Snohomish County
Sustainable Climate & Energy Initiative

Greenhouse Gas Emissions Inventory and Forecast

April 28, 2008

Acknowledgements

This report was compiled by the Snohomish County Climate Change Committee. The authors would like to thank the following people for assistance with data collection and analysis:

Contributing Snohomish County Departments:

Executive Office
Planning & Development Services
Public Works – Transportation and Environmental Services Division
Public Works – Fleet Management Division
Public Works – Solid Waste Division
Facilities Management
Parks and Recreation
Snohomish County Airport – Paine Field

ICLEI:

Alex Ramel, Program Officer
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Contributing Agencies:

Snohomish Public Utility District
Puget Sound Energy
Cascade Natural Gas
Puget Sound Regional Council
Washington Department of Ecology
Washington Department of Transportation
Waste Management
Allied Waste Services
Rubatino Waste Disposal

Snohomish County Greenhouse Gas Emissions Inventory and Forecast

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Executive Summary

In Executive Order 07-48, the County Executive set an initial greenhouse gas reduction goal of 20% below 2000 levels by the year 2020. Per this Executive Order, the county has conducted an inventory of greenhouse gas emissions and a forecast of future emissions to create a baseline for reaching the Executive's greenhouse gas reduction target. The county will use the baseline and a forecast to identify a set of policies and actions that achieve the reduction target. Identifying these policies and actions will be a focus of county work in 2008, in coordination with the Snohomish County Green Ribbon Climate Task Force.

As a member of *ICLEI-Local Governments for Sustainability* (formerly the *International Council for Local Environmental Initiatives*), the county gained access to the organization's established methodology common to other Washington and US jurisdictions. Consistent with the ICLEI methodology, the County has performed two assessments, a "Community Analysis" focused on countywide emissions, and a "Government Analysis" focused on county government operations.

Each assessment calculated emissions for the year 2000 and forecasted emissions for the year 2020 under a "business as usual" approach. Each assessment also includes an emissions calculation for an interim year to identify the recent trend in the county's emissions. An interim year of 2005 was chosen for the Community Analysis, and 2006 was chosen for the Government Analysis.

Key Findings:

INVENTORY: In 2000, Snohomish County emitted approximately 5.5 million metric tons of greenhouse gases. Government operations constituted 25,666 metric tons, or 0.5% of those emissions.

2005/2006 STATUS: Interim analyses in 2005 and 2006 indicate that countywide emissions are dropping, largely due to cleaner electricity fuel sources from the Snohomish County Public Utility District (PUD). Snohomish County emitted approximately 4.8 million metric tones of greenhouse gases in 2005. While emissions decreased in these years, energy consumption rose.

FORECAST: Applying projected growth rates in population, employment, and number of households to 2005 emissions provides a forecasted "business-as-usual" growth scenario showing 2020 countywide emissions at 6.4 million metric tons.

Figure (1): Snohomish County Emissions Summary

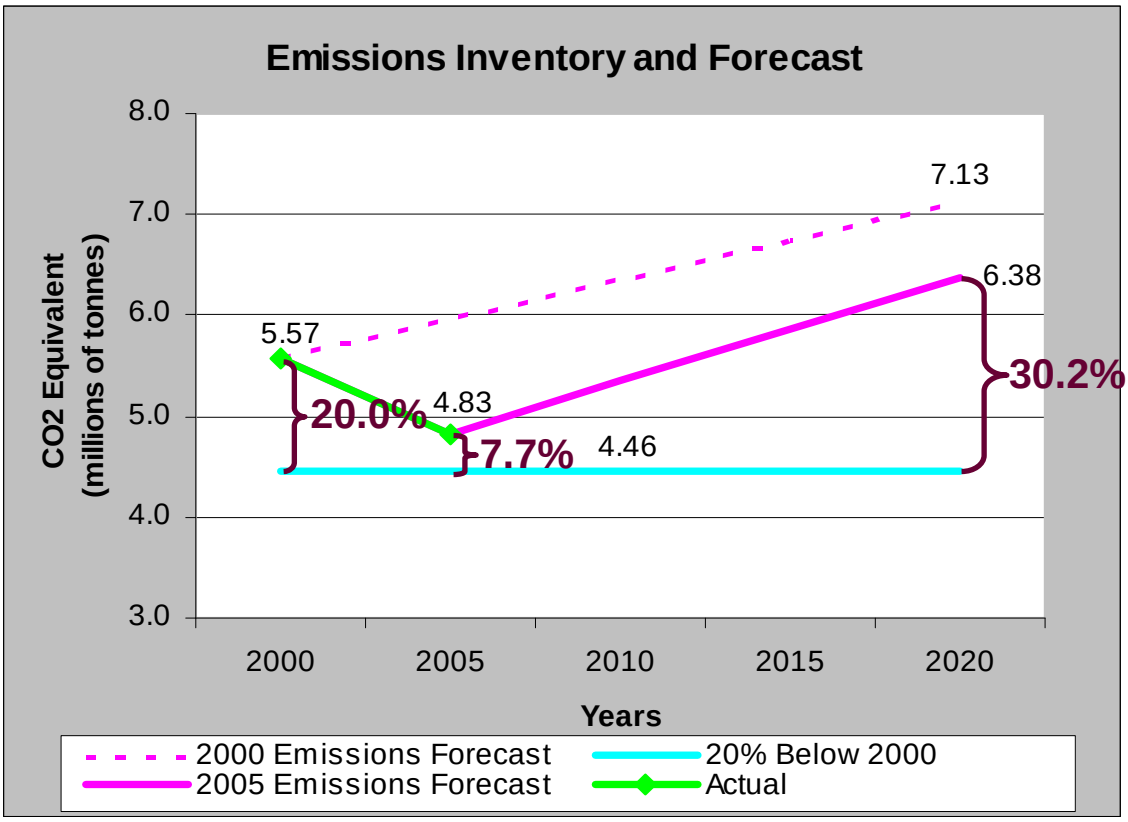

Figure (1) charts the results of the base year (2000) inventory, interim year (2005) inventory, and 2020 forecast to show progress to date in improving our practices, compared to the business-as-usual approach utilized in the forecast. Data from 2000 was used to derive a target reduction line of 20% below 2000 emissions levels (blue line in Figure (1)). Data from 2005 was used to forecast a "business-as-usual" scenario of emissions for the year 2020 (solid pink line in Figure (1)). The phrase business-as-usual indicates the growth in emissions that would occur if current consumption rates were multiplied by growth estimates for population, employment, and number of households. This calculation indicates that a 20% reduction in 2000 emissions is equal to a 30.2% reduction in projected 2020 emissions.

I. Introduction

Background

Snohomish County's mission is to enhance the quality of life for present and future generations. Climate change and its projected impacts on weather, water resources, and ecosystems create a new threat to our quality of life. Growing evidence indicates that global warming and associated climate change is occurring, and has very likely been influenced by human activity related to fossil fuel use and land use changes.[1] A recent report from the University of Washington projects local impacts to include a sea level rise of at least three inches in the Puget Sound by 2050 to be among climate change impacts felt locally.[2] A detailed introduction to climate change science is included in Appendix A. Leaders from the international scale down to the local government level are responding to this evidence. To protect the health and livelihood of citizens, the economy, and our natural resources, Snohomish County will do its part to reduce greenhouse gas emissions and ensure our preparedness to manage the local effects of climate change.

Snohomish County does not act alone in this objective. These actions are in step with state, regional, and other local government actions. By acting in concert with neighboring jurisdictions and other regional partners, we can make a strong impact and present a model of cooperation worth emulating nationwide. Examples of regional efforts include:

At the state level, Executive Order 07-02 and RCW 80.80.020 adopt a series of targets for state greenhouse gas reductions, with an ultimate target of reducing emissions to 50% below 1990 levels by 2050. Governor Gregoire has engaged Washington stakeholders, including Snohomish County, in a Climate Advisory Team tasked with reducing climate pollution, identifying measures to prepare for and adapt to climate change, developing clean energy jobs, and moving toward energy independence.

The University of Washington Climate Impacts Group (CIG) focuses on local climate impacts to the Pacific Northwest, and works with local policy makers to increase the region's resilience to address those impacts.

Puget Sound Regional Council's draft multicounty planning policies, Vision 2040, include a goal and five policies focused on reducing "production of harmful elements that contribute to climate change."[3] Adoption of these policies is anticipated in April 2008.

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[1] United Nations Intergovernmental Panel on Climate Change - IPCC (2007). "Climate Change 2007: The Physical Science Basis. Summary for Policy Makers," http://www.ipcc.ch/SPM2feb07.pdf

[2] University of Washington Climate Impacts Group (2008). "Sea Level Rise in the Coastal Waters of Washington State," http://www.cses.washington.edu/db/pdf/moteetalslr579.pdf

[3] Puget Sound Regional Council (2007). "Draft Vision 2040: People-Prosperity-Planet," http://psrc.org/projects/vision/pubs/draftV2040/mpp_environment.pdf

ICLEI – Local Governments for Sustainability (formerly the *International Council for Local Environmental Initiatives*) works with numerous local governments in Washington to implement climate protection plans. Whatcom, Snohomish, and King Counties are engaged in climate planning under ICLEI's established methodology, as are numerous cities in Washington. Within Snohomish County, the cities of Edmonds, Everett, and Lynnwood are currently working toward climate protection plans.

ICLEI has been working with local governments to reduce greenhouse gas (GHG) emissions, improve air quality, and enhance urban sustainability since 1993. They use the following Five Milestone framework to help local governments reduce emissions.

Milestone 1: Conduct a baseline emissions inventory and forecast;
Milestone 2: Adopt an emissions reduction target;
Milestone 3: Develop a Climate Action Plan for reducing emissions;
Milestone 4: Implement policies and reduction measures; and
Milestone 5: Monitor and verify results.

Snohomish County Climate Initiative

In July 2007, Snohomish County joined ICLEI and embarked on an initiative to plan for climate change following the Five Milestone framework. This document reports the county's progress to date, including a baseline emissions inventory and forecast identified in Milestone 1, and relating that information to the county's adopted emissions reduction target in Milestone 2. The county will use this information to develop emissions reduction strategies in a Climate Action Plan, as defined in Milestone 3, and will continue to work on implementation and monitoring thereafter.

As a first step in Snohomish County's Climate Change Initiative, Snohomish County Executive Aaron Reardon issued Executive Order 07-48 Regarding Climate Change and Sustainability on July 20, 2007. The Order lays out a framework for the county's climate change initiative by:

Establishing an initial goal to reduce community greenhouse gas emissions to 20% below year 2000 levels by the year 2020;
Announcing the county's membership in ICLEI and an intent to follow ICLEI's established framework for reducing greenhouse gas emissions;
Announcing the formation of a Green Ribbon Climate Task Force to develop recommendations in 2008 that meet the county's goals for greenhouse gas reduction and adaptation to climate change impacts; and
Establishing and directing a County Staff Climate Change Committee to recommend an inventory and baseline of greenhouse gas emissions for the year 2000, recommend a climate action plan, implement emission reduction measures, policies, and practices as directed by the Executive, monitor and verify results, and recommend changes to the action plan based on monitoring results.

Baseline Inventory and Forecast

This document contains a baseline emissions inventory and forecast in response to Action 4.3.1(a) of Executive Order 07-48. The emissions inventory calculates GHG emissions by major sources to help quantify reduction targets and help prioritize reduction strategies. The inventory follows the established ICLEI methodology, and emissions were calculated using ICLEI's Clean Air and Climate Protection (CACP) software. A detailed methodology is included in Section II.

II. Assessment Methods

ICLEI's methodology allows local governments to systematically estimate and track greenhouse gas (GHG) emissions from energy- and waste-related activities at the community-wide scale and from government operations. Once completed, these inventories provide the basis for creating an emissions forecast, and enable the quantification of emissions reductions associated with implemented and proposed measures.

1. CACP Software and Inventory Method

The Clean Air and Climate Protection (CACP) software package has been used by over 350 U.S. cities and counties to calculate their GHG emissions, including several local governments in Washington. Although the software provides Snohomish County with a useful tool, calculating emissions with precision is difficult. The model depends upon numerous assumptions, and is limited by the quantity and quality of available data. The specific numbers generated by the model are approximations, rather than exact values. Despite the limitations of the data, the software holds tremendous value in allowing the county to generate comparable reports over time, showing a trend in county emissions.

The software estimates emissions from energy consumption and waste generation within a community using inputs of total fuel and waste consumed. It determines emissions using specific factors (or coefficients) according to the type of fuel used. Emissions are aggregated and reported in terms of equivalent carbon dioxide units, or CO_2e. Converting all emissions to equivalent carbon dioxide units allows for the consideration of different greenhouse gases in comparable terms. For example, methane is twenty-one times more powerful than carbon dioxide in its capacity to trap heat, so the model converts one unit of methane emissions to 21 units of CO_2e. Greenhouse gas emissions are reported in metric tons, or tonnes, as it is the most common standard of measuring greenhouse gas emissions, and is useful to adopt in this report for purposes of comparison. A metric ton is slightly larger than the short ton: 1.1 metric tons equals 1 short ton.

The emissions coefficients and methodology employed by the software are consistent with national and international inventory standards established by the Intergovernmental Panel on Climate Change (1996 Revised IPCC Guidelines for the Preparation of National Inventories) and the U.S. Voluntary GHG Reporting Guidelines (EIA Form 1605).

The inventory is composed of two assessments, analyzed independently: a Community Analysis and a Government Analysis. The Community Analysis explores emissions sources within the Snohomish County limits. Both incorporated and unincorporated county land is included. The Government Analysis includes only those sources that are under the operational control of Snohomish County government. Snohomish County has developed Community and Government Analyses based on the year 2000 (baseline year). In addition, the county conducted interim inventories to track recent trends. The year 2005 is inventoried for the Community Analysis and 2006 is inventoried for the Government Analysis.

The Community and Government Analyses are not cumulative. The Government Analysis is a subset of the Community Analysis. These two categories are explored independently for several reasons. The Community Analysis explores general sectors of emissions (residential, transportation, etc.), while a more detailed analysis is possible in the Government Analysis (energy use by facility, for example). Additionally, when considering where emissions reductions are possible, there will be a different set of options for county-owned facilities than for private sector emissions.

Each of these categories is further broken down by sources and sectors. Sources are the fuel or energy that is the basis of the emissions. In this inventory, the main sources considered are electricity, natural gas, diesel, gasoline, and waste. Sectors are the portion of the community or government operations to which the emissions are attributable. In the Community Analysis the sectors considered are residential buildings, commercial buildings, industrial buildings, transportation, and waste. Emissions related to land clearing, maritime activities, and air transportation are not included. In Government Analysis the sectors considered are buildings, vehicle fleet, employee commute, streetlights, traffic signals, and waste[4].

The Community Analysis includes calculations of energy *consumed* in Snohomish County. For example, even if the electricity used by residents is produced elsewhere, this energy and its associated emissions appear in the inventory. The decision to calculate emissions in this manner reflects the general philosophy that a community should take full ownership of the impacts associated with its energy consumption, regardless of whether the generation occurs within the geographical limits of the community. For the same reasons, when calculating the county's community emissions inventory, all municipal solid waste generated in the county was included, though it is landfilled outside the county.

2. Inventory Sources and Creation Process

The creation of an emissions inventory required the collection of information from a variety of sectors and sources. For the Community Analysis, the main sources of data were the Snohomish County Public Utility District (PUD), Puget Sound Energy, Cascade Natural Gas, Puget Sound Regional Council, the Washington Department of Ecology, and the Snohomish County Public Works - Solid Waste Division. For the Government Analysis, the primary data sources were the Snohomish County PUD, Puget Sound Energy, Cascade Natural Gas, Snohomish County Public Works – Fleet Management Division, Allied Waste, Waste Management, Rubatino Refuse Removal, Washington Department of Transportation, and Snohomish County Public Works - Transportation and Environmental Services Division.

The waste sector of both the analyses requires additional explanation. The emissions inventory related to solid waste management represents only the emissions that result

[4] Jurisdictions that serve as water and/or sewer purveyors also calculate water/sewage emissions. Because Snohomish County does not perform these functions, emissions in this sector of the inventory are zero.

from the generation of methane and carbon dioxide from landfilled organic matter, including paper, food waste, plant material, wood, and certain textiles. When these materials decompose deep in a landfill where there is little oxygen, methane (CH_4) is created, which traps more than twenty times as much heat as carbon dioxide when it enters the atmosphere.

The vast majority of Snohomish County's municipal solid waste (96% in 2005) is sent to Roosevelt Regional Landfill in Klickitat County. At this landfill, methane gas is trapped and burned to generate electricity, which in the process produces the less powerful CO_2 . ICLEI advisors recommended calculating the effectiveness of methane capture at Roosevelt Regional Landfill at 80%, though the actual percentage could be higher or lower.

It is important to note that the Community Analysis does not include the upstream emissions associated the production of goods that are consumed and disposed of in Snohomish County. The upstream greenhouse gas impacts of production, such as mining and manufacturing, are much larger than emissions from disposal activities and can be mitigated in part through waste prevention and recycling strategies. Strategies that address upstream reductions will be evaluated subsequent to this inventory.

III. Inventory Results

1. Overall Inventory Results:

Snohomish County conducted a baseline emissions inventory for the year 2000 for both the Community and Government Analyses. Additionally, an interim year of 2005 was selected for the Community Analysis, and 2006 was chosen for an interim Government Analysis.

Table (1) : Summary of Snohomish County Emissions

Snohomish County Emissions – Base Year and Interim Year Emissions Summary		
	Community Analysis (2000, 2005)	**Government Analysis (2000, 2006)**
Base Year: 2000 CO_2e emissions (metric tons)	5,573,395	25,666
Interim Years: 2005, 2006 CO_2e emissions (metric tons)	4,828,739	31,867

Source: CACP Model Output

2. Community Emissions Inventory:

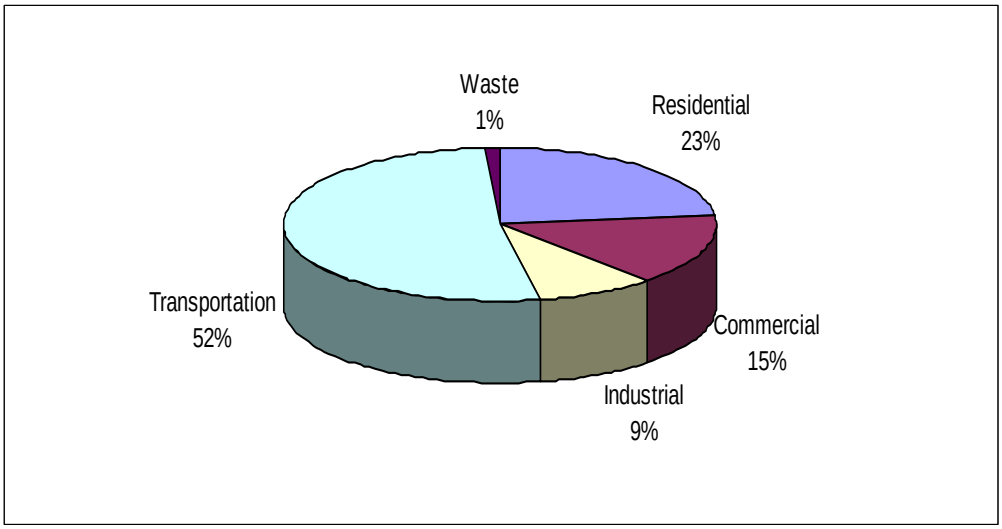
In the year 2000, the Snohomish County community emitted approximately 5,573,395 metric tons (tonnes) of carbon dioxide equivalents (CO_2e). By 2005, emissions had decreased to 4,828,739 metric tons. Table (2) and Figures (2) and (3) below show the breakdown of emissions by sector.

Table (2): 2000 and 2005 Community Emissions by Sector

Sector	**2000 Equiv CO_2 (metric tons)**	**2005 Equiv CO_2 (metric tons)**	**% Change**
Total Residential	1,305,902	873,744	-33.1
Total Commercial	817,466	528,188	-35.4
Total Industrial	500,363	319,978	-36.1
Total Transportation	2,887,605	3,045,956	5.5
Waste	62,059	60,873	-1.9
All Sectors	5,573,395	4,828,739	-13.4

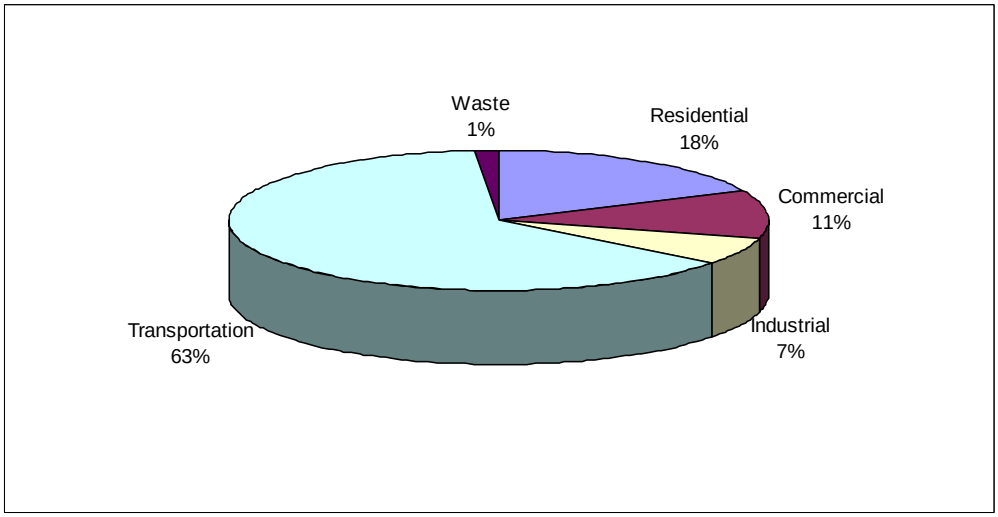
Source: CACP Model Output

Figure (2): Community Greenhouse Gas Emissions by Sector - Year 2000



Source: CACP Model output

Figure (3): Community Greenhouse Gas Emissions by Sector - Year 2005



Source: CACP Model output

Energy/Stationary Source Emissions

Stationary emissions sources include the electricity and natural gas used in residential, commercial (including institutional), and industrial buildings. When combined, these three sectors of the county's building stock account for 47% of the community's 2000 emissions. Approximately 34% of the emissions are from natural gas, and 66% are from electricity.

In 2005, stationary emissions sources comprised 36% of the community's emissions. Emissions from residential, commercial, and industrial buildings decreased by 34% between 2000 and 2005. This reduction is largely due to changes in the fuel mix from

which electricity is generated. In 2000, approximately 22% of the Snohomish County Public Utility District's (PUD's) fuel mix consisted of coal. By 2005, the PUD's fuel mix included only about 8% coal, and the PUD has increasing moved toward cleaner fuels such as hydroelectric power. Hydroelectric power expanded from 64% to 76% of the fuel mix between 2000 and 2005.

The difference in emissions between different fuel mixes is demonstrated in Figure (4). The chart shows that electricity *emissions* decreased by 53.5% countywide, while electricity *use* decreased by 3.4%. The change in the PUD's fuel mix accounts for the differing trends between emissions and energy outputs.

Figure (4): Comparison of Changes in Emissions and Energy

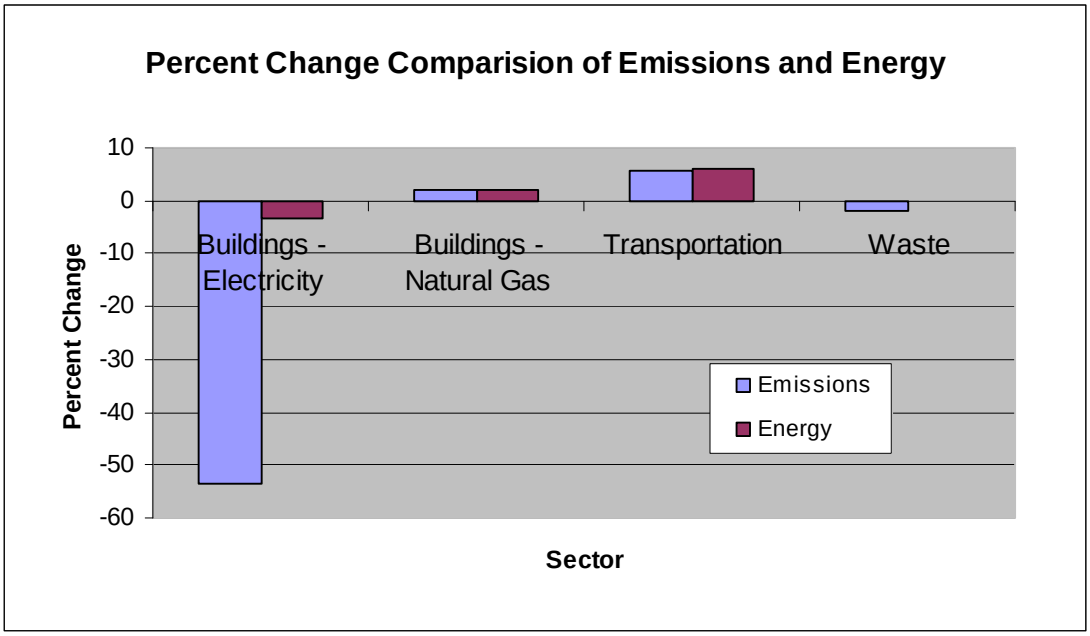


Figure (4) compare the percent of change in community emissions compared to the percent change in energy use between 2000 and 2005. Changes to the electricity fuel mix account for a significant reduction in the emissions associated with the Snohomish County PUD's electricity, although electricity consumption dropped only slightly.

Transportation Emissions

Transportation emissions include a calculation of vehicle miles traveled (VMT), as modeled by the Puget Sound Regional Council. Emissions from other motorized transportation systems, such as rail systems, marine transportation and air travel systems, are not included in the analysis. To account for differences in fuel types and fuel efficiencies, national data on the proportion of a variety of vehicle types and their fuels was factored into the CACP model. With this information, the model included as assumption that 93% of vehicle miles traveled were running on gasoline, and 7% were running on diesel.

Vehicle miles traveled form the single largest source of measured emissions in the Community Analysis. Puget Sound Regional Council estimates annual countywide vehicle miles traveled at 4.63 billion in 2000, and 5.11 billion in 2005[5]. This translates to about 52% of the community's greenhouse gas emissions in 2000, and 63% of the community's emissions in 2005. The decreasing emissions from the electricity sector between 2000 and 2005, discussed above, resulted in a greater percentage of 2005 emissions being attributed to the transportation sector. Note that while the transportation sector gained ten percentage points in its proportion of total emissions, transportation emissions themselves rose by only 5.5%. Per capita transportation emissions, shown in Table (4), decreased slightly by 4.2 percent.

Solid Waste Emissions

Emissions from the landfill disposal of solid waste make up about 1.1% of Snohomish County's community emissions. Waste emissions and per capita waste emissions did not significantly change between 2000 and 2005. For a variety of reasons, including lack of characterization data, only municipal solid waste[6] and wood waste were included in this analysis. Snohomish County sends the vast majority (about 96%) of its municipal solid waste to Roosevelt Regional Landfill in Klickitat County, Washington. Solid waste emissions from landfilling organic matter resulted 62,059 metric tons of greenhouse gas emissions in 2000, and 60,873 metric tons in 2005. The exact emissions depend on the type of organic matter being disposed, and the rate at which it decomposes. Waste composition data for both 2000 and 2005 analyses were drawn from a 1998 Snohomish County study. Waste composition studies have been conducted about once per decade in Snohomish County, and the most recent available data is from 1998. This data will be updated following a waste composition study that will be completed in early 2009.

In addition to waste composition, emissions also depend on the landfill's methane recovery factor. A portion of the methane created from the decomposition of organic waste inevitably escapes a landfill. A landfill's methane recovery factor is the percent of that methane that is flared, or burned to create electricity and is released as carbon dioxide instead of methane (methane is a greenhouse gas over twenty times more potent in the atmosphere than carbon dioxide). A methane recovery factor of 80% was estimated for the Roosevelt Regional Landfill. The actual recovery factor could be more or less under various circumstances.

[5] Puget Sound Regional Council's transportation model results were not available for 2005. Data from 2006 was substitute.

[6] Municipal Solid Waste is commonly known as garbage and consists of mixed everyday items such as product packaging, grass cuttings, furniture, clothing, bottles, food scraps, newspapers, appliances, and construction and demolition debris disposed by households and businesses through typical non-harzardous waste disposal processes, such as through Snohomish County's solid waste and recycling transfer stations.

Table (3): 2000-2005 Emissions Comparison Relative to Indicators

Sector	2000 Equiv CO_2 Emitted (metric tons)	2005 Equiv CO_2 Emitted (metric tons)	% Change
Residential Emissions (per household)	5.8	3.6	-37.9
Commercial Emissions (per establishment)	73.3	47.4	-35.3
Industrial Emissions (per establishment)	307.3	196.5	-36.1
Transportation Emissions (per capita)	4.8	4.6	-4.2
Waste Emissions (per capita)	0.1	0.1	0.0
Total - All Sectors (per capita)	**9.2**	**7.4**	**-19.8**

Source: CACP Model Output

3. Government Emissions Inventory

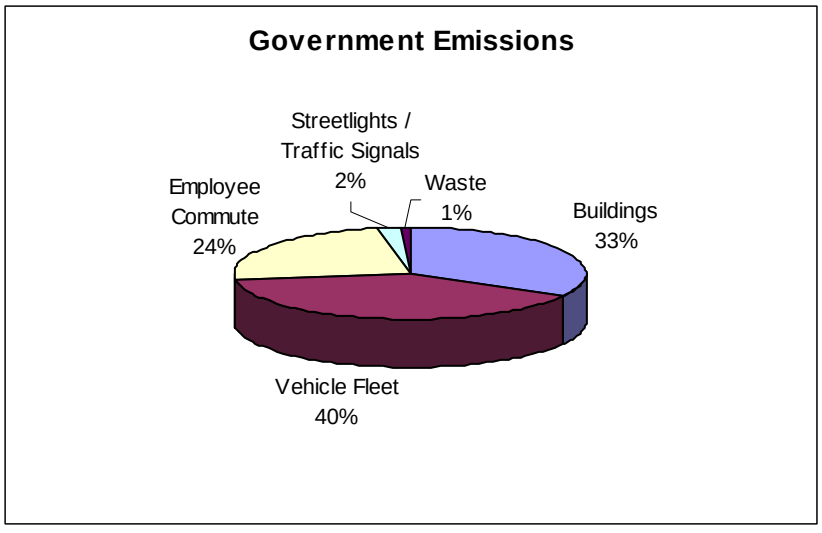
In 2000, Snohomish County's operations generated 25,666 metric tons of CO_2e. Table (5) and Figures (5) and (6) show the breakdown of government emissions by source. Government emissions in Snohomish County constituted about 0.5% of the county's total greenhouse gas emissions in 2000. As a minor contributor to countywide emissions, actions to reduce government emissions may have a limited impact on Snohomish County's community emission levels. However, government action has symbolic value and demonstrates leadership that extends beyond the magnitude of emissions reduced.

Table (4): Comparison between and Government Emissions by Sector

Sector	2000 Equiv CO_2 Emitted (metric tons)	2006 Equiv CO_2 Emitted (metric tons)	% Change
Total Buildings	8,563	7,678	-10.3
Total Vehicle Fleet	10,153	15,953	57.1
Streetlights & Traffic Signals	558	274	-50.9
Employee Commute	6,193	7,707	24.4
Waste	200	254	27.0
All Sectors	25,666	31,867	24.2

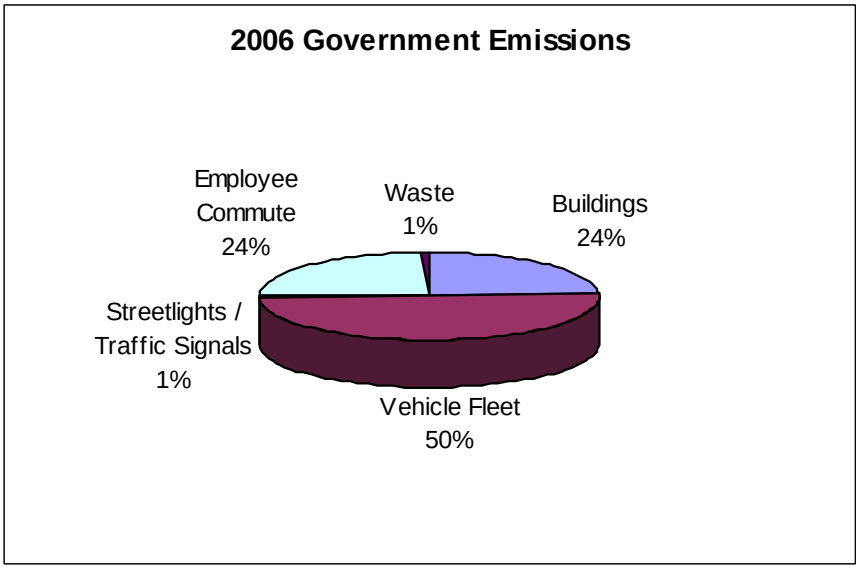
Source: CACP Model Output

Figure (5): Snohomish County Government Greenhouse Gas Emissions – Year 2000



Source: CACP Model output

Figure (6): 2006 Government Emissions



Source: CACP Model

Energy/Stationary Source Emissions

The Government Analysis considers electricity and natural gas inputs to county owned and operated buildings, streetlights, and traffic signals. Buildings comprised about one-third of the government emissions in 2000. Streetlights and traffic signals were a smaller source of emissions: the county's 1,085 streetlights emitted 285 metric tons of emissions, and 62 traffic signals emitted 273 metric tons of emissions.

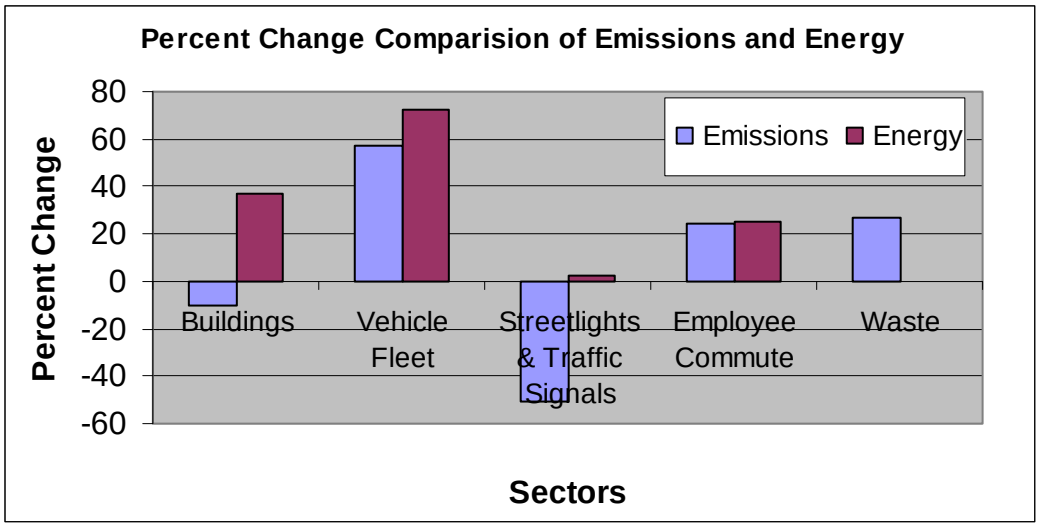
In the case of electricity, actual data on kilowatt hours were not available for the year 2000, and were estimated based on payments made to the Snohomish County PUD and electricity rates in 2000. Appendix B includes tables of the thirty largest electricity accounts and the thirty largest natural gas accounts in the county. The largest electricity account includes both the Snohomish County Courthouse and Mission Building on the main county campus, and consumed 5.6 million kilowatt hours of electricity in 2000, and emitted 1,519 metric tons of carbon dioxide equivalents. County campus buildings also made up four of the five largest natural gas accounts.

The sharp reduction in electricity-related emissions that was observed in the Community Analysis between 2000 and 2005 is repeated in the Government Analysis. As the PUD has increasingly turned to cleaner sources of fuel, the greenhouse gas emissions associated with their electricity diminish. Figure (7) compares changes in electricity *consumption* with electricity *emissions* to demonstrate the influence of the electricity source fuels on the greenhouse gas impacts of the electricity. In buildings, energy use increased by 37%, while emissions actually dropped by 10%.

The trend toward higher energy use with lower emissions also appears in the streetlights and traffic signals sector, to a lesser degree. Cleaner electricity fuel sources from the

PUD are compounded with a conversion to light-emitting diode (LED) technology in traffic signals. In 2000, the county operated 62 traffic signals that consumed 3,465 MMBtus of energy and generated 273 metric tons of carbon dioxide equivalents. By 2006, the county had switched all traffic signals to LED lighting. The traffic signal count grew to 82 in 2006, but they consumed only 2,981 MMBtus of energy due to the increased energy efficiency of the lighting. The signals generated 113 metric tons of CO2E. The streetlights and traffic signals sector in total showed slight increases in energy use and slight decreases in emissions.

Figure (7): Comparison of Percent Changes in Emissions and Energy, 2000-2006



Transportation / Vehicle Emissions

Considering vehicle emissions from both employee commute methods and county fleets, county transportation and vehicle emissions made up 64% of county government emissions in 2000 and 74% of the emissions in 2006. The increased proportion of the pie dedicated to transportation and vehicle emissions is due to both increasing transportation-related emissions and to the decreased emissions from the buildings sector of the analysis. On-the-job use of the county's vehicle fleet is the single largest source of government emissions, at 40% of the 2000 inventory, and 50% of the 2006 inventory. Construction equipment accounts for about 10% of the county's vehicle fleet emissions.

Solid Waste Emissions

As in the Community Analysis, the waste-related emissions in the Government Analysis include only those attributed to methane and carbon dioxide escape from decomposing material in landfills. Upstream production and transportation emissions are not included in the waste sector, and would increase emissions attributed to solid waste.

Because data on actual waste collected was not available, the model used estimates waste quantities based on the size of the waste containers, assuming the containers were full.

Further, there is greater confidence in the completeness of 2005 data than there is with 2000 data. County record retention schedules do not reach back to the year 2000, and may have resulted in a lack of complete information. With these and other assumptions,[7] calculations indicate an estimated 200 metric tons of waste-related greenhouse gases were emitted from Snohomish County facilities in 2000, and an estimated 254 metric tons were emitted in 2006. These emissions were based on estimates that 992 short tons[8] of waste were collected from Snohomish County facilities in 2000, and 1,263 short tons of waste were collected in 2006.

Two of the largest waste sources are county parks – Kayak Point Park and Flowing Lake Park. Waste from these parks is largely generated by park users, rather than by county employees. Data shows that emissions per full-time employee (FTE), rose 16% between 2000 and 2006.[9] This sharp rise may be due in part to data availability.

Table (5): Emissions Comparisons Relative to Indicators

Sector	2000 Equiv CO_2 (metric tons)	2006 Equiv CO_2 (metric tons)	% Change
Buildings Emissions (per 1000 ft^2)	3.00	1.89	-36.9
Vehicle Fleet Emissions (per FTE)	3.88	5.61	44.4
Streetlight & Traffic Signal Emissions (per light/signal)	0.50	0.20	-60.0
Waste Emissions (per FTE)	0.08	0.09	16.7
Employee Commute (per FTE)	2.37	2.71	14.4

Source: CACP Model Output

[7] Additional assumptions in calculating solid waste disposal include: (1) Rabanco/Allied Waste amounts were unavailable in 2000, so account data from 2006 was applied for those accounts that existed in 2000; and (2) to determine Waste Management cost, averages derived from Allied and Rubatino accounts were applied.

[8] Measures of waste collected are reported in short tons (equal to 2,000 pounds), while greenhouse gas emissions are measured in metric tons, or tonnes (equal to about 2,205 pounds).

[9] An employee count for 2000 was unavailable. A full-time employee count from 2002 was substituted.

IV. Forecast for Greenhouse Gas Emissions

Based on the community and government emissions inventories developed for Snohomish County for 2000, the next step was to forecast future emissions generated in the county. Conducting an emissions forecast is essential for meeting the county's emissions reduction target, since the amount of GHG emissions Snohomish County has pledged to reduce will be derived from projected emissions. The emissions forecast in Table (8) represents a business-as-usual prediction of how greenhouse gas (GHG) emissions could grow over time.

Emissions were forecasted for the year 2020, as it is the target year identified in the county's community emissions reduction target. The forecast is projected from the year 2005, rather than from the base year of 2000 to portray a more realistic picture of the business-as-usual scenario. Using growth projections from Snohomish County Planning and Development Services, forecasted emissions in the Community Analysis are based on projected population growth rates, employment growth rates, and growth in the projected number of households.

In the Government Analysis, the CACP model replicates 2000 emissions as a 2020 forecast without applying a growth factor. Government operations typically do not grow commensurate with community growth. While some growth has occurred in government operations in recent years, the county recognizes that trend may not continue into the future. As cities continue to annex urban land, the county will increasingly manage rural areas and could see diminished service areas. Due to the uncertainty of this trend, the county accepted the CACP model's default forecast indicating no change to the size of county operations.

The following section discusses the implications of this forecast in relation to the county's adopted emissions reduction target.

Table (6): Snohomish County Emissions Summary

Snohomish County Emissions Summary		
	Community Analysis	**Government Analysis**
Base Year 2000		
CO_2e Emissions in 2000 (metric tons)	5,573,395	25,666
Forecast Year 2020		
Business-as-usual projection of CO_2e emissions in 2020 (metric tons)	6,384,787	25,666

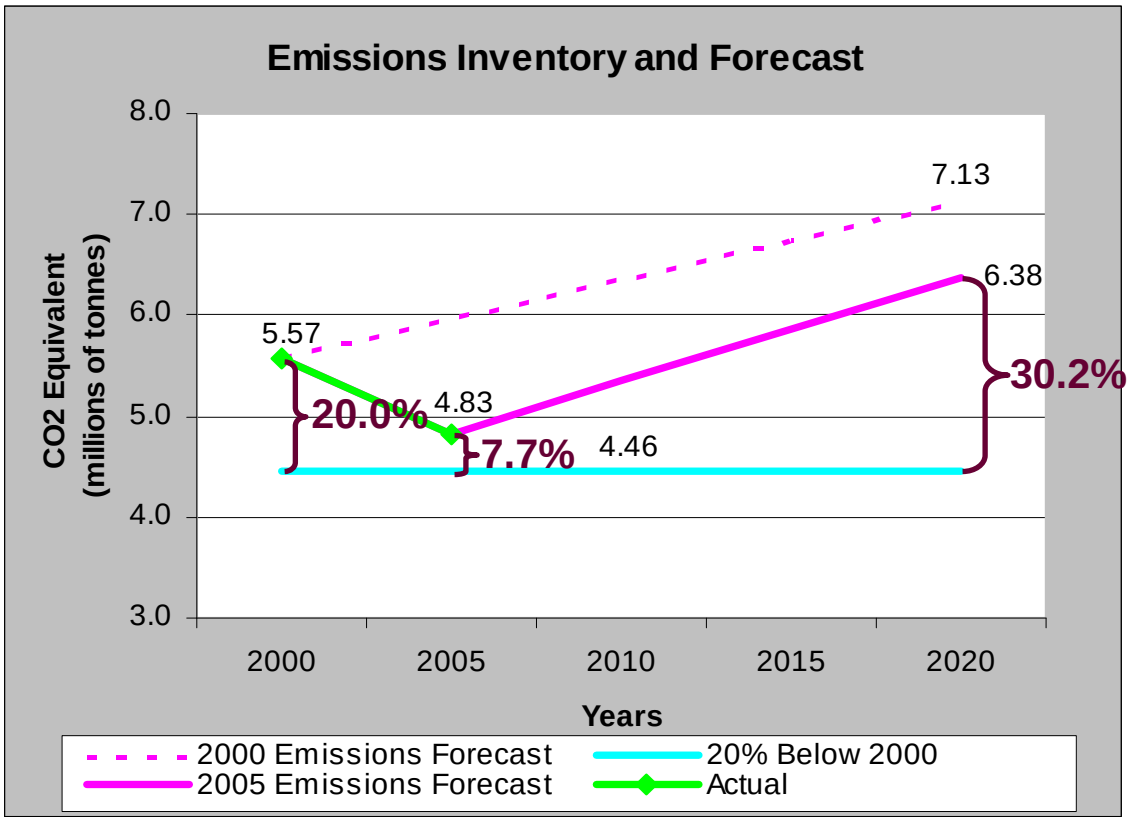
Source CACP Model Output

V. Greenhouse Gas Emissions Reduction Target

Snohomish County adopted an initial goal of reducing community greenhouse gas emissions by 20% below 2000 levels by the year 2020. Information from the preceding inventory and forecast shows that the county has made substantial progress toward this goal between 2000 and 2005, but there is still more work to be done. Figure (8) charts the results of the base year inventory, interim year inventory, and 2020 forecast to show progress to date in improving our practices, compared to the business-as-usual approach utilized in the forecast. Data from 2000 was used to derive a target reduction line of 20% below 2000 emissions levels. Data from 2005 was used to forecast a "business-as-usual" scenario of emissions for the year 2020, as 2005 data represents a more realistic starting point for analysis than 2000. The phrase business-as-usual indicates the growth in emissions that would occur if current consumption rates were multiplied by growth estimates for population, employment, and number of households. This calculation indicates that a 20% reduction in 2000 emissions equates to a 31.3% reduction in projected 2020 emissions.

As of 2005, county emissions were 7.7% above the 2020 target, indicating the county has already improved over the business-as-usual approach. As mentioned earlier, this is due in large part to the Snohomish County PUD's investment in cleaner sources of fuel. While the overall trend is toward decreasing emissions, it is important to recognize that population growth, vehicle miles traveled, and waste production continue to rise. In order to maintain these gains and ensure county emissions continue to decrease, additional measures must be put in place.

Figure (8) : Snohomish County Emissions Summary



VI. Conclusion

Executive Order 07-48 and this inventory of community and government emissions are early steps toward reducing Snohomish County's impact on climate change. This report will be updated periodically to continually gauge progress toward achieving the county's emissions reduction goals, and the information provided within this report will guide the dedication of resources toward reducing emissions. Meeting reduction targets will depend both on the actions of individual residents and on policies or regulations implemented at the city and county levels.

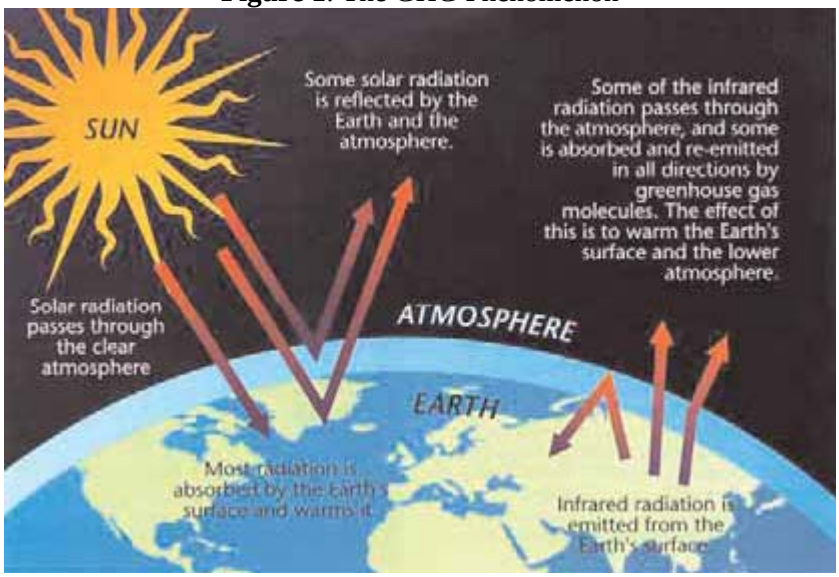
Next Steps

Snohomish County will work with a public stakeholder group, the Green Ribbon Climate Task Force, through 2008 to identify feasible actions the county can undertake to meet its 2020 reduction target. The recommended action items that result from this work will be formulated into an action plan in 2009 and implemented thereafter. The county will continue to periodically inventory emissions and track progress in reducing greenhouse gas emissions in the future.

Appendix A:
Introduction to Climate Change Science

The Earth's atmosphere is naturally composed of a number of gases that act like the glass panes of a greenhouse, retaining heat to keep the temperature of the Earth stable and hospitable for life at an average temperature of 60ºF. Carbon dioxide (CO_2) is the most prolific of these gases. Other contributing gases include methane (CH_4), nitrous oxide (NO_2), ozone (0_3), and halocarbons. Without the natural warming effect of these gases the Earth's surface temperature would be too cold to support life (Figure 1).

Figure 1: The GHG Phenomenon



Source: US Environmental Protection Agency

While the existence of GHG in the atmosphere is necessary for life on Earth, human beings are changing the proportions of these gases in the atmosphere, most significantly by adding CO_2 from the burning of fossil fuels. Atmospheric CO_2 concentrations have increased from between 270-280 parts per million (ppm) in pre-industrial times to more than 380 ppm today.[10] If current emissions levels continue, the atmospheric CO_2 concentration is projected to reach 730-1020 ppm by 2100. The current atmospheric concentration of carbon dioxide exceeds by far the natural range over the last 650,000 years (180 to 300 ppm) as determined from ice core measurements.[11]

[10] United Nations Intergovernmental Panel on Climate Change - IPCC (2007) "Climate Change 2007: The Physical Science Basis. Summary for Policy Makers" http://www.ipcc.ch/SPM2feb07.pdf

[11] United Nations Intergovernmental Panel on Climate Change - IPCC (2007) "Global Climate Projections. In: Climate Change 2007: The Physical Science Basis"
http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Pub_Ch10.pdf

What is the IPCC?

The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP) to establish a scientific consensus on the issue of global warming. The IPCC does not conduct research, but provides a process for climate experts from the world's leading universities and government institutions to synthesize the most recent scientific findings every five to seven years. The IPCC has issued comprehensive assessments for political leaders in 1990, 1996, 2001 and 2007.

The Fourth Assessment Report (AR4) was released in February of 2007 and represents the most comprehensive synthesis of climate change science to date. Experts from more than 130 countries have contributed to this assessment over a six year period. More than 450 lead authors have received input from more than 800 contributing authors, and an additional 2,500 experts peer-reviewed the draft documents.

Source: About the IPCC - http://www.ipcc.ch/about/faq.htm

Over this same geologic time period, methane concentrations have increased from 715 parts per billion (ppb) to more than 1774 ppb, and nitrous oxide, (N_2O) concentrations have increased by 270 ppb to 319 ppb.[12] In addition to these naturally occurring gasses, humans have introduced synthetic gasses with heat-trapping capacity into the atmosphere, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Though relatively low in concentration, these gasses are of particular concern because they have a heat trapping capacity between 1,500 and 22,000 times stronger than CO_2.[13]

Elevated concentrations of GHG in the atmosphere have had a destabilizing effect on the global climate, fueling the phenomenon commonly referred to as global warming. **The 2007 United Nations Intergovernmental Panel on Climate Change (IPCC) report states that "warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures."[14]** The IPCC is referring to the 1.3°F increase in surface temperature over the last century.[15] These increases in global temperature have accelerated recently, with 11 of the 12 warmest years on record occurring between 1995 and 2006.[16]

The climate and the atmosphere will not necessarily react in a linear fashion to increased GHG. That is to say that you cannot simply predict that for each ton of carbon dioxide emitted the Earth will warm a certain amount. The Earth's climate has a number of feedback loops and tipping points that scientists fear will accelerate global warming beyond the rate at which it is currently occurring. For example, as CO_2 emissions have increased in recent human history, the oceans and terrestrial ecosystems have been absorbing a significant portion of these gases. With continued warming, scientists anticipate a decrease in the ability of oceans and terrestrial ecosystems to absorb GHG, causing anthropogenic CO_2 emissions to have a more substantial impact on global

[12] United Nations Intergovernmental Panel on Climate Change - IPCC (2007). "Climate Change 2007: The Physical Science Basis. Summary for Policy Makers," http://www.ipcc.ch/SPM2feb07.pdf
[13] United Nations Intergovernmental Panel on Climate Change - IPCC (2001). "Third Assessment Report. Climate Change 2001: The Scientific Basis," http://www.ipcc.ch/pub/wg1TARtechsum.pdf
[14] United Nations Intergovernmental Panel on Climate Change - IPCC (2007). "Climate Change 2007: The Physical Science Basis. Summary for Policy Makers," http://www.ipcc.ch/SPM2feb07.pdf
[15] Ibid
[16] Ibid

climate.[17] Another example of a compounding effect can be found in the polar ice caps. Ice is highly reflective and acts like a giant mirror, reflecting the sun's rays back into space. As the planet warms and some of this ice melts, a darker land or ocean surface is revealed. This darker surface will tend to absorb more heat, accelerating the speed at which the planet warms with each ton of GHG emitted.

Findings and Projections from the 2007 IPCC Report:

"Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level."

"Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values."

"The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land-use change, while those of methane and nitrous oxide are primarily due to agriculture."

"The observed widespread warming of the atmosphere and ocean, together with ice mass loss, support the conclusion that it is *extremely unlikely* that global climate change of the past fifty years can be explained without external forcing [including anthropogenic sources], and *very likely* that it is not due to known natural causes alone."

Source: IPCC WGI Fourth Assessment Report Summary for Policy Makers

B. Effects & Impacts of Climate Change

Global Impacts

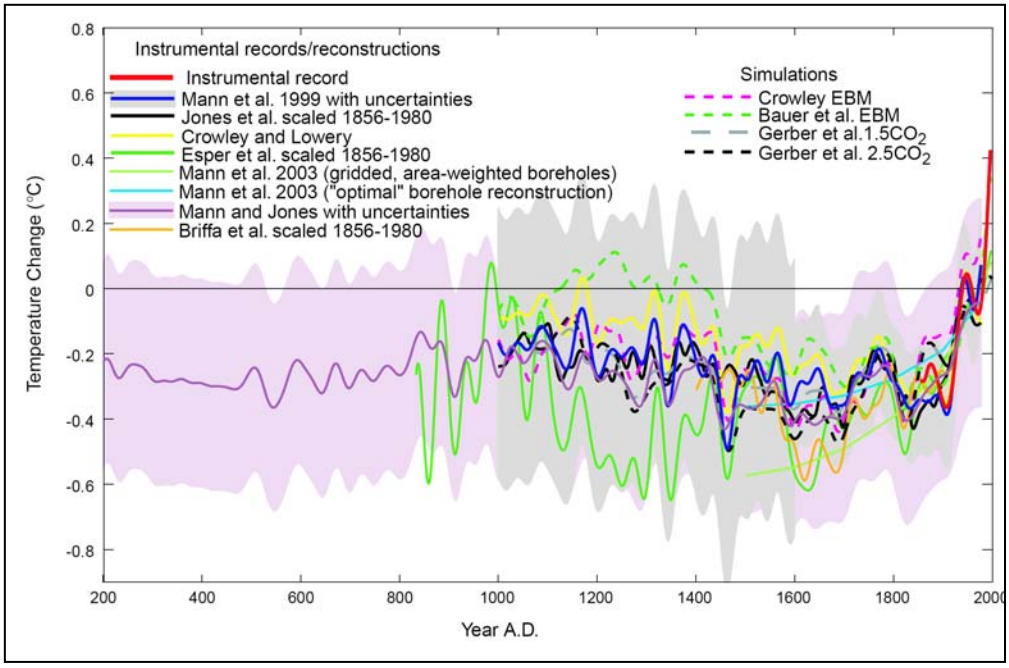
Changes in temperature and climate will have a dramatic impact on plants and animals that are adapted to present climactic conditions. Surface temperatures are on course to increase by between 3.2 and 7.2ºF by the year 2100, with temperatures in the Arctic expected to increase by twice the global average.[18] In addition to causing average temperature increases, rising levels of GHG have a secondary destabilizing effect on a number of different microclimates, conditions, and systems.

The increase in the temperature of the oceans is projected to accelerate the water cycle, thereby increasing the severity and rate of both storms and drought which, along with decreased snow pack, could disrupt ecosystems, agricultural systems and water supplies.[19]

As Figure 2a below indicates, following almost 2000 years of steady or slightly declining temperature, there has been a rapid increase in global surface temperature over the past century, which is inconsistent with the geologic record. Figure 2b shows that increasing global temperatures have already led to the widespread melting of snow and ice around the world. Melting snow and ice in Greenland and Antarctica have, in turn, contributed to a rise in sea level.[20] Rising sea levels could lead to significant environmental and ecosystem disturbances, as well as major population displacement and economic upheaval.

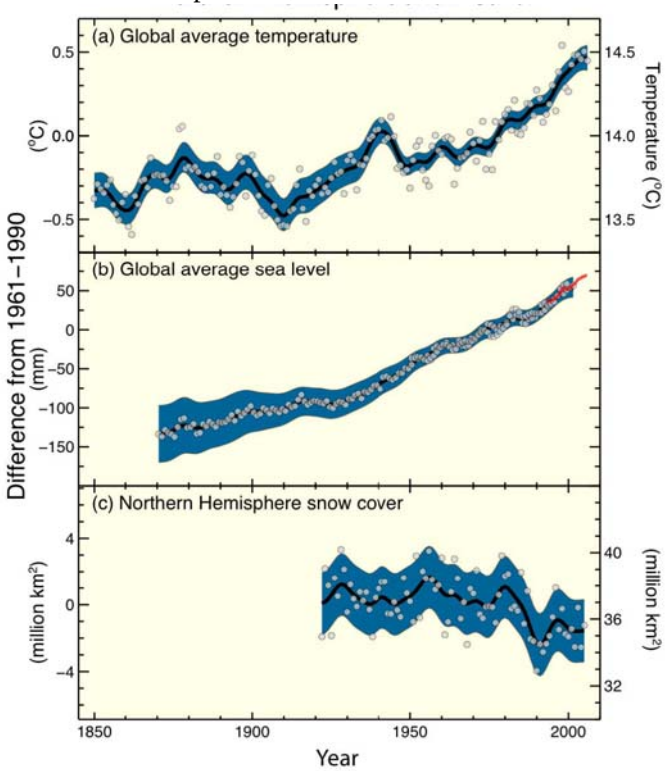
[17] United Nations Intergovernmental Panel on Climate Change - IPCC (2007). "Climate Change 2007: The Physical Science Basis. Summary for Policy Makers," http://www.ipcc.ch/SPM2feb07.pdf
[18] Ibid
[19] Ibid
[20] Ibid

Figure 2a: Global Temperature Reconstructions for the Past 2000 Years



Source: Mann et. al. 2003 "On Past Temperatures and Anomalous Late 20th Century Warmth"
EOS, TRANSACTIONS AMERICAN GEOPHYSICAL UNION, VOL. 84, NO. 44, PAGE 473

Figure 2b: Changes in Global Temperature, Sea Level, and Snow Cover Over the Past Century



Source: IPCC "Climate Change 2007: The Physical Science Basis. Summary for Policy Makers"

In addition to increased temperatures, other secondary impacts of climate change have been observed. These impacts include:[21]

> The extent of Arctic sea ice has shrunk by 2.7% per decade since 1978;
> Significantly increased precipitation levels in eastern parts of North and South America, northern Europe and northern and central Asia between 1900 and 2005;
> More intense and longer droughts have occurred over wider areas since the 1970s, particularly in the tropics and subtropics;
> The frequency of heavy precipitation events has increased over most land areas;
> Frost has become less frequent, while heat waves have become more frequent over the past 50 years;
> An increase in the intensity of hurricanes in the North Atlantic since 1970; and
> A decrease in ocean salinity at mid- to high-latitudes and an increase in the tropics, suggesting changes in precipitation and evaporation.

Secondary impacts are more difficult to predict, as they are caused by multiple that vary by region. It is also important to understand that while the average global temperature has risen and will continue to rise, the net result in individual locations will vary widely.

Local Impacts

Climate change is a global problem influenced by an array of interrelated factors that have concrete consequences for the Pacific Northwest. A 2005 report by the University of Washington's Climate Impacts Group found that climate change will significantly challenge the region's natural and built systems.[22] (All subsequent mention of climate impacts in Northwest, aside from the studies directly cited, reference the Climate Impacts Group 2005 study.)

***Natural disasters*:** Local climate trends will reflect continued increases in both average air and water temperatures. Sea level rise is likely to occur faster than global averages, and earlier snowmelt may cause changes in river and stream flows. Sea level rise and increased seasonal flooding could incur considerable costs as these phenomena pose risks to property, infrastructure and human safety.

Impact on water: Water quality and quantity are at risk to be depleted as a result of changing temperatures. With warmer average temperatures, more winter precipitation will fall in the form of rain instead of snow, shortening the winter snowfall season and accelerating the rate at which the snow pack melts in the spring.

These snow melt patterns increase the threat for spring flooding and decrease the storage of the natural water tower in the Cascades, meaning less water will be available for agricultural irrigation, hydro-electric generation and the general needs of a growing population.

***Impact on plants and animals*:** Increased temperatures also provide a foothold for invasive weed and insect species, as well as other non-native threats. Scientists are reporting more species moving to higher elevations or more northerly latitudes.

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[21] United Nations Intergovernmental Panel on Climate Change - IPCC (2007). "Climate Change 2007: The Physical Science Basis. Summary for Policy Makers," http://www.ipcc.ch/SPM2feb07.pdf

[22] Casola, Kay, Snover et. al.(2005). "Climate Impacts on Washington's Hydropower, Water Supply, Forests, Fish, and Agriculture."Climate Impacts Group, University of Washington. http://www.cses.washington.edu/db/pdf/kc05whitepaper459.pdf

Nearby shore habitat such as coastal wetlands and salt marshes are at risk of being inundated by rising sea levels. Increased flow and salinity of water resources would also seriously affect the food web and mating conditions for fish that are of both economic and recreational interest to residents. These trends compound the challenges already posed to dwindling populations of salmon, at all stages of their lifecycle.

Additionally, these trends alter the natural cycle of flowering and pollination, as well as the temperature conditions necessary for a thriving locally adapted agriculture. Perennial crops in particular will be challenged.

***Public health impact*:** Warming temperatures and increased precipitation can accelerate the breeding of mosquitoes, thus engendering diseases for which mosquitoes are vectors. Increased temperatures also increase ozone levels and air pollution toxicity, which are tied to increased rates of asthma and other pulmonary diseases. The anticipated increase in hotter days poses heat-stroke risks particular for the elderly, young, those already sick, and people who work outdoors.

Regional impacts: The local impacts of climate change are already apparent, and are expected to continue to escalate if the levels of heat trapping pollution continue to increase. Figure 3a shows precipitation trends; 3b shows trends in April 1 snow pack.

These figures show widespread increases in average annual precipitation for the period 1920 to 2000 and decreases in April 1 snow water equivalent (an important indicator for forecasting summer water supplies) for the period 1950 to 2000. The size of the dot corresponds to the magnitude of the change.

Figure 3a: Precipitation trends (1920-2000)

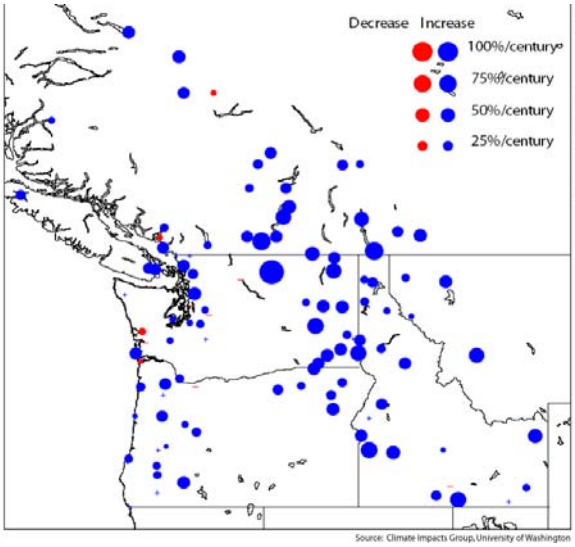
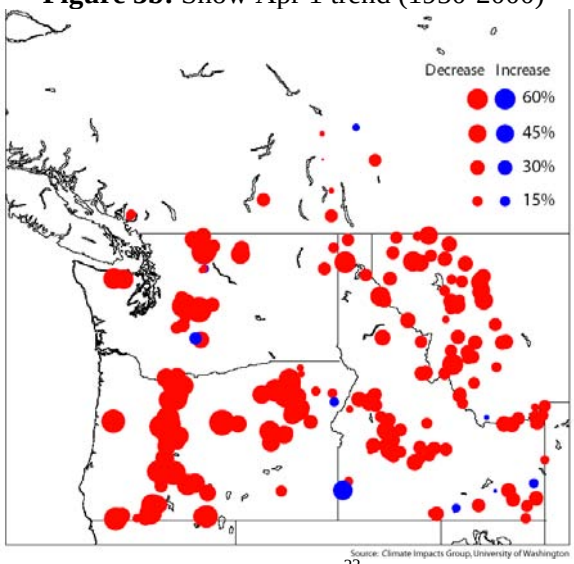


Figure 3b: Snow Apr 1 trend (1950-2000)

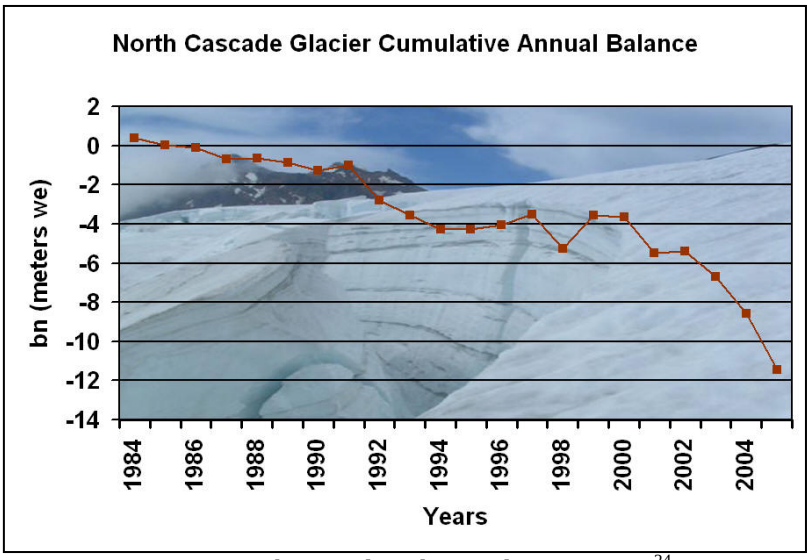


Source: Climate Impacts Group, University of Washington, 2006[23]

Figure 4a below indicates the rate that glaciers in the North Cascades are shrinking. The loss of glacier volume since 1984 represents 20 to 40 percent of entire glacier volume.

[23] Climate Impacts Group. 2006. "Pacific Northwest 20th Century Climate Change." http://www.cses.washington.edu/cig/pnwc/cc.shtml#figure1

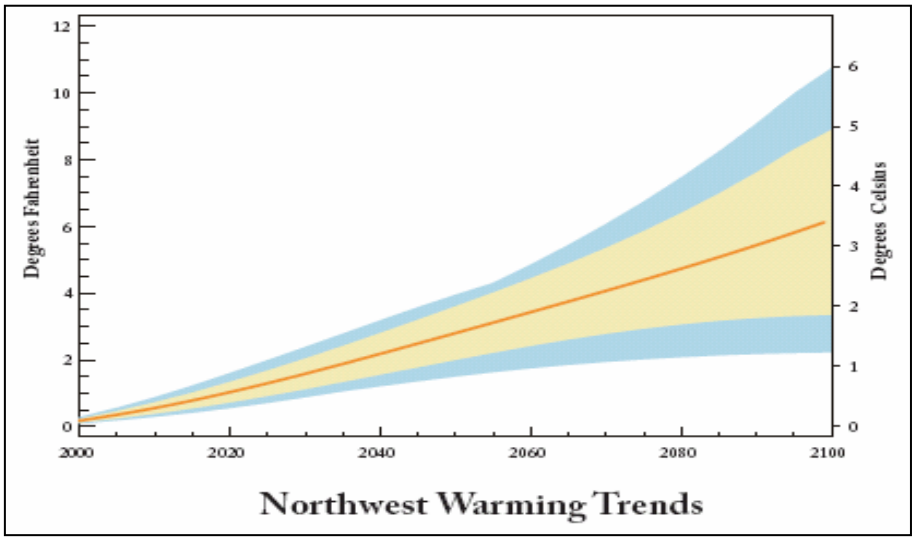
Figure 4a: Rate of recession of glaciers in the North Cascades



Source: North Cascades Glacier Climate Project[24]

Scientists have calculated a number of predicted increases in average temperature in the Northwest under ten different climate change study scenarios. Figure 5 below illustrates these predictions from the University of Washington Climate Impacts Group. Each scenario makes different assumptions about the levels of heat trapping pollution that humans will emit over the next one hundred years. The orange line indicates the average temperature from all of the scenarios. The yellow area indicates the temperature range that two-thirds of the scenarios fall within. The blue area indicates the full range of variability of all of the scenarios.

Figure 5: Temperature under increased emissions scenarios



Source: University of Washington Climate Impacts Group. 2005. "Uncertain Future"

[24] North Cascades Glacier Climate Project. 2006. http://www.nichols.edu/departments/Glacier/

There is little variability in short-term predictions of the average global temperature over the next twenty to thirty years. This is due to the lag time inherent in the climate system: the impact of gases already in the atmosphere will determine the impacts felt in the near term. The short- and medium-term implications of climate change are therefore largely unalterable. However, longer-term outcomes, meaning those relating to outcomes that will be felt between 2040 and 2100, will be shaped by actions taken today.

C. Action Being Taken on Climate Change

National and State Action

State Actions: As of July 2007, 35 states have completed or are currently working on comprehensive Climate Action Plans.[25] Seventeen of these states have passed legislation setting GHG targets.[26]

In addition to individual state actions, the Western Regional Climate Action Initiative was announced in February 2007, by the governors of Arizona, California, New Mexico, Oregon and Washington. Since that time, Utah, British Columbia, and Manitoba have joined the Initiative. Under the Initiative, the participating states have agreed to cut GHG emissions levels to 15% below 2005 levels by 2020 by establishing and implementing a market-based system by August 2008.[27]

Washington State

Over the past few years the Washington State Legislature has passed a number of bills that will have a significant impact on the reduction of GHG emissions.

> ***HB 3141 (2004)*** This bill initiates the process of regulating carbon emissions by requiring fossil fueled thermal power plants to have a generating capacity of 25 MW or more, which provides mitigation for 20 percent of the CO_2 emissions produced by that plant over a period of 30 years.[28]
>
> ***SB 1397 (2005)*** Commonly called the "clean cars bill," this legislation adopts the California emissions standards for new cars, which are stricter than national standards. While the California standards, will have significant impact on the ambient air quality in our region, it will have only a minor impact on CO_2 emissions. The waiver request to implement the new California standards is currently being reviewed by Environmental Protection Agency after the Supreme Court ruled that CO_2 is a pollutant that can be regulated by the states. If allowed, this rule would require significant improvements in average fuel efficiency and reduce CO_2 emissions significantly.[29]
>
> ***HB 2738 (2006)*** This bill creates a renewable fuel standard requiring that biodiesel comprise a small percentage of all diesel sold in Washington and that all gasoline be blended with a small percentage of ethanol. The percentage of the renewable fuels mandated for sale may be

[25] Pew Center on Global Climate Change: http://www.pewclimate.org/what_s_being_done/in_the_states/action_plan_map.cfm
[26] Pew Center on Global Climate Change: . http://www.pewclimate.org/what_s_being_done/in_the_states/emissionstargets_map.cfm
[27] Washington Department of Ecology http://www.ecy.wa.gov/climatechange/CATdocs/06052007CATsummary.pdf
[28] House Bill Report: HB 3141,(2004). As Reported by House Committee On: Technology, Telecommunications & Energy. http://www.leg.wa.gov/pub/billinfo/2003-04/Pdf/Bill%20Reports/House/3141.HBR.pdf
[29] Sightline Institute. http://sightline.org/research/energy/res_pubs/backgrounder-climate-policy

increased over time as the Department of Agriculture determines state farmers' capacity to meet the demand.

I-937 (2006) This voter-passed initiative establishes a state renewable energy portfolio standard. It mandates that 3% of the state's energy come from non-hydro renewable sources by 2012 and 15% renewable sources by 2020.

SB 6001 (2007) This bill sets goals to reduce the state's GHG emissions to 1990 levels by 2020, 25% below 1990 levels by 2035, and 50% below 1990 levels by 2050. This bill also sets power plant performance standards to effectively eliminate coal plants that do not sequester CO_2 emissions from being built in the state, as well as new out-of-state electricity purchases produced at coal plants.

Further, Governor Gregoire has engaged Washington stakeholders in a Climate Advisory Team tasked with reducing climate pollution, identifying measures to prepare for and adapt to climate change, developing clean energy jobs, and moving toward energy independence.

Local Action

Cool Counties Climate Stabilization Initiative

On July 16, 2007 at the National Association of Counties Annual Conference in Richmond, Virginia, 12 pioneering counties representing 17 million people launched "Cool Counties." The Cool Counties initiative seeks to marshal the resources of all 3,066 counties across the nation to address the challenges of climate change. Participating counties commit to four actions: reducing own contributions to climate change through our internal operations; demonstrating regional leadership to achieve climate stabilization and protect local communities; helping the local community become climate resilient; and urging the federal government to support county efforts.

U.S Mayor's Climate Protection Agreement

A national effort called the U.S Mayor's Climate Protection Agreement (MCPA) was established by Seattle Mayor Greg Nickels to promote local adherence to the goals of the Kyoto Protocol – an international agreement addressing global warming pollution and ratified by 164 countries. On February 16, 2005, the Agreement was launched and now includes over 640 signatures from mayors representing over 72 million Americans in all 50 states, Washington, D.C., and Puerto Rico. Signing the agreement makes a pledge that a city will reduce its GHG emissions consistent with the Kyoto Protocol, which declares reductions of 7 percent bellow 1990 levels by the year 2012. For more information about the MCPA, visit: http://www.seattle.gov/mayor/climate/

ICLEI—Local Governments for Sustainability

ICLEI was launched in the United States in 1993 and has grown to over 300 cities and counties providing national leadership on climate protection and sustainable development. Today in Washington, ICLEI is working with over 20 cities and counties on local climate policies – and forging a strong network between these governments.

ICLEI's mission is to improve the global environment through local action. The Cities for Climate Protection® (CCP) Campaign is ICLEI's flagship campaign designed to educate and empower local governments worldwide to take action on climate change. ICLEI provides resources, tools, and technical assistance to help local governments measure and reduce GHG emissions in their communities and their internal municipal operations.

APPENDIX B: 2000 ELECTRICITY ACCOUNTS - TOP 30 ACCOUNTS

ADDRESS	CITY	DESCRIPTION	ACCOUNT #	EST. KWH*	COST
1201 Bonneville Ave.	Snohomish	Road Maintenance District # 3	6162 416079 01	83,924	4,068.41
2731 Tenth	Everett	Multiservice Center	5162 423919 01 1	91,039	4,413.33
10427 109th St SW	Everett	Airport Bldg. 1116 (Warehouse)	0010 206753 06	116,375	5,641.54
15928 Mill Creek Rd	Mill Creek	Sheriff - South Precinct	4525 271208 086	119,836	5,809.32
415 E Burke St	Arlington	Cascade District Court	2236 235077 02	131,148	6,357.70
10217 102nd Pl SW	Everett	Airport Central Hangars C51-C53	4139 408544 01 5	141,277	6,848.74
3601 109th St SW	Everett	Airport Bldg. 219 - AARF/ Maintenance	4139 403755 01 2	144,775	7,018.29
3001 Oakes	Everett	Carnegie Building	5117 195333 02 3	145,670	7,061.66
1911 Pacific Ave	Everett	Corrections - Annex Service / Courthouse	5117 194568 02 5	165,949	8,044.73
14405 179th Ave. SE	Monroe	Evergreen Fairgrounds	7341 293794 013	175,753	8,520.02
			4217 415622 01 5	187,552	9,092.00
19700 67th Ave. NE	Arlington	Road Maintenance District #1	2134 415739 01 5	206,666	10,018.59
2731 Tenth	Everett	Multiservice Center	5162 124868 03 8	219,440	10,637.83
14414 179th Ave SE	Monroe	Evergreen District Court	7341 229103 024	222,626	10,792.28
2116 34th St.	Everett	Public Works	5162 111723 02 2	242,198	11,741.11
7526 Menzel Lake Road	Granite Falls	Public Works	2662 434069 01	246,486	11,948.98
2902 36th St.	Everett	Solid Waste Division	5162 135204 01 7	271,927	13,182.28
14414 SR 9 SE	Snohomish	Solid Waste - Cathcart	6862 242841 02 8	275,201	13,340.98
14414 SR 9 SE	Snohomish	Solid Waste - Cathcart	6862 254499 01 2	309,093	14,983.97
19601 Nicks Rd.	Arlington	Indian Ridge Corrections Facility	2362 106829 03 1	313,813	15,212.81
20520 68th Ave W	Lynnwood	South District Court	8362 140276 02	460,729	22,334.86
1201 Bonneville Ave.	Snohomish	RD Fleet Management	6162 108756 01 8	549,480	26,637.26
9805 20th St. SE	Everett	Public Works	4662 427850 014	553,630	26,838.44
19600 63rd Ave NE	Arlington	North County Transfer Station	2762 376991 01 7	568,445	27,556.65
21311 61st Pl. W	Mountlake Terrace	Public Works - SW Transfer Station	8962 126258 01 4	649,862	31,503.52
14528 SR 9	Snohomish	Solid Waste Pre-Treatment Facility	0010 359798 01	1,346,050	65,252.79
1918 Wall St.	Everett	Snohomish County Corrections - Jail	0010 290357 02	1,965,107	95,262.96
2801 Tenth	Everett	Denny Juvenile Justice Center	0010 419177 01	2,038,664	98,828.81
14405 179th Ave. SE	Monroe	Evergreen Fairgrounds	0010 112913 01	2,063,390	100,027.48
3000 Wetmore	Everett	Courthouse and Mission Bldg.	0010 281367 01	5,646,821	273,742.36
TOTAL FOR TOP 30 ACCOUNTS:				19,652,924	$952,720

ADDRESS	CITY	DESCRIPTION	ACCOUNT #	EST. KWH*	COST
TOTAL FOR OTHER ACCOUNTS:				2,318,628	112,401.00

*Kilowatt hours were estimated by applying rates and fees to known costs.

APPENDIX B: 2000 NATURAL GAS ACCOUNTS - TOP 30 ACCOUNTS

ADDRESS	CITY	DESCRIPTION	ACCOUNT #	THERMS	COST
3509 109th St. SW	Everett	Dept. of Emergency Management (Paine Field Bldg	*961-091-700*	354	213.33
14405 179th Ave SE	Monroe	Evergreen Fairgrounds	*995-578-110*	506	497.29
3509 109th St. SW	Everett	Dept. of Emergency Management (Paine Field Bldg	*390-928-500*	540	315.00
14405 179th Ave SE	Monroe	Evergreen Fairgrounds	*068-506-110*	644	445.38
19620 67th Ave NE	Arlington	Public Works Arlington Roads Shop	038-1390 CNG	1,260	1,586.89
1127 Bonneville Ave.	Snohomish	Public Works Roads - Traffic and Sign Shop	063-857-400-4	1,544	1,345.60
1201 Bonneville Ave	Snohomish	Snohomish Cty Road Maint. District #3	023-460-600-2	1,593	1,407.79
15000 40th Ave. NE	Marysville	Snohomish County Sheriff - North Precinct	395-613-300-7	1,823	1369.21
3520109th St. SW	Everett	Snohomish County Airport Facilities - Bldg. 124	853-180-800-7	1,991	1545.71
3001 Oakes	Everett	Carnegie Building	771-743-700-3	2,066	1466.58
3001 Rockefeller	Everett	Snohomish County Courthouse Annex	506-200-800-7	3,100	2090.58
2920 Chestnut St	Everett	Snohomish County Public Works Signal Shop	000-016-500-1	3,234	2,323.44
14405 179th Ave SE	Monroe	Evergreen Fairgrounds	*893-146-110*	4,531	2184.76
3601 109th St. SW	Everett	Snohomish County Airport Bldg. 219 - AARF/Maint.	616-821-900-1	4,845	3754.31
19700 67th Ave NE	Arlington	Public Works Shop	038-1170 CNG	5,260	6,356.68
15928 Mill Creek Road	Mill Creek	Snohomish Co Sheriff - South Precinct	547-367-400-9	6,692	5039.85
9509 29th Ave. W	Everett	Sno Co Medical Examiner (Paine Field)	271-525-500-2	7,856	4929.29
14405 179th Ave SE	Monroe	Evergrn State Fairground	*635-112-700*	8,943	4625.68
14405 179th Ave SE	Monroe	Evergreen State Fair Pavilion	*467-080-700*	9,261	5987.94
14405 179th Ave SE	Monroe	Evergreen Fairgrounds	*872-698-110*	10,415	4048.11
3402 McDougall Ave.	Everett	Snohomish County Fleet Mgmt	*108-840-700*	12,586	7109.05
14405 179th Ave SE	Monroe	Evergreen State Fair	*626-938-110*	14,620	7160.20
3000 Rockefeller	Everett	Mission Building	*997-960-700*	14,893	10731.37
1918 Wall St	Everett	Snohomish County Corrections Center	455-865-300-4	15,554	10700.28
600 128th St SE	Everett	Sno Co Parks & Rec - McCollum Pool	598-035-900-3	19,396	10337.68
3001 Rockefeller	Everett	Annex Building	285-138-900-3	21,946	13613.07
3000 Rockefeller	Everett	Courthouse	*629-320-700*	41,530	17319.37
3001 Rockefeller	Everett	Admin Building	*260-680-700*	42,532	22262.93
2801 Tenth	Everett	Denny Juvenile Justice Center	*510-312-700*	80,663	44005.82
1918 Wall St	Everett	Snohomish County Corrections - Jail	*366-024-700*	132,871	74889.08
TOTAL FOR TOP 30 ACCOUNTS:				473,049	269,662.27
TOTAL FOR ALL OTHER ACCOUNTS:				269	136.89

APPENDIX B: 2006 ELECTRICITY ACCOUNTS - TOP 30 ACCOUNTS

Address	City/Zip	Description	Account#	2006 kWh	2006 $
14508 STATE ROUTE 9 SE	SNOHOMISH	Solid Waste - Cathcart	550001565	101,240	$7,377
25505 MOUNTAIN LOOP HWY	GRANITE FALLS	Public Works - Sand Hill Pit	534001069	109,120	$7,707
2600 100TH ST SW	EVERETT	Public Works Paine Field Shop (RD #2)	516001522	113,200	$8,160
15928 MILL CREEK BLVD	MILL CREEK	Sheriff - South Precinct	371008208	114,160	$8,104
3509 109TH ST SW 211	EVERETT	Dept. of Emergency Management	307003293	117,040	$8,366
14528 STATE ROUTE 9 SE	SNOHOMISH	Solid Waste - Cathcart	354001499	131,200	$9,337
3006 102nd PL SW	EVERETT	Paine Field Hangars C53	508001544	134,800	$9,679
3434 MCDOUGALL AVE	EVERETT	Hazardous Waste Storage Building	526001415	135,120	$9,794
14414 STATE ROUTE 9 SE	SNOHOMISH	Solid Waste - Cathcart	342002841	138,960	$10,112
1201 BONNEVILLE AVE	SNOHOMISH	Public Works Road Maint. District #3	230075628	139,127	$9,898
3601 109TH ST SW	EVERETT	Paine Field Building 219	503001755	146,200	$10,487
17900 48TH ST SE	SNOHOMISH	Flowing Lake Park	319002204	146,460	$10,561
14001 179TH AVE SE	MONROE	Evergreen State Fairgrounds	393001794	155,240	$11,302
15100 40TH AVE NE 3	MARYSVILLE	Sheriff - North Precinct	547002482	173,917	$12,368
4822 GROVE ST	MARYSVILLE	Sheriff / Natural Resources	330062066	209,440	$15,059
2116 34TH ST	EVERETT	Public Works - Fleet Management	211002723	228,480	$16,351
19700 67TH AVE NE	ARLINGTON	Public Works Road Maint. District 1	515001739	235,920	$16,898
2731 10TH ST	EVERETT	Multiservice Center	224003868	265,840	$19,104
19601 NICKS RD	ARLINGTON	Indian Ridge Corrections	206003829	303,900	$21,606
1201 BONNEVILLE AVE	SNOHOMISH	Public Works Road Maint. District 3	516001079	319,200	$22,685
20520 68TH AVE W	LYNNWOOD	South District Court	240002276	396,240	$27,522
1000 CALIFORNIA ST	EVERETT	Facilities Management - Records Storage	139000015	438,960	$30,019
9509 29TH AVE W	EVERETT	Paine Field - Medical Examiner Bldg	527001850	452,960	$31,130
21311 61ST PL W	TERRACE	Public Works SW Transfer Station	136000192	776,248	$49,466
14528 STATE ROUTE 9 SE	SNOHOMISH	Solid Waste PreTreatment Facility	959001798	1,094,400	$67,701
10700 MINUTEMAN DR	EVERETT	Airport Rd Recycling and Transfer Station	423034427	1,199,840	$73,075
14001 179TH AVE SE	MONROE	Evergreen State Fairgrounds	912001913	2,039,203	$124,989
2801 10TH ST	EVERETT	Denny Juvenile Justice Center	919001177	2,239,200	$130,968

APPENDIX B: 2006 ELECTRICITY ACCOUNTS - TOP 30 ACCOUNTS

Address	City/Zip	Description	Account#	2006 kWh	2006 $
1918 WALL ST	EVERETT	Snohomish County Corrections - Old Jail	692000399	6,111,300	$346,325
3000 ROCKEFELLER AVE	EVERETT	Snohomish County Campus Buildings	126000211	7,580,400	$435,160
TOTAL FOR TOP 30 ACCOUNTS				**25,747,315**	**1,561,310**
TOTAL FOR ALL OTHER ACCOUNTS				**1,860,021**	**$140,077**

APPENDIX B: 2006 NATURAL GAS ACCOUNTS - TOP 30 ACCOUNTS

ADDRESS / SNOCO DESCRIPTION	CITY	DESCRIPTION	ACCOUNT #	2006 THERMS	2006 $
3001 Oakes Avenue	Everett	Snohomish County Facilities Carnegie Bldg	771-743-700	1,591	2,037.32
1127 Bonneville Ave.	Snohomish	Public Works Roads - Traffic and Sign Shop	063-857-400	1,678	2,513.08
3220 100th St. SW	Everett	Snohomish County Airport Administration	413-947-105	1,823	2,224.20
3509 109th Street SW	Everett	Snohomish County Dept Emerg Mgmt	474-486-900	1,882	2,180.17
19620 67th Ave NE	Arlington	Public Works Arlington Roads Shop	038-1390	2,142	1,539.95
14405 179th Ave. SE	Monroe	Evergreen Fairgrounds	893-146-110	2,668	2,894.67
2920 Chestnut St.	Everett	Snohomish County Public Works - Signal Shop	000-016-500	2,826	3,445.86
21311 61st Pl. W	Mountlake Terrace	Solid Waste - SW Transfer Station	086-940-031	2,841	3,514.15
14414 179th Ave SE	Monroe	Evergreen District Court	123-594-715	3,152	3,107.30
3509 109th Street SW	Everett	Snohomish County Dept Emerg Mgmt	189-405-300	3,923	4,393.05
9629 32nd St. SE	Everett	Snohomish Co Parks & Recreation - Willis Tucker Park	129-877-427	3,948	3,765.97
14405 179th Ave. SE	Monroe	Evergreen Fairgrounds	872-698-110	4,709	3,957.81
14405 179th Ave. SE	Monroe	Evergreen State Fairgrounds - Pavilion	467-080-700	5,002	3,763.03
3601 109th St SW	Everett	Snohomish County Airport Bldg 219 (Fire Station)	616-821-900	5,637	6,429.32
15100 40th Ave NE	Marysville	Snohomish County Sheriff - North Precinct	395-613-300	5,970	7,007.90
15928 Mill Creek Road	Mill Creek	Snohomish County Sheriff - South Precinct	547-367-400	6,664	7,556.69
14405 179th Ave. SE	Monroe	Evergreen State Fair	626-938-110	8,459	7,692.76
1000 California	Everett	Snohomish County Facilities - Records Storage	700-178-056	9,524	11,304.27
9509 29th Ave W	Everett	Sno Co Medical Examiner Office	271-525-500	9,607	11,073.76
3402 McDougall Ave.	Everett	Snohomish County Fleet Management	108-840-700	9,711	11,401.88
14405 179th Ave. SE	Monroe	Evergrn State Fairground	635-112-700	11,887	13,146.14
1201 Bonneville Ave	Snohomish	Snohomish Cty Road Maintenance District #3	023-460-600	13,861	19,238.87
3000 Rockefeller	Everett	Snohomish County Facilities - Mission Building	228-025-623	15,346	18,024.78
19700 67th Ave NE	Arlington	Public Works Arlington Shop	038-1170	16,977	10,880.15
600 128th St SE	Everett	Sno Co Parks & Rec - McCollum Pool	598-035-900	28,745	6,391.91
3000 Rockefeller	Everett	Snohomish County Courthouse	629-320-700	37,483	41,204.39
3030 Oakes	Everett	Snohomish County Facilities - Admin	228-025-611	49,484	57,648.87
2801 Tenth	Everett	Denny Juvenile Justice Center	510-312-700	70,499	80,840.05
1918 Wall Street	Everett	Snohomish County Corrections - Old Jail	366-024-700	92,691	104,751.50
3025 Oakes	Everett	Snohomish County Corrections - New Jail	997-960-700	297,272	313,212.83
TOTAL OF TOP 30 ACCOUNTS				728,002	767,143
TOTAL FOR ALL OTHER ACCOUNTS				5,192	12,956.75