently ongoing. Like the inquiry on conservation incentives, the inquiry on renewable resources included two work sessions, and elicited extensive comments from investor-owned utilities, consumer advocates, state government, and environmental advocates. The UTC is examining the following issues as part of this inquiry:

1. The progress of investor-owned utilities in meeting the renewable portfolio standards (RPS).[39]
2. Whether the existing statutory and regulatory frameworks impede compliance with RPS requirements.
3. Whether the statutory and regulatory frameworks should encourage acquisition of renewable resources in excess of that required by the RPS.
4. Whether the UTC should consider adopting rules or new regulatory practices that would provide incentives for utilities and customers to acquire renewable resources.
5. Whether the UTC should propose any legislative changes relative to incentives for acquisition of renewable resources by utilities and customers.

Based upon the information and stakeholder perspectives resulting from the inquiry process, the UTC will decide what further steps, such as proposing legislation, might be appropriate to encourage regulated utilities to meet the RPS requirements, while protecting the interests of ratepayers.

Reducing state government GHG emissions

In 2009, the Washington Legislature recognized that state government should lead by example in reducing GHG emissions and promoting deployment of cleaner, more efficient energy technologies. The State Agency Climate Leadership Act was enacted by the Legislature and signed into law by Governor Gregoire.[40] This act requires all administrative, legislative, and judicial agencies, boards and commissions, colleges, and universities to reduce their GHG emissions to similar levels as the state's statutory emissions limits.

- 15 percent below 2005 levels by 2020.
- 36 percent below 2005 by 2035.
- 57.5 percent below 2005 by 2050.

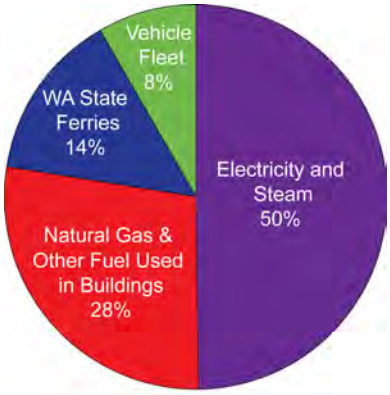
Governor Gregoire has further challenged state agencies to go beyond our statutory limits and become carbon neutral by 2020. Carbon neutrality means there are no net carbon emissions. In essence, state agencies will reduce our emissions as much as possible. Then any remaining

[39] Codified as RCW 19.285.
[40] Codified as RCW 70.235.050 and RCW 70.235.060.

emissions would be reduced to zero through projects outside of state government operations that will reduce emissions by an equal amount.

Figure 5: 2009 Washington State Agency Greenhouse Gas Emissions by Sector.

State agency carbon footprint



With help from Ecology, state agencies estimated and reported their GHG emissions for 2005, 2008 and 2009, projected their emissions through 2035, and reported on actions already taken to reduce GHG emissions.[41]

In 2008, Washington State government operations account for approximately 1.2 percent of total statewide emissions, or 1.2 million metric tons CO_2e. GHG emissions from state government operations increased 4 percent in the past few years from 1.19 million metric tons CO_2e in 2005 to 1.24 million metric tons CO_2e in 2009.

Together, the five largest emitters – Departments of Transportation, Corrections, and Social and Health Services, along with the University of Washington and Washington State University – account for approximately 68 percent of total state government emissions.

The main source of GHG emissions from state government is from electricity and natural gas consumed to power and heat buildings (Figure 5). The next largest source is diesel used in the Washington State ferry system and gasoline and diesel consumed in vehicles and equipment owned by the state. Together these account for 22 percent of state government emissions. WSDOT is the largest emitter in state government, with a majority of its emissions from the state ferry system.

Business travel (including air and business travel in employee-owned vehicles) and employee commuting were reported for 2009, but are not included in the total emissions reported here, because overall, agencies have limited data from which to calculate these emissions. Based on our 2009 numbers, business travel and commuting increased total 2009 emissions by 17 percent to 1.45 million metric tons CO_2e. We are exploring options for improving these data in the future.

[41] For additional information, see *Pathway to Reducing Greenhouse Gas Emissions, Washington State Government* in Appendix 9.

Agencies have taken action to conserve energy, improve energy efficiency, and deploy clean energy technologies, leading to significant savings in utility and fuel costs. Here are a few examples:

- Washington State is ranked #3 nationally among all public sector fleets (and #1 among state fleets) for the number of hybrid vehicles in the Motor Pool. Fifty-four percent of the Motor pool vehicles are hybrids, or 958 out of 1,760 vehicles.
- Twenty state facilities have Leadership in Energy and Environmental Design (LEED) certification from the U.S. Green Building Council. Seventy-three projects are pursuing LEED certification.
- State agencies have reduced air travel significantly and have reduced travel through investments in video-conferencing, teleconferencing, and web conferencing.
- State agencies are making progress in reducing drive-alone commute trips and vehicle miles traveled. From 2007 to 2009, the drive alone rate declined 3.1 percent and vehicle miles traveled per employee dropped 3.3 percent at state agency worksites that participate in the Commute Trip Reduction program.
- Several agencies generate renewable energy onsite or purchase green power or renewable energy credits through their utility or a third-party provider.
- State agencies have taken action to reduce their environmental impact through recycling, composting, resource conservation, and environmentally preferred purchasing.

Agencies have also taken action to conserve water, implement stormwater best management practices, and reduce GHG emissions from wastewater treatment.
Starting in early 2011, agencies will begin working on developing a strategy to meet the reduction targets. The strategies are due to Ecology by June 30, 2011. Agencies will track their progress in meeting the reduction targets and will each year submit GHG inventories and a list of actions taken to reduce GHG emissions. Every two years, Ecology will report to the Governor and the Legislature the total GHG emissions from state government operations and the progress in reducing emissions.

Carbon smart

In December 2009, following her trip to the United Nations climate summit in Copenhagen, Governor Gregoire challenged Ecology to lead state government toward carbon neutrality. As the first agency to consider how to be carbon neutral, Ecology can develop business practices and strategies to help all state agencies and the public reduce emissions.[42] Ecology named this project Carbon Smart, because the agency strives to become smarter in how we use energy and conduct our business to reach this ambitious goal.

In 2009, Ecology's activities produced 6,201 metric tons CO_2e from our vehicle fleet and the electricity and natural gas used in our buildings. Overall, Ecology's GHG emissions increased between 2005 and 2008, before decreasing slightly in 2009. Business travel by Ecology employees and commuting to and from work add another 3,173 metric tons CO_2e to Ecology's inventory.

[42] For additional information, see www.ecy.wa.gov/carbonsmart.

After calculating our emissions, Ecology examined the many actions to reduce emissions already launched, and strategies Ecology already planned to implement that will reduce emissions. We reported these to the Governor in January and June 2010.

Seventy-five percent of Ecology's emissions come from electricity and natural gas or other fuel used in our buildings. To address our largest source of emissions, we contracted with McKinstry to conduct a thorough energy audit of all Ecology's owned buildings, as well as a sample of buildings we lease around the state.

McKinstry identified 65 actions to reduce emissions in the three buildings Ecology owns. If fully implemented, these individual actions will reduce Ecology's emissions to zero. Of these recommendations, we plan to immediately implement the 17 most cost-effective projects. These projects will reduce Ecology GHG emissions by 8 percent each year and save the taxpayers more than $100,000 annually in energy costs. Changes include:

- Lacey building: Reworking lighting systems; upgrading heating and ventilation systems; replacing paper towel dispensers with high-efficiency hand dryers; and installing more efficient plumbing fixtures.
- Padilla Bay: Improving lighting, building system controls and weatherization.
- Spokane building (Eastern Regional Office): Upgrading heating, air and temperature systems.

Ecology is still evaluating the cost-effectiveness of the other actions identified by McKinstry and will implement other projects that make sense over the next few years.

In addition to auditing and managing energy use in our buildings, Ecology is engaging our employees to reduce our collective GHG emissions. At work, we are providing tools and information for staff to take action at their desk, around the office, or when traveling. We then plan to communicate our successes and failure to other agencies as we all work to be carbon neutral.

The first of these, *Carbon Smart @ Work*, was designed to lower work-related carbon footprint activities – at the desk, in the building and as part of the job commute. The second program, *Low Carbon Diet @ Home*, encouraged interested Ecology staff to take the extra step of further reducing their carbon footprints through daily lifestyle and household changes. Both programs provide staff information about how their everyday choices impact climate change, and connect them with tools and resources.

In the first year, 370 Ecology staff participated in an online pledge to reduce their individual carbon footprints at work. Twelve teams of employees – 82 staff members in all – took the extra step of reducing their carbon footprints at home. These efforts provide an easy-to-use template for other public agencies or other employers to use in engaging employees in voluntary actions to reduce their individual and household carbon footprints.

Providing national leadership

Western Climate Initiative

State and provincial climate action plans and programs continue to pave the way for cost-effective reductions of GHGs across the United States and Canada. Working together, the states and provinces of the Western Climate Initiative (WCI) have achieved a unique consensus, forging a comprehensive approach to address climate change and spur investment in clean-energy technologies that create green jobs and enhance our energy independence.

Washington was a founding member of the WCI, along with Oregon, California, Arizona, and New Mexico. The WCI has grown to include Utah, Montana, British Columbia, Manitoba, Ontario, and Quebec.

The Governors and Premiers who created WCI recognized that because GHGs are emitted from a wide variety of sources, they are best reduced through a range of strategies and interrelated policies. In a Memorandum of Understanding (MOU) issued in February 2007, these leaders agreed to establish a regional GHG reduction goal and directed their staff to develop the design for a regional market-based system.[43] The MOU also directed the state and provinces to:

- Develop clean and renewable energy
- Use energy as efficiently as possible
- Prepare for the impacts of a changing climate
- Work with Congress and federal agencies in the development of national policies that address the unique issues of the WCI jurisdictions.

In September 2008, WCI issued its initial design for an economy-wide cap-and-trade program. The detailed design was issued in July 2010. California along with Provinces of British Columbia, Ontario and Quebec are in the process of developing their individual state or provincial rules to implement the program starting in 2012.

In addition to the emissions trading program, WCI is working on a portfolio of climate action to advance the transition to a low-carbon economy and prepare for the impacts of climate change. This work will emphasize collaborative partnerships with private, public, and non-profit organizations. New and existing WCI participants will help develop and ultimately implement regional strategies that best suit their needs, which may or may not include the regional emissions trading program.

[43] For additional information, see http://www.westernclimateinitiative.org.

IV. Adapting to the Impacts of Climate Change

Overview

Due to increased concentrations of GHGs already accumulated in the atmosphere, Washington faces certain impacts to our forests, agriculture, snowpack, rivers, coastal waters, and other natural resources that are vital for our economy and environment. The extent and duration of these impacts will largely be determined by our collective success in reducing future emissions of GHGs.

Ecology, along with other state agencies, has already started planning for the unavoidable consequences of a changing climate. Many of these challenges the state will face are similar to those we have been wrestling with for decades – water supply and quality, ecosystem health, air quality, and shoreline and habitat protection and restoration. But the rate and severity of the changes we are likely to witness in the coming years will be unlike anything Washingtonians have ever experienced.

In February 2009, the Climate Impacts Group (CIG) at the University of Washington released a comprehensive assessment of the predicted climate change impacts on Washington.[44] We face threats from rising sea levels that threaten to inundate Washington's most populous cities located on the shores of Puget Sound. Rising sea levels will also affect ports that do brisk trade with countries overseas, and coastal infrastructure that provide essential services, such as water treatment plants and coastal highways.

We also expect less precipitation to fall as snow, reducing our total snowpack and changing the timing of stream-flow in many rivers around the state. These changes will likely impact water supplies for agriculture, people, and fish (especially salmon). Water shortages, extreme weather, and flooding events are also predicted to be more frequent and severe in the future.

The area burned by forest fires in the region may double or triple. Mountain pine beetle outbreaks may reach higher elevations and pine trees will be more vulnerable as forests become drier and hotter. Climate change is also likely to have serious and long-term consequences for public health and security. As summer temperatures increase and our population grows, Washington can expect more heat-related related deaths annually.

Together, all of the adverse effects of climate change will impact Washington's economy. A 2009 report by the University of Oregon states that without additional actions to reduce GHG emissions, the severity and duration of the impacts due to climate change will be profound and will negatively affect nearly every part of Washington's economy. It could cost each household in Washington an average of $1,250 each year by 2020.[45]

In recognition of Washington's vulnerability to climate change impacts, Executive Orders 07-02 and 09-05 and the State Agency Climate Leadership Act directed Ecology and several other agencies to develop a state response strategy.[46] The strategy will allow the state to prepare for

[44] For additional information, see http://cses.washington.edu/db/pdf/wacciaexecsummary638.pdf.
[45] For additional information, see http://www.ecy.wa.gov/climatechange/economic_impacts.htm.
[46] Codified as RCW 43.21M.

and adapt to the unavoidable impacts of climate change. Specifically, Executive Order 09-05 directed Ecology to focus on the risks of rising sea levels and risks to water supplies.

Developing an integrated climate change response strategy

The Departments of Ecology, Agriculture, Commerce, Fish and Wildlife, Natural Resources, and Transportation are charged with developing an integrated climate change response strategy. The Department of Health was invited to participate in the effort.

The purpose of the response strategy is to better allow state and local agencies, public and private businesses, nongovernmental organizations (NGOs), and individuals to prepare for, address, and adapt to the impacts of climate change.

In developing the response strategy, the six state agencies are consulting with a wide range of public and private stakeholders and experts.[47] Four stakeholder advisory groups have been formed to focus on the following topics:

- Built environment, infrastructure and communities.
- Human health and security.
- Ecosystems, species and habitats.
- Natural resources (working lands and waters).

For each topic, the advisory groups are identifying:

- Impacts of projected changes in temperature, snowpack, precipitation, sea-level rise, and other climate variables on humans, ecosystems, and the economy.
- Key vulnerabilities and risks to plan for.
- Barriers to adaptation and how to overcome these challenges.
- Policy recommendations and strategies (responding to short-term, mid-term, and long-term impacts events), prioritization criteria, and selection rationale.
- Benefits and co-benefits of strategies.
- Opportunities to integrate climate science and projected impacts into planning and decision making.
- Several other key areas, such as opportunities for institutional partnerships, improved understanding and knowledge about climate change impacts, building adaptive capacity, responsible implementers of the strategies, and ability to engage the public and communicate risks and opportunities.

The final climate change response strategy will integrate the work of advisory groups and prioritize the recommended strategies. It will also identify resources needs, additional research and monitoring, and highlight ways to effectively increase public awareness of climate change.

[47] For additional information, see http://www.ecy.wa.gov/climatechange/2010TAG.htm.

The report will outline a process to assist state agencies with incorporating adaptation actions in planning, and policy design. The initial strategy is due in December 2011.

Leading regional efforts to prepare for a changing climate

The state has also been coordinating with regional partners in the Pacific Northwest to increase our resources and knowledge on climate change impacts and adaptation.

- Washington, Oregon, and California are co-sponsoring a study by the National Academy of Sciences to evaluate major contributors to sea-level rise along the West Coast; provide values or range of values of sea-level rise for the years 2030, 2050, and 2100; and summarize what is known about whether restoring the coast and coastal habitats works to increase resilience of communities and ecosystems along the west coast.
- Under the West Coast Governors' Agreement on Ocean Health, signed by the Governors of Washington, Oregon, and California, the three states will develop a West Coast-wide assessment of shoreline changes and expected impacts to coastal areas and communities. They will also recommend actions to adapt to climate change and related coastal hazards. (Washington chairs the climate change coordination group of the West Coast Governors' Agreement on Ocean Health).
- Washington and British Columbia have been sharing data and research on sea-level rise, coastal impacts, and hydrologic and water resources impacts.
- Washington Department of Transportation is partnering with the Federal Highway Administration in piloting approaches to conduct climate change vulnerability and risks assessments of transportation infrastructure.
- The Western Governors Association is working with its member states to advance climate adaptation planning and practices through engaging stakeholders and identifying policy options, tools, and best practices.

V. Appendices

The following appendices to this report are available online at this location, www.ecy.wa.gov/climatechange/2010CompPlan.htm:

- Appendix 1. *Washington State Greenhouse Gas Emissions Inventory 1990-2008.* www.ecy.wa.gov/biblio/1002046.html
- Appendix 2. *Washington Policies to Reduce Greenhouse Gas Emissions.* www.ecy.wa.gov/climatechange/docs/ccp_appendix2.pdf
- Appendix 3. *Washington Greenhouse Gas Emissions Projection 2009-2035.* www.ecy.wa.gov/climatechange/docs/ccp_appendix3.pdf
- Appendix 4. *Issues and Option for Benchmarking Industrial Greenhouse Gas Emissions.* www.ecy.wa.gov/climatechange/docs/Benchmarking_White_Paper_Final.pdf
- Appendix 5. *Governor's Executive Order 09-05 Washington's Leadership on Climate Change Report on 2(a)* http://www.wsdot.wa.gov/NR/rdonlyres/7CE0134C-9E0F-41DC-BE5F-0363D046245B/0/04Appendixc.pdf
- Appendix 6. Forest Sector Workgroup on Climate Change Mitigation Final Report. http://www.ecy.wa.gov/biblio/1110006.html
- Appendix 7. *Energy Strategy Update and 2011 Biennial Report with Indicators.* www.commerce.wa.gov/DesktopModules/CTEDPublications/CTEDPublicationsView.aspx?tabID=0&ItemID=9107&MId=863&wversion=Staging
- Appendix 8. *In the Matter of the Utilities and Transportation Commission Investigation into Energy Conservation Incentives.* http://www.wutc.wa.gov/rms2.nsf/177d98baa5918c7388256a550064a61e/43eb29bd6e98d0e8882577d1007fea20!OpenDocument
- Appendix 9. *Reducing Greenhouse Gas Emissions, Washington State Government*. www.ecy.wa.gov/biblio/1001007.html