Town of Coupeville

Greenhouse Gas Inventory &

Proposed Climate Action Plan

November 2006

ICLEI
Local Governments for Sustainability

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Prepared by ICLEI – Local Governments for Sustainability for the
Northwest Clean Air Agency and the Town of Coupeville

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Town of Coupeville Climate Action Plan

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Executive Summary

The debate is over. The overwhelming scientific consensus is that human-induced climate change is among the most pressing environmental problems facing this generation and those to come.

The time to act is now. Never in the past 1000 years has the planet warmed at a faster rate than during the 20th century, and the most recent decade has been the warmest ever on record. Allowing this trend to continue could result in decreased agricultural output, increased catastrophic weather events such as forest fires, drought and floods and displacement of entire populations due to rising sea levels.(Please see section I.A for more information about the science of climate change.)

The Town of Coupeville must do its part. Although the United States accounts for a mere 4% of the world's population, it produces 25% of the world's greenhouse gases. The Town of Coupeville released 18,133 tons of eCO_2 in 2000 and is projected to emit 41% more in 2020. However, on July 25, 2006, the Town of Coupeville pledged to take action against this destructive trend by passing a resolution to join more than 190 U.S. local governments and 770 local governments worldwide in ICLEI's Cities for Climate Protection® (CCP) Campaign. In so doing, we have committed to ICLEI's Five Milestone Process to prevent global warming:

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 measures
Milestone 5: Monitor and verify results.

The Town of Coupeville's Climate Action Plan
The Climate Action Plan for Coupeville includes a greenhouse gas emissions inventory for a selected baseline year and an interim year for both the community and the municipal operations of the Town of Coupeville. The community inventory includes greenhouse gas emissions from the residential, commercial, and industrial sectors, the transportation sector, and methane released from solid waste. The municipal inventory includes greenhouse gas emissions from municipal buildings/facilities, vehicle fleet, water & sewage, employee commute, street and traffic lights, and solid waste. Moreover, the inventory also includes forecast emissions for the selected target year based on business-as-usual conditions.

Based on the results of the inventory, it is recommended that Coupeville adopt an emissions reduction target of 20% below 2000 levels by 2020. A 20% reduction below 2000 levels means a reduction of 11,049 tons of eCO2 by 2020. Several proposed measures have been outlined to help Coupeville reach this goal.

The good news is that Coupeville is already on the way to reaching this goal. Several existing measures are already in place that have worked to help reduce 2005's eCO2 levels to 4% below the projected forecast from the 2000 business as-usual scenario. Some of these measures include increased recycling in the community, energy efficient streetlight replacements, and green power purchasing within the residential and commercial sectors. Additional recommended measures, such as the implementation of a curbside recycling program, a no-idle policy for police vehicles, and 100% municipal green power purchasing (paid for with the expected savings in hauling fees from the implementation of a yard-waste & bio-solids composting program), are outlined in this

report. Combined, these measures will help Coupeville achieve up to 43% of the reduction target in the next few years. An evaluation of progress towards the reduction target is recommended to occur by 2012, the target year of the Kyoto Protocol. Forecast data for this year has been entered into the software to help with this goal.

Climate change is an issue of growing concern for communities across the United States and around the world. The Town of Coupeville has displayed great leadership and foresight in choosing to confront this issue now. By pledging to reduce the amount of greenhouse gases emitted by its community, Coupeville joins hundreds of other American cities in stemming the tide of global warming and its numerous associated threats.

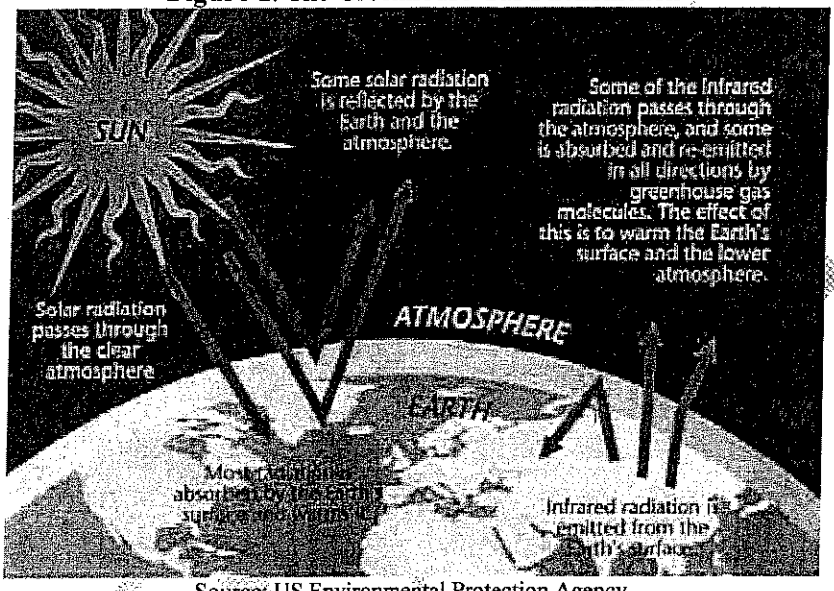
In addition to mitigating the destabilization of the climate and associated effects, Coupeville stands to benefit in many other ways from the proposed measures outlined in this report. Many of the proposed measures have additional benefits such as financial savings resulting from improved energy efficiency, a more walkable community, improved air quality, increased energy security, encouragement the emerging renewable energy sector of the economy, and most of all the knowledge that Coupeville is doing its part to curb the trend of global warming and leave our planet a better place for the next several generations.

I. Introduction

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 60°F. 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 Greenhouse Gas Phenomenon



Source: US Environmental Protection Agency

However, recently elevated concentrations of these gases in the atmosphere have had a de-stabilizing effect on the global climate, fueling the phenomenon commonly referred to as global warming. The global average surface temperature increased during the 20th century by about 1°F. [1]According to NASA scientists, the 1990s were the warmest decade of the century, and the first decade of the 21st century is well on track to be another record-breaker. The years 2002, 2003, 2004 and 2005, along with 1998, were the warmest five years since the 1890s, with 2005 being the warmest year in over a century. [2]

Scientific Facts and Projections:

- The atmospheric concentration of carbon dioxide (CO_2) during the last two decades has increased at the rate of 0.4% every year.
- Current CO_2 concentrations are higher than they have been in the last 420,000 years, and according to some research, the last 20 million years.
- About three-quarters of the CO_2 emissions produced by human activity during the past 20 years are due to the burning of fossil fuels.

Source: The UN Intergovernmental Panel on Climate Change (IPCC) TAR: Summary for Policy Makers

[1] United Nations Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report. "Climate Change 2001: Synthesis Report. Summary for Policy Makers" http://www.ipcc.ch/pub/un/syreng/spm.pdf

[2] NASA Goddard Institute for Space Studies, http://www.nasa.gov/vision/earth/environment/2005_warmest.html

The climate and the atmosphere do not react in a linear fashion to increased greenhouse gases. That is to say that you cannot simply predict that for each ton of carbon dioxide emitted from a power plant or a vehicle's tailpipe, 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 have been absorbing a significant portion of these gases, but as the oceans become more permeated with CO_2, scientists anticipate they will reach a saturation point, after which each ton of anthropogenic emissions of CO_2 will have a more substantial impact.[3] Another example of this compounding can be found in the polar ice caps. Ice is highly reflective and acts effectively like a giant mirror, reflecting the sun's rays back into space. As the planet warms and some of this ice melts away, 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 greenhouse gas emitted. As these examples illustrate, the stakes are high, and there is no time to lose in the race against global warming.

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 conditions that will no longer prevail. Surface temperatures are on course to increase by between 2.5 and 10.5°F by the year 2100, with regions in the northern parts of North America and Asia heating by 40% above the mean increase.[4] In addition to causing average temperature increases, rising levels of greenhouse gases have a 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.

Globally, snow cover has decreased by 10% in the last forty years. Average sea level has risen between 1/3 and 2/3 of a foot over the course of the 20th century and is projected to rise by at least another 1/3 of a foot and up to almost 3 feet by the year 2100.[5] These coastal infringements on such a large scale could lead to not only significant environmental and ecosystem disturbances, but also major population displacement and economic upheaval.

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. [6] (All subsequent mention of climate impacts in Northwest, aside from the studies directly cited, reference the Climate Impacts Group 2005 study.)

Natural disasters: The Climate Impacts Group has found that local climate trends will reflect continued increases in both average air and water temperatures. Additionally, sea level rise is likely to occur faster than global averages and earlier snowmelt may cause changes in river and

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[3] United Nations Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report. "Climate Change 2001: Synthesis Report. Summary for Policy Makers" http://www.ipcc.ch/pub/un/syreng/spm.pdf

[4] Ibid

[5] Ibid

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

stream flows. Sea level rise and increased seasonal flooding could incur considerable costs as these phenomena pose risks to property, infrastructure and even human life.

Impact on water: Water quality and quantity are also 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.

Not only does such snow melt increase the threat for spring flooding, but it will also 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. As we have seen in recent years, water resources for agricultural and residential use may become scarce, especially during the summer months.

Impact on plants and animals: The local native plants and animals are also at risk as temperatures rise. Scientists are reporting more species moving to higher elevations or more northerly latitudes. Increased temperatures also provide a foothold for invasive species of weeds, insects and other non-native threats.

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

Public health impact: Warming temperatures and increased precipitation can be encouraging to mosquito-breeding, thus engendering diseases for which mosquitoes are vectors, such as the West Nile virus, a disease of growing concern in our region.

Increased temperatures also pose a risk to human health because it increases ozone levels and air pollution toxicity, which are tied to increased rates of asthma and other pulmonary diseases. Furthermore, the anticipated increase in hotter days poses heat-stroke risks particular for the elderly, young, those already sick, and people who work outdoors.

Regional Evidence: The impacts of climate change are already here, and are expected to continue to escalate if the levels of heat trapping pollution continue to increase. Figure 2a shows precipitation trends; 2b shows trends in April 1 snow pack.

Figure 2a: Precipitation trends (1920-2000)

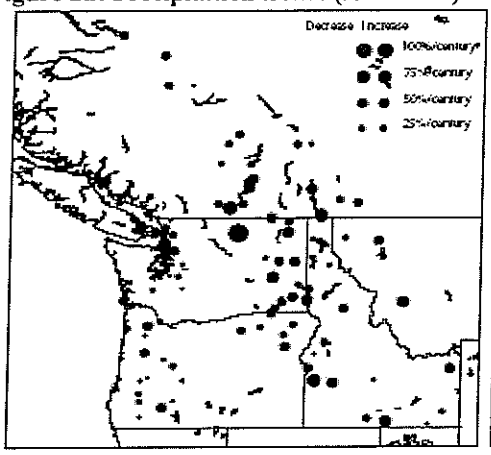
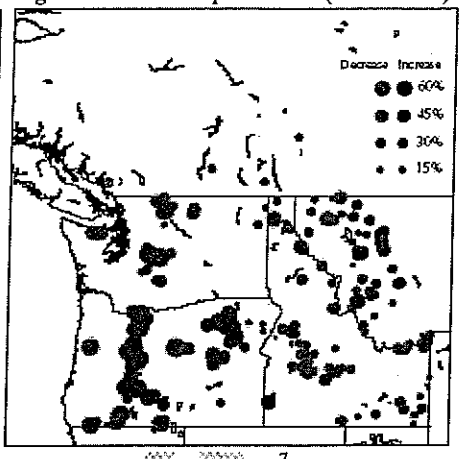


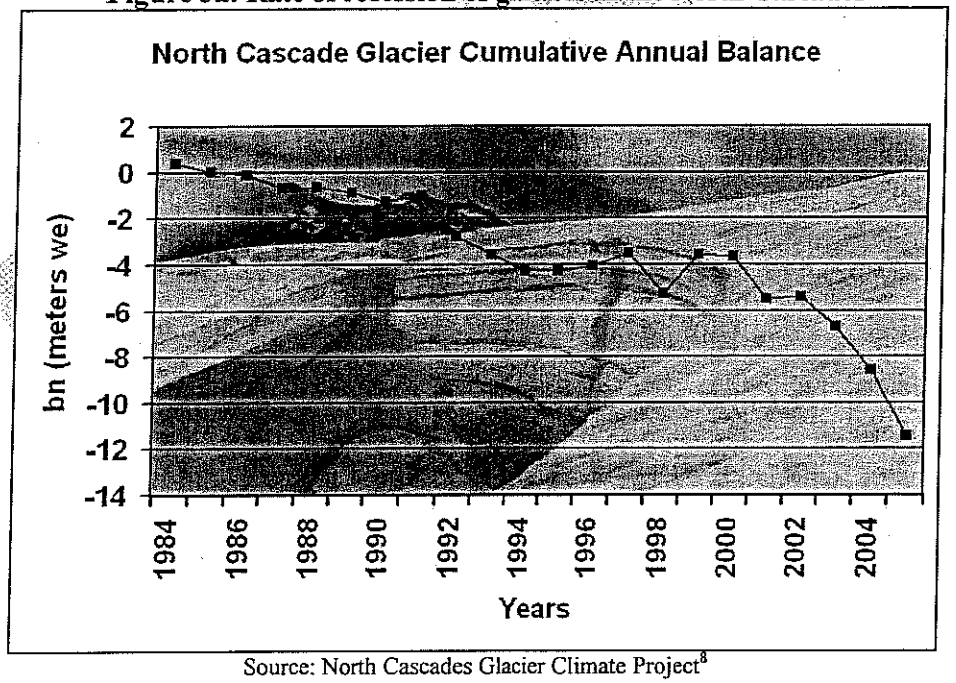
Figure 2b: Snow Apr 1 trend (1950-2000)



Source: Climate Impacts Group, University of Washington, 2006[7]

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 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. Figure 3b illustrates how this change has been so dramatic and rapid it can be seen with the naked eye.

Figure 3a: Rate of recession of glaciers in the North Cascades



Source: North Cascades Glacier Climate Project[8]

Figure 3b: Eye-witness North Cascades Glacier Recession

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

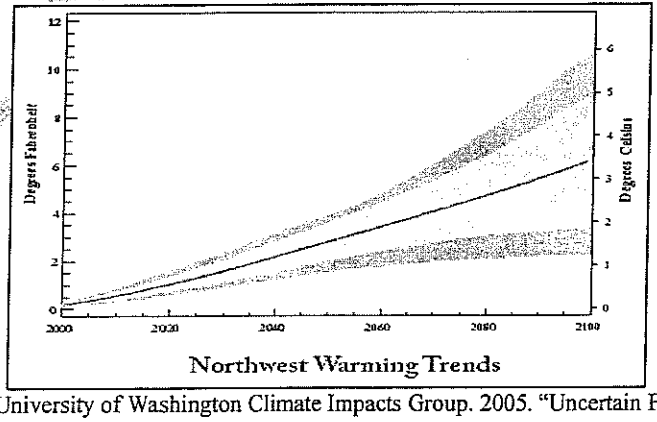
[8] North Cascades Glacier Climate Project. 2006. http://www.nichols.edu/departments/Glacier/

Source: North Cascades Glacier Climate Project[9]

Scientists have calculated a number of predicted increases in average temperature in the Northwest under ten different climate change study scenarios. Figure 4 illustrates these predictions. 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.

It is important to note that there is very little variability in short-term predictions of the average global temperature in the next twenty to thirty years. However, the long-term outcome will be governed by decisions made today. This phenomenon is due to the significant inertia in the climate system: the impact of gases already in the atmosphere will not become apparent until further into the future. Moreover, despite the proliferation of energy saving technologies, existing power plants and vehicles will continue to be used. The short and medium-term implications of climate change are unavoidable. But the long-term impacts that will be felt between 2040 and 2100 have a high range of variability.

Figure 4: Temperature under increased emissions scenarios



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

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

National and State Action

Although significant action to prevent climate change has been lacking at the national level, there has been significant movement at the state and local levels.

State Actions: Many states have begun to consider the affects of climate disruption. A survey published in 2003 found that legislatures in 21 different states had passed legislation specifically directed at climate change.[10] The most common laws covered by the survey call for studies of the impacts of climate change, require inventories of the states' greenhouse gas emissions and creation of commissions to study the possible implications of greenhouse gas trading systems.

In addition to these individual state actions, there are two regional coalitions coordinating an interstate agreement to prevent climate change: the West Coast Governors' Global Warming Initiative and the Regional Greenhouse Gas Initiative (RGGI) of the Northeastern and Mid-Atlantic states.

The West Coast Governors' Global Warming Initiative was approved in 2004 by the Governors of California, Oregon and Washington. The Initiative attempts to synchronize a number of climate change measures each state was independently pursuing, including the bulk purchase of hybrid cars for state fleets and organizing the deployment of electrification technologies at truck stops throughout the I-5 corridor. The RGGI coalition has also set reduction targets for heat trapping pollution emitted from the generation of electricity and is trying to establish a market-based regional cap and trade emissions program they hope to put into effect by 2009.[11]

Washington State

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

SHB 3141 (2004) This bill initiates the process of regulating carbon emissions by requiring fossil fueled thermal power plants with a generating capacity of 25 MW or more to provide mitigation for 20 percent of the CO_2 emissions produced by that plant over a period of 30 years.[12]

ESHB 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, as they now stand, will have significant impact on the ambient air quality in our region, it will have only a minor impact on CO_2 emissions. Changes to the California standards, known as the "Pavley Amendment," are currently being reviewed by the California judiciary. If allowed, this rule would require significant improvements in average fuel efficiency and therefore would reduce CO_2 emissions significantly.

SSB 6508 (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 should be blended with a small percentage of ethanol. The percentage of the renewable fuels mandated for sale will be increased over time as the Department of Agriculture determines that the state's farmers have the capacity to meet the demand.

[10] U.S EPA. http://yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsStateLegislativeInitiatives.html

[11] http://www.rggi.org/agreement.htm

[12] House Bill Report: HB 3141, As Reported by House Committee On: Technology, Telecommunications & Energy. 2004. http://www.leg.wa.gov/pub/billinfo/2003-04/Pdf/Bill%20Reports/House/3141.HBR.pdf

Local Action

A great deal of work is being done at the local level on climate change as well. ICLEI—Local Governments for Sustainability has been a leader on both the international and local level for more than ten years, representing over 770 local governments around the world. ICLEI was launched in the United States in 1995 and has grown to nearly 200 cities and counties providing national leadership on climate protection and sustainable development. In June 2006, ICLEI and the Northwest Clean Air Agency partnered to launch the Northwest Climate Protection and Energy Conservation Project funding, among other things, this report.

Additionally, a national effort called the U.S. Mayors' Climate Protection Agreement (MPCA) was launched locally by Seattle Mayor Greg Nickels to promote climate protection and the goals of the Kyoto Protocol – an international agreement addressing global warming pollution and ratified by 164 countries. On February 16, 2005, Seattle Mayor Greg Nickels launched the MCPA. Today it includes over 300 signatures from mayors representing over 49 million Americans in 44 states and Washington, D.C... Signing the agreement makes a pledge that your city will reduce its greenhouse gas emissions by 7 % bellow 1990 levels by the year 2012. For more information about the MCPA, visit: http://www.seattle.gov/mayor/climate/

D. ICLEI and the Cities for Climate Protection Campaign

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 greenhouse gas emissions in their communities and their internal municipal operations.

ICLEI's International CCP Campaign was launched in 1993 when municipal leaders, invited by ICLEI, met at the United Nations in New York and adopted a declaration that called for the establishment of a worldwide movement of local governments to reduce greenhouse gas emissions, improve air quality, and enhance urban sustainability. The CCP Campaign achieves these results by linking climate change mitigation with actions that improve local air quality, reduce local government operating costs, and improve quality of life by addressing other local concerns. The CCP Campaign seeks to achieve significant reductions in U.S. greenhouse gas emissions by assisting local governments in taking action to reduce emissions and realize multiple benefits for their communities.

ICLEI uses the performance-oriented framework and methodology of the CCP Campaign's Five Milestones to assist U.S. local governments in developing and implementing harmonized local approaches for reducing global warming and air pollution emissions, with the additional benefit of improving community livability. The milestone process consists of:

- 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 measures
- Milestone 5: Monitor and verify results

In August 2006 the City of Coupeville adopted a resolution to take action for climate protection and officially joined ICLEI's Cities for Climate Protection Campaign. This report signals the completion of steps one through three in the Milestone process, and presents the city with a draft Climate Action Plan.

II. Emissions Inventory

A. Reasoning, Methodology & Model

ICLEI's Cities for Climate Protection methodology allows local governments to systematically estimate and track greenhouse gas emissions from energy and waste related activities at the community-wide scale and those resulting directly from municipal operations. The municipal operations inventory is a subset of the community-scale inventory.

Once completed, these inventories provide the basis for creating an emissions forecast and reduction target, and enable the quantification of emissions reductions associated with implemented and proposed measures.

1. CACP Software

To facilitate local government efforts to identify and reduce greenhouse gas emissions, ICLEI developed the Clean Air and Climate Protection (CACP) Software package with Torrie Smith Associates. This software estimates emissions derived from energy consumption and waste generation within a community. The CACP software 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 eCO_2. 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 ton of methane emissions to 21 tons of eCO_2.

The emissions coefficients and methodology employed by the software are consistent with national and international inventory standards established by the UN Intergovernmental Panel on Climate Change (1996 Revised IPCC Guidelines for the Preparation of National Inventories) and the U.S. Voluntary Greenhouse Gas Reporting Guidelines (EIA form1605). The CACP software has been and continues to be used by over 200U.S. cities and counties to reduce their greenhouse

[22] Based on the estimated price per gallon of diesel the Town purchased in 2005 compared to the current (August 2006) price per gallon of bio-diesel offered by south Whidbey Island's only local proprietor, Island Clean Energy.

gas emissions. However, it is worth noting that, although the software provides the Town of Coupeville with a sophisticated and useful tool, calculating emissions from energy use with precision is difficult. The model depends upon numerous assumptions, and it is limited by the quantity and quality of available data. With this in mind, it is useful to think of any specific number generated by the model as an approximation, rather than an exact value.

2. Inventory Sources and Creation Process

The creation of an emissions inventory required the collection of information from a variety of sectors and sources. These data were entered into the software to create a community emissions inventory and a municipal emissions inventory. The community inventory represents all energy use within the Town of Coupeville and its contribution to greenhouse gas emissions. The municipal inventory is a subset of the community inventory, and includes energy use and emissions derived from internal government operations.

There are two main reasons for completing separate emissions inventories for community and municipal operations. First, the government is committed to action on climate change, and has a higher degree of control to achieve reductions in its own municipal emissions than those created by the community at large. Second, by proactively reducing emissions generated by our own activities, the Town of Coupeville government takes a visible leadership role in the effort to address climate change. This is important for inspiring local action in Coupeville, as well as for inspiring other communities.

Both the community and municipal inventories are based on the year 2000. An additional inventory for 2005 was also completed for both sectors in order to provide a more complete picture of current energy use and progress already being made toward the reduction target.

When calculating The Town of Coupeville's emissions inventory, all energy consumed in Coupeville was included. This means that, even though the electricity used by Coupeville residents is produced elsewhere, this energy and emissions associated with it appears in Coupeville's 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.

B. Baseline Year Inventory Results

2000 Emissions Summary

Table 1: Coupeville Emissions Summary - 2000

	Community Analysis	Municipal Operations Analysis
Base Year: 2000		
eCO_2 Emissions (tons)	**18,133**	**469**

Source: CACP Model output

1. Community Emissions Inventory - 2000

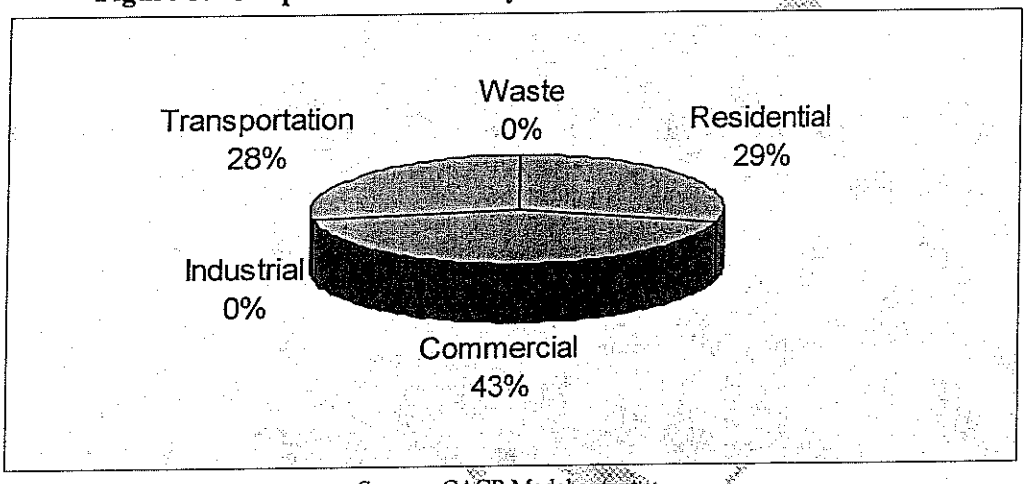
In the base year 2000 the community of Coupeville emitted approximately 18,133 tons of eCO_2 from residential, commercial and industrial sectors. Notably, the greatest amount of emissions came from electricity use in the commercial sector. Table 1 and Figure 5 below show the breakdown of community emissions by source type.

Table 2: Coupeville Community Emissions Summary –2000

Potential Sources	Equiv CO_2 (Tons)	Energy (Million Btu)
Residential	5,353	41,241
Commercial	7,859	53,632
Industrial	10	64
Transportation	5,079	58,955
Waste	- 169	n/a
TOTAL	**18,133**	**153,893**

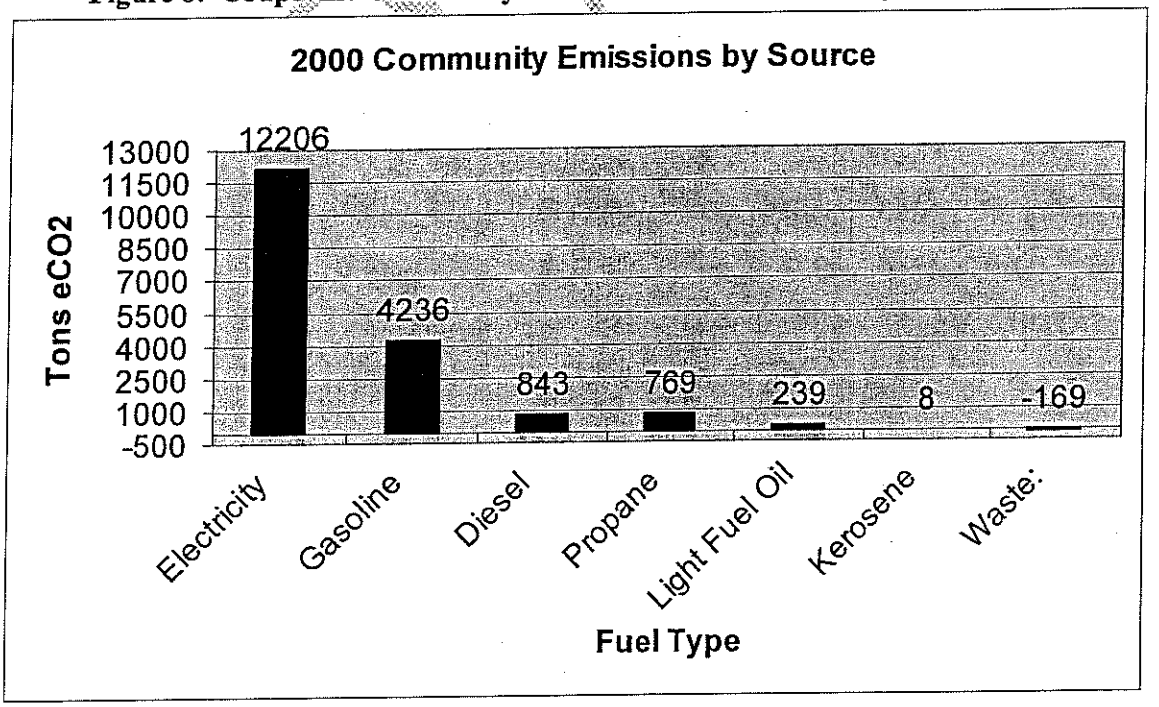
Source: CACP Model output

Figure 5: Coupeville Community Greenhouse Gas Emissions - 2000



Source: CACP Model output

Figure 6: Coupeville Community Greenhouse Gas Emissions by Source – 2000



Source: CACP Model output

Energy/Stationary Source Emissions

Emissions from the residential, commercial, and industrial sectors in Coupeville are primarily composed of stationary sources. Stationary sources refer to emissions generated from fixed places or objects, such as buildings and homes, from which pollutants are released. Seventy-two percent of Coupeville's emissions came from stationary sources within these three sectors. The majority of these emissions (sixty-seven percent) came from electricity use, predominantly from the community's residential sector. Four percent of total emissions came from propane, and just one percent came from light fuel oil.

Transportation Emissions

Emissions from the transportation sector account for twenty eight percent of total emissions. Gasoline comprises the majority at twenty three percent of overall emissions with diesel coming in next at five percent.

Solid Waste Emissions

Coupeville residents sent an estimated 889 tons of municipal solid waste (MSW) to the landfill in 2000.The GHG emissions generated from waste are dependent on the type of waste being disposed of and the configuration of the landfill where waste is disposed. Two processes generally occur in a typical landfill. First, the waste does not completely decompose; causing some of the carbon that would have been released as CO_2 to actually be sequestered in the landfill. Second, because of the lack of oxygen in the landfill, the decomposing matter is released as methane, a greenhouse gas 21 times more potent than CO_2. If methane is not captured or burned, landfills are net sources of greenhouse gas emissions. And in some cases, waste disposal can be a significant part of a community's climate pollution profile.

However, the methane released at a landfill can be captured to produce energy or it can be burned, which converts it back to the less potent CO_2. Coupeville's waste was sent to Columbia Ridge, a sanitary landfill with a methane recovery factor of 80%. This means that 80% of the methane gas released is captured (or "recovered") at the landfill. In Coupeville's case, the net result is that a little bit more carbon equivalent is buried and trapped in the landfill than is added to the atmosphere. This effect explains why eCO2 emissions from our waste sector are reported as negative. Therefore no emissions were generated from the waste sector, but rather emissions were reduced overall by 169 tons of eCO_2.

This does not mean that creating additional garbage is part of the solution, but that in Coupeville, waste reduction should not be a top priority for climate protection. It is also important to note that while waste reduction from recycling is not a priority for climate protection in this analysis, recycling saves a substantial amount of energy upstream by reducing the need for virgin inputs. While the benefits of recycling are not accounted for within the confines of this inventory, in the larger picture, it does have a net benefit for the climate.

Included in this calculation were the estimated emissions from trucking the waste to Seattle and then loading it on a train to be hauled to Oregon. (See the waste transport coefficient set in the software and the Excel spreadsheet entitled "Waste emissions coefficients calculator" for a further explanation of theses calculations.)

2. Municipal Operations Emissions Inventory - 2000

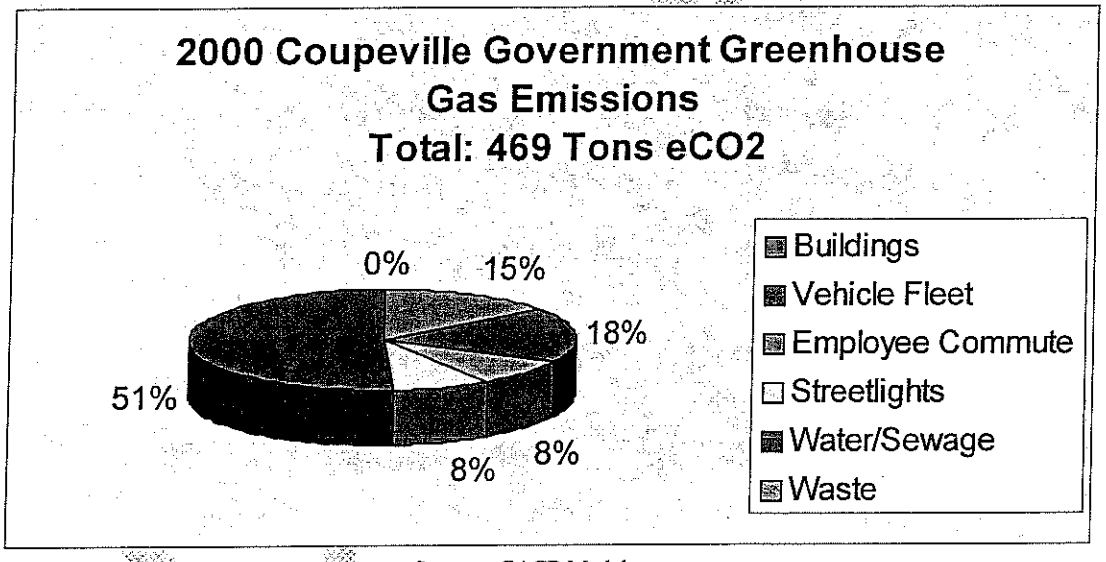
In the base year of 2000, Coupeville's municipal operations generated 469 tons of eCO_2. Table 2 and Figure 7 show the breakdown of municipal operations emissions by sector.

Table 3: Coupeville Municipal Emissions Summary - 2000

Municipal Sectors	Equiv. CO_2 (Tons)	Energy (Million Btu)	Cost ($)
Buildings	71	571	$9,421
Vehicle Fleet	85	995	$11,708
Employee mute	38	445	
Streetlights	40	267	$16,838
Water/Sewage	242	1616	$32,475
Waste	-8		$1,800
TOTAL	**469**	**3894**	**$72,243**

Source: CACP Model output

Figure 7: Coupeville Municipal Greenhouse Gas Emissions – Year 2000



Source: CACP Model output

Municipal emissions in the Town of Coupeville constitute about 2.6 percent of the Town's total emissions. Local government emissions typically fall between 2 to 5 percent of overall community emissions. As a minor contributor to total emissions, actions to reduce municipal energy use may have a limited impact on the Town of Coupeville's overall community emissions levels. However, municipal action has symbolic value and demonstrates leadership that extends beyond the magnitude of emissions actually reduced.

Energy/Stationary Source Emissions

Across sectors, the vast majority of emissions came from stationary sources using electricity. Fifty one percent came from the city's water and sewer accounts, fifteen percent from buildings and 8 percent from streetlights. The grand total for stationary sources comes to seventy four percent.

Transportation Emissions

Emissions from the city's vehicle fleet and the employee commute category account for twenty six percent of total emissions. The vehicle fleet, comprised of four full-size police cars, three light trucks and three heavy trucks accounted for eighteen percent of emissions.

With 14.65 full time employees, the Town of Coupeville's employees accounted for 8% of municipal emissions. Of note is that none of the employees reported walking, bicycling, or taking public transit for any part of their commute. Employee commute data is based on a 55% survey response rate for 13 employees in 2000, and should therefore be considered an estimate.

Solid Waste Emissions

In 2000 the Town of Coupeville paid for 19 tons of MSW and 3 tons of roadside yard waste to be disposed of by the local disposal company. However, due to Coupeville's waste being sent to Columbia Ridge (a landfill with an estimated 80% methane recovery) waste actually ends up serving as a net carbon sink. Therefore no emissions were generated from the municipal waste sector, but rather reduced overall emissions by 8 tons of eCO2. These calculations are consistent with the methodology described in Section B.1: Community Emissions Inventory, 2000.

C. Interim Year Inventory Results
2005 Emissions Summary

Table 4: Coupeville Emissions Summary – 2005

	Community Analysis	Municipal Operations Analysis
Interim Year: 2005		
eCO_2 Emissions (tons)	**19,104**	**618**

Source: CACP Model output

1. Community Emissions Inventory – 2005

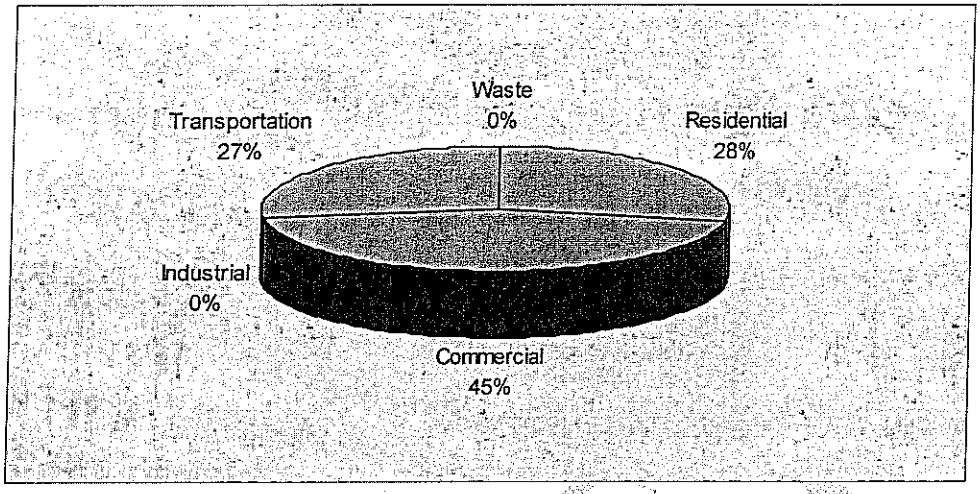
In 2005, the community of Coupeville emitted approximately 19,104 tons of eCO_2, a 5.4% increase over 2000. Of note is that the greatest amount of emissions continued to come from electricity use in the commercial sector, showing a 7.3% increase over 2000. Table 4 and Figure 8 below show the breakdown of community emissions by source type.

Table 5: Coupeville Community Emissions Summary - 2005

Sources	Equiv CO_2 (Tons)	Energy (Million Btu)
Residential	5,338	40,633
Commercial	8,692	57,208
Industrial	2	12
Transportation	5,291	61,676
Waste	- 219	n/a
TOTAL	**19,104**	**159,529**

Source: CACP Model output

Figure 8: Coupeville Community Greenhouse Gas Emissions - 2005



Source: CACP Model output

Energy/Stationary Source Emissions

Across all sectors, the vast majority of emissions came from stationary sources. Sixty seven percent came from electricity, primarily generating from the community's commercial sector. Four percent came from propane, and just one percent came from light fuel oil. The grand total for stationary sources comes to seventy two percent. Note that the general percent contribution by fuel type to the community's emissions remained relatively stable between 2000 and 2005.

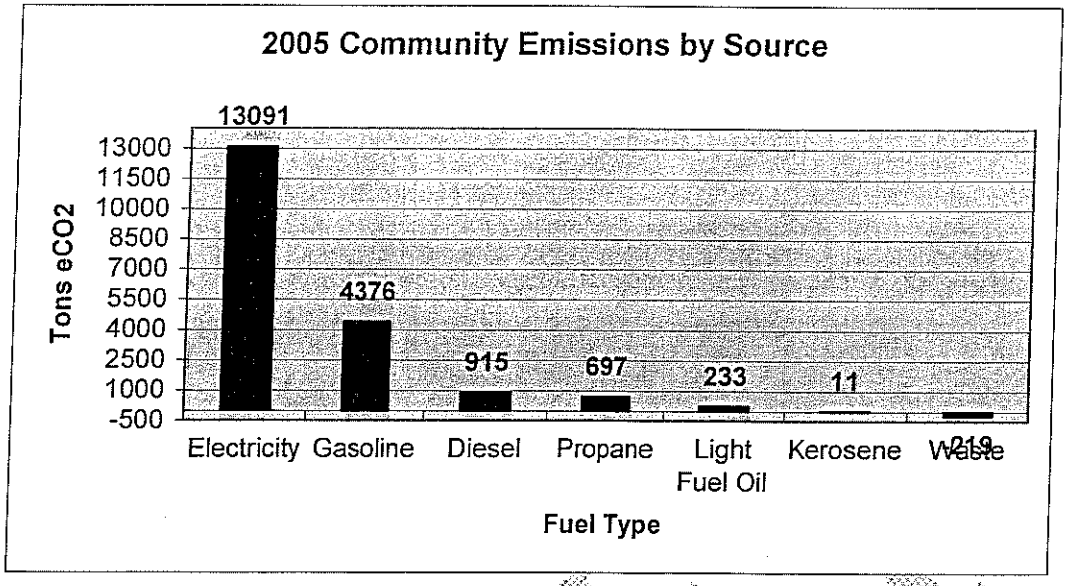
Transportation Emissions

Emissions from the transportation sector account for twenty eight percent of total emissions. Gasoline comprises the majority at twenty three percent of total emissions and diesel coming in next at five percent.

Solid Waste Emissions

Coupeville residents sent an estimated 1,144 tons of MSW to the landfill in 2005. However, due to Coupeville's waste being sent to Columbia Ridge (a landfill with an estimated 80% methane recovery) waste actually ends up serving as a net carbon sink. Therefore no emissions were generated from the waste sector, but rather reduced overall emissions by 219 tons of eCO2. The reduction of eCO2 is larger in 2005 because more waste was generated. These calculations are consistent with the methodology described in Section B.1: Community Emissions Inventory, 2000.

Figure 9: Coupeville Community Greenhouse Gas Emissions by Source – 2005



Source: CACP Model output

2. Municipal Operations Emissions Inventory - 2005

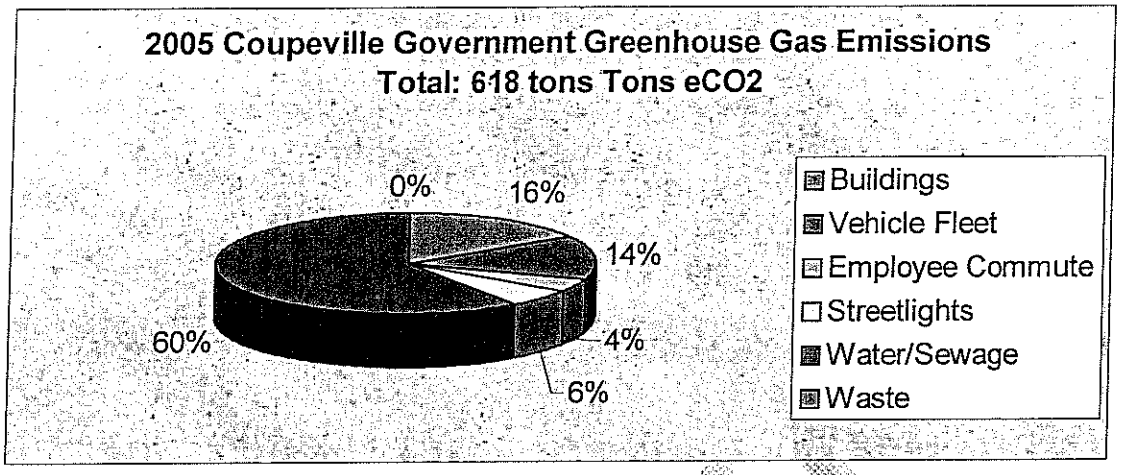
In 2005, Coupeville's municipal operations generated 618 tons of eCO_2. The largest source of emissions came from electricity usage for wastewater and sewage accounts, followed next by electricity for municipal buildings. Of particular note is an unusually high percent increase in kWh used for two municipal accounts that are discussed later in the measures section. Table 6 and Figure 10 show the breakdown of municipal operations emissions by sector.

Table 6: Coupeville Municipal Emissions Summary - 2005

Municipal Sectors	Equiv CO_2 (Tons)	Energy (Million Btu)	Cost ($)
Buildings	103	826	$17,774
Vehicle Fleet	88	1,028	$15,516
Employee Commute	26	310	
Streetlights	37	239	$16,509
Water/Sewage	375	2412	$53,403
Waste	-11	n/a	$1,713
TOTAL	**618**	**4817**	**$104,915**

Source: CACP Model output

Figure 10: Coupeville Municipal Greenhouse Gas Emissions - 2005



Source: CACP Model output

Municipal emissions in Coupeville constituted about 3.2 percent of the Town's total emissions in 2005. Note that this represents an increase over 2000.

Energy/Stationary Source Emissions

Across all sectors, the vast majority of emissions came from stationary sources using electricity. Sixty percent came from the town's wastewater and sewer accounts, sixteen percent from buildings, and six percent came from streetlights. The grand total for stationary sources came to eighty two percent.

Transportation Emissions

Emissions from the town's vehicle fleet and from employee commute together accounted for eighteen percent of total emissions. The vehicle fleet, comprised of four full-size police cars, three light trucks and three heavy trucks accounted for fourteen percent of emissions.

With 14.65 full time employees, the Town of Coupeville's employees accounted for four percent of municipal emissions. Of note is that out of the 82% survey response in 2005, none of the employees reported walking, bicycling, or taking public transit for any part of their commute. However, the results of the 2000 and 2005 employee commute surveys should not be compared since they are based on different employee response rates.

Solid Waste Emissions

In 2005, the Town of Coupeville paid for 11 tons of MSW and 11 tons of roadside yard waste to be disposed of by Island County Solid Waste. However, due to Coupeville's waste being sent to Columbia Ridge (a landfill with an estimated 80% methane recovery), waste actually ends up serving as a net carbon sink. Therefore, no emissions were generated from the municipal waste sector, but rather waste reduced overall emissions by 11 tons of eCO2. The reduction of eCO2 was larger in 2005 (-219 tons of eCO2 in 2005 vs. -169 tons of eCO2 in 2000) because more waste was generated in 2005. These calculations are consistent with the methodology described in Section B.1: Community Emissions Inventory, 2000.

Table 7: Coupeville Emissions Summary – A Comparison of Base Year and Interim Year

	Community Analysis	Municipal Operations Analysis
Base Year: 2000		
eCO_2 Emissions (tons)	18,133	469
Interim Year: 2005		
eCO_2 Emissions (tons)	19,104	618
Percent increase: 2000 to 2005	**5.4%**	**3.2%**

Source: CACP Model output

III. Forecast for Greenhouse Gas Emissions

Based on the community and municipal operations emissions inventories developed for the Town of Coupeville for the base year 2000, our next step was to forecast future emissions generated in our community between the baseline, interim and target years. The emissions forecast represents a business-as-usual prediction of how greenhouse gas (GHG) emissions may change in our community over time. This forecast is essential for setting the reduction target, since the amount of greenhouse gas emissions Coupeville has pledged to reduce will be derived from projected emissions

The year 2020 was selected as the target year for reaching the City's emissions reduction goals. This timeframe was chosen based on the desire for the year to be near enough to incite positive action, while simultaneously being distant enough to allow a reasonable period for the Town of Coupeville to achieve its goal. Additionally, 2020 is an attractive target from the perspective of regional consistency, as many neighboring municipalities have also selected 2020 for their target year.

Additionally, a forecast was also done for the year 2012 for informational purposes, as that is the target year of the Kyoto Protocol. It is recommended that this year be used for a midpoint evaluation, at which time progress towards the 2020 target reduction goal can be evaluated and adjustments made accordingly.

Table 8: Coupeville Emissions Summary – Baseline 2000 and Target Year 2020

	Community Analysis	Municipal Operations Analysis
Base Year: 2000		
eCO_2 Emissions (tons)	18,133	469
Target Year: 2020		
eCO_2 Emissions (tons) using Business As Usual Forecast	25,555	1007

Source: CACP Model Output

IV. Greenhouse Gas Emissions Reduction Target

A reduction target provides a tangible goal for Coupeville's emissions reduction efforts. Our emissions reduction target represents a percentage by which the community aims to decrease emissions, below the 2000 baseline, by a target year.

The recommended reduction target for Coupeville is 20% below 2000's emissions by the year 2020. To reach this target, Coupeville must reduce annual emissions by 11,049 tons by the year 2020. Many factors were considered when selecting a recommended reduction target for Coupeville.

The Kyoto Protocol, an international agreement addressing global warming pollution and ratified by 164 countries, sets an emissions reduction target of 7% below 1990 levels. The Intergovernmental Panel on Climate Change (IPCC) suggests that we could need to achieve as much as a 60% reduction below 1990 levels in order to slow global warming and stabilize the climate. Given this backdrop we strove to select a reduction target that would be both aggressive and achievable given local circumstances. It is recommended that progress toward the goal be monitored and the reduction target be re-assessed during the 2012 mid-point evaluation.

Some specific local factors to be considered when finalizing the reduction target include estimation of the effects of implemented and planned programs and policies, an approximate assessment of future opportunities to reduce emissions, targets adopted by peer communities, and emissions reductions efforts resulting from policies established by the State of Washington.

Table 9: Coupeville Emissions Summary – Baseline, Target Year and Reduction Target

	Community Analysis	Municipal Operations Analysis
Base Year: 2000		
eCO_2 Emissions (tons)	18,133	469
Target Year: 2020		
eCO_2 Emissions (tons) Using Business As Usual Forecast	25,555	1007
Reduction Target below 2000 levels		
Percent eCO_2 reduction	20%	20%
eCO_2 Emissions (tons)	11,049	632

Source: CACP Model output

V. Existing Measures

At both the community-scale and within municipal operations, Coupeville has already undertaken a number of programs, policies and projects that have resulted in reduced greenhouse gas emissions.

A. Existing Community-Scale Measures

Coupeville has already undertaken a number of community-scale measures resulting in reduced greenhouse gas emissions relative to the base year of 2000. Together these measures already account for 8% of Coupeville's ultimate reduction goal, and are an excellent first step towards significant reductions of greenhouse gas emissions in the community.

By comparing the projected growth in community emissions to the actual emissions observed in 2005, it is possible to estimate the cumulative impact of these measures. Certain measures such as green power purchasing, increased recycling, and residential solar panel installments were able to be quantified and together accounted for an estimated 290 tons eCO_2 of the difference between 2005's projected and actual emissions. The remaining difference (589 tons) is assumed to be the result of various hard to quantify measures that we nevertheless know have been undertaken. Some of these measures most likely include conservation-oriented behavioral changes amongst residents and business owners, and vehicle emissions reductions attributable to the newly painted bike lanes down Main Street.

Table 10: Existing Community Greenhouse Gas Emissions Reduction Measures

Policy	Year Initiated	eCO_2 Reduction by 2020 (tons)	Percent Reduction by 2020
Residential			
Green Power	2005	153	1.4%
PV Array	2000-2005	1	0%
Waste			
Recycling	2000-2005	136	1.2%
Reduction from hard to quantify measures	2000-2005	589	5.3%
Total reduction		**879**	**8%**

Source: CACP Model output

B. Existing Municipal Operations Measures

Coupeville has also already undertaken a number of municipal operations measures resulting in reduced greenhouse gas emissions relative to the base year of 2000. These measures are an excellent first step towards significant reductions of greenhouse gas emissions from municipal operations. According to estimates produced using the CACP software, these measures already account for 6 tons eCO_2 reduction, or 1% percent towards Coupeville's ultimate municipal operations reduction goal. They have been broken down by sector and are outlined below.

Table 11: Existing Municipal Greenhouse Gas Emissions Reduction Measures

Policy	Year Initiated	Tons eCO_2 Reduction by 2020	% Reduction by 2020	Project Lead, Contact and/or Department
Employee Commute. Employee switch from SUV to hybrid & biodiesel compact cars	2003	3	.5 %	Larry Kwarsick
Street Lights. Main St. & Prairie Light Efficient Bulb Replacement	2005	1	.2%	Public Works Director
Waste. Town Hall mixed paper recycling	2005	2	.3%	Mayor Conard
Total reduction		**6**	**1%**	

Source: CACP Model output

C. The Emissions Reductions Needed to Make Proposed Targets

After quantifying the emissions reductions achieved from existing measures, Coupeville can determine how close we are to approaching our target and how far we have to go. As the table below indicates, in order to achieve our reduction target of 20% we will have to reduce annual eCO_2 emissions by a total of 10,164 tons, 626 of which should come from government measures.

Table 12: Coupeville Emissions Summary – Reductions Achieved and Necessary

	Community Analysis	Municipal Operations Analysis
Base Year: 2000		
eCO_2 Emissions, (tons)	18,133	469
Target Year: 2020		
eCO_2 emissions (tons)	25,555	1007
Reduction Target		
Percent eCO_2 reduction	20%	20%
eCO_2 Emissions (tons)	11,049	632
Existing Reductions to Date		
eCO_2 Emissions (tons)	885	6
Reductions Necessary to Reach Target		
Percent of eCO_2 emission reduction needed to reach the 20% reduction goal	92%	99%
eCO_2 Emission (tons)	10,164	626

Source: CACP Model output

C. External Measures

In addition to emissions reduction measures implemented within our community, the effects of measures recently implemented at the state and federal level also deserve consideration in the context of our greenhouse gas emissions inventory. They have not been integrated into the project emissions reductions for Coupeville above because they originated outside of the community. However, actions at other levels warrant consideration, and have thus been outlined below.

Washington, three state policies recently passed by the legislature, the renewable fuel standard, SHB 3141, and the "clean cars bill" that adopts California's emissions standards. These, and others, will indirectly reduce individual emissions. Coupeville residents may not notice these changes in their day-to-day life, but they will have the potential to significantly impact town and state greenhouse gas emissions. There are still too many uncertainties about the impacts of these laws to be able to quantify their impact on future emissions in Coupeville. However, it is clear that there will be some aid from the State in achieving Coupeville's goals.

VI. Proposed Emissions Reduction Measures

After careful consideration of the distribution of emissions production across various sectors of the community, as well as resources available and potential costs and co-benefits, the most beneficial and feasible measures were chosen to help reduce greenhouse gas emissions by 20% by 2020. CACP Software was used to calculate the greenhouse gas reductions both in tons and percentage. However, these measures will not only result in reduced greenhouse gas emissions, but many will also reduce particulate air pollutants, save money, and create more attractive walkable communities. The measures have been broken down by sector and are described below.

A. Community Measures

Table 13: Proposed Community Greenhouse Gas Emissions Reduction Measures

Policy	Year to be initiated	Tons eCO_2 Reduction by 2020	Percent Community emissions reduction	Project Lead, Contact and/or Department
Residential & Commercial				
Community Green Power Challenge!	2007	1,851	18.2%	Mayor Conard
Energy Performance Contracting	2007	617	6.1%	Mayor Conard
Transportation				
Smart Growth Land Use planning	2007	295	2.9%	Mayor Conard
Waste				
Curbside Recycling	2007	290	2.9%	Mayor Conard Jerry Mingo, Island County Solid Waste
Total		**3,053**	**30%**	

Source: CACP Model output

1. Residential & Commercial:

a. Community-wide Green Power Challenge:

An education program to set the goal of 15% green power to be purchased by Coupeville's combined residential and commercial sectors by 2020, would equate to a carbon savings of 1,851 tons per year based on 2005 data. Of note is that in 2005 1.2% of all the electricity purchased by the combined residential and commercial sectors was already green power. This means that with no local education or outreach program, residents and business owners have begun to do this by themselves. With a conscious campaign and education outreach effort, a significant increase may be possible. Green power is not much more expensive, and the more people who buy, the lower the cost will become. According to Puget Sound Energy (PSE - the local electricity provider), if the average residence purchases green power for the equivalent of 30% of their electric bill, they would only spend $6 on green power per month. If 15% of commercial and residential establishments purchase 100% green power, or 100% of commercial and residential establishments buy just 15% of their electricity from green power, we can achieve our goal. Through a combination of enthusiastic supporters buying 100% and most residents and businesses making a small adjustment to their energy bill, the 15% green power goal is well within our reach.

b. Energy Performance Contracting:

Establish a goal of reducing electricity usage from the combined residential and commercial sectors by 5% through energy conservation. Energy audits and retrofits can be made easier through the help of a revolving fund/energy performance contracting company. Energy Performance Contracting is a means to use utility savings to pay all project costs, and is by far the most cost-effective process for completing building energy upgrades. It involves a partnership between an Energy Service Company (ESCO) and the facility owner, wherein the ESCO completes an energy audit of the facility, commissions and finances the projects you select, and is then repaid with the accumulated utility savings from the project, eventually passing the savings back on to the customer. This method helps individual homeowners and businesses overcome the initial capital investment hurdle of many different types of energy retrofit projects. Strong regional interest (), including the participation of neighboring municipalities, makes this a potentially viable option - to either attract an existing Energy Service Company to the area, or to establish one locally.

2. Transportation:

a. Smart Growth & Land-Use Planning

It is recommended that Coupeville incorporate smart growth land-use planning strategies throughout future development proposals and via updates to the Comprehensive Plan and zoning requirements. Of particular relevance for Coupeville is the zoned density/acre for new developments. It is recommended that the next Comprehensive Plan update process include a revision of zoning codes to help incorporate higher density development, and mixed-use communities, thereby increasing walkability and decreasing dependence on automobiles. These measures would preserve the traditional development patterns that have made Coupeville the town that it is and encourage residents living in the central business area to rely on alternative transportation means for travel within the town's boundaries. Additional recommendations include the continued maintenance and expansion of existing bicycle lane and pedestrian trail systems. If Coupeville reduced its annual vehicle miles traveled (VMT) 5% by 2020 via smart growth land-use planning tools and by encouraging increased use of public transit and alternative transportation, it could expect an emissions reduction of 295 tons of eCO2.

3.Waste:

a. Curbside Recycling:

Currently there is strong county interest in working with Whidbey Island's primary disposal company to establish an alternate week curbside recycling pick-up program. Island County Solid Waste has urged local cities to express their support for such a program and to work collaboratively with the local proprietor to see what it would take to offer such a service. It is estimated that the implementation of curbside pickup would increase the efficiency of recyclables recovery from 10% to 50%. Currently, the hauling company implements a passive recycling program where some recyclables are manually picked out of the MSW stream, however, it is estimated that participation in this program is low, and that this is not the most efficient recovery method. Past efforts at promoting this passive recycling program have generally been boom and bust, where participation rose initially, but then fell back to previous levels. Additionally, it is estimated that only 1 in 10 residents self-haul their recyclables to local drop-boxes. Adding curbside recycling would make it easier for Whidbey Island residents to recycle, and would have a lasting benefit to the environment. Coupeville's estimated share of the eCO2 reduction of such a measure would be 290 tons eCO2.

B. Municipal Measures

Table 14: Proposed Municipal Greenhouse Gas Emissions Reduction Measures

Policy	Year to be initiated	Tons eCO2 Reduction by 2020	Percent Municipal emissions reduction	Estimated Savings
Buildings				
Energy audits of target facilities	2006	62	10%	$9,664.
100% Municipal Green Power Purchasing	2007	494	79%	-$10,000.
Vehicle Fleet				
Bio-diesel	2007	7	1.1%	-$667.
No-idle policy	2006	9	1.4%	$1,507.
Waste				
Yard waste/ biosolids composting program	2007	202	32.3	$10,000.
Total		**774**	**124%**	**$10,504.**

Source: CACP Model output

1. Buildings

a. Energy audits of targeted facilities

Throughout the inventory process, two facilities were identified as being potential opportunities for energy conservation based on high kWh usage and steep percent increases in both energy use and cost between the years 2000 and 2005. These facilities are the record storage warehouse at 201 Main St. and the Wastewater Treatment Plant

3. Waste:

a. Composting Program:

The burn ban going into effect January 1, 2007, will mean that residents will need new ways to get rid of their yard waste.[23] The implementation of a yard waste composting program, modeled off of the successful program in Langley is recommended in order to ensure that this yard waste is recycled. Additionally, a program such as this offers Coupeville a huge opportunity to reduce their cost of hauling bio-solids, which in 2005 cost the town approximately $64,000.! By just composting 15.6% (647 tons) of the 4,141 tons of bio-solids generated in 2005 and combining this with residential yard waste from the Burn Ban going into effect January 1, 2007, Coupeville could save $10,000 in hauling fees - enough money to pay for 100% municipal green power.

Table 15: Coupeville Final Emissions Summary

	eCO_2 in tons
Emissions reduction achieved to date	885
Emissions reductions from Proposed Community Measures (tons)	3,053
Emissions Reductions from Proposed Municipal Measures (tons)	774
Total Emissions Reduction Achieved and Proposed	**4712**
Volume of Emissions Reduction Needed to Reach 20% Target	11,049
Percent of Target Realized through Achieved and Proposed Measures	**42.6%**

[23] Burn Ban (All following information from the Northwest Clean Air Agency (www.nwcleanair.org):

Types of Burn Bans: A Burn ban is due to impaired air quality and is called when air pollutants are measured at unhealthful levels. The Northwest Clean Air Agency or the Washington State Department of Ecology is responsible for calling this type of ban. The stage of burn ban depends on the level of air pollution; Stage I Burn Ban: No outdoor burning or burning in any uncertified wood stove or fireplace; Stage II Burn Ban: No outdoor burning or burning in any wood stove, fireplace or pellet stove. Exemptions include: Households with no other source of adequate heat can request an exemption from NWCAA to burn during a burn ban.

Permanent burn bans permanently prohibit land-clearing and residential burning of yard clippings and other vegetative debris in specific cities and their \urban growth areas. On January 1, 2007, the permanent burn ban areas for both residential and land-clearing burning will be extended to Coupeville and Langley, as well as a number of other cities in the Northwest Clean Air Agency's jurisdiction.

VII. Conclusion

Climate change is an issue of growing concern for communities across the United States and around the world. The Town of Coupeville has displayed great leadership and foresight in choosing to confront this issue now. By reducing the amount of greenhouse gases emitted by its community, Coupeville joins hundreds of other American cities in stemming the tide of global warming and the numerous threats associated with it, such as increased droughts and flooding, disrupted agricultural systems and rising sea levels.

In addition to mitigating the destabilization of the climate and associated effects, Coupeville stands to benefit in many other ways from the proposed measures outlined in this report. Many of the proposed measures have additional benefits such as financial savings resulting from improved energy efficiency, a more walkable community, increased energy security, improved air quality, stimulation of the emerging renewable energy sector of the economy and most of all the knowledge that Coupeville is doing its part to curb the trends of global warming and leave our planet a better place for the next several generations.

Meeting Coupeville's reduction target will require both persistence and adaptability. Next steps include the formation of a municipal climate task force and/or citizen energy committee to take the work presented in this report and carry it forward towards official Council adoption of the target and Action Plan. The Town of Coupeville should continue to work with ICLEI and the Northwest Clean Air Agency throughout the Action Plan implementation process. A system for monitoring progress towards the reduction target should be established with the recommendation that progress towards the reduction target be re-assessed by 2012.

VIII. Guide for Future Steps

A. Administration and Staffing

A key part of effective measures implementation is assigning and defining management responsibilities for the individual components. These assignments can be specified in the section of the Local Action Plan that proposes potential measures. Wherever possible, use arrangements already in place as it is best if the Climate Action Plan fits in with existing workloads.

An appropriate Town staff person should be assigned overall responsibility for coordinating the implementation of the Climate Action Plan. It is a good idea to establish an interdepartmental committee to ensure effective communication and coordination between those responsible for the program's various elements.

Ensure from the beginning that there are adequate resources to implement the Climate Action Plan. These include funding, and adequate staff or outside assistance. If it is necessary to add staff or outside assistance, the plan should acknowledge this. One possible way to use existing resources more effectively is to use volunteers or interns from the community to gather information or do public outreach. Protecting the environment is an issue that appeals to many well-informed citizens. Since we're counting on the results from existing measures to give us a head start on meeting the greenhouse gas reduction goal, it will be important to identify the actions or steps necessary to ensure that existing measures are implemented fully and effectively.

The Climate Action Plan is an opportunity to renew and reinforce commitment to existing programs and projects that have the effect of reducing greenhouse gas emissions. By identifying these as key elements in the Climate Action Plan, measures that may, for one reason or another, have been languishing on the back burner can be brought back to life.

B. Financing and Budgeting

Many opportunities will arise to incorporate measures into existing projects and expenditures, from right-sizing the municipal fleet to incorporating policies that encourage and enable transit in lieu of single occupancy vehicles. Some actions, such as adding more buses or routes to expand transit use, may require significant up-front investment, whereas some, such as reducing number of vehicles in the municipal fleet or setting all computers on energy efficient sleep mode will require no added expenditure.

Funds can be found from the existing municipal budget. Parking revenues, for instance, might be used to pay for alternative transit improvements, on the grounds that these improvements reduce parking demand. The energy-saving benefits of the measures you implement for your whole community will be vastly greater than the savings from local government operations, but they will accrue to the private sector, not to your local government. However, you can tap into some of these savings to fund program implementation through fees or surcharges on utility bills, building permits, and so on. Local needs and the political viability of this approach will affect pursuing such funding mechanisms.

When municipal resources fall short, there are a number of alternative resources, including financial arrangements with local utilities, assistance through federal and state programs, and energy service corporations (ESCOs). Puget Sound Energy has expressed interest in a variety of partnerships in this area. ICLEI and the Northwest Clean Air Agency are eager to help bring these efforts to fruition.

C. Developing a Timeline

The schedule for implementing the Climate Action Plan's programs and measures should be timely enough to get Coupeville to its goal by the target year. However, it should also be practical, taking into account the administrative, political, technical, practical, and other issues involved in getting programs up and running.

The overall schedule should meet the target date set for meeting the greenhouse gas reduction goal, provide ample time for external review and input and put aside time for citizen involvement and input, committee and commission review as necessary. It makes sense to implement the simplest and easiest measures first. For projects or policies that will be more complicated or controversial, take the time needed to lay the necessary groundwork to develop the best possible recommendations and generate the strongest possible support, as well as integrating the schedule with existing processes and responsibilities

D. Public Involvement in the Implementation Process

The implementation phase should continue to include strong public input, involvement, and buy-in. Consider establishing a community task force to work with municipal staff and elected officials in the Climate Action Plan's implementation. Another key tool is to recruit volunteers and interns to assist in presenting the Plan to the public and helping in its implementation.

E. Monitoring

To make sure the Climate Action Plan is implemented effectively and on schedule, it is important to include procedures for monitoring its implementation, measuring results, keeping track of changing conditions, taking advantage of new information and ideas, and so on. This requires following-up on the sources and data developed in preparing the emissions analysis and forecast. Monitor to check if the figures change in the ways predicted. If not, resolve whether this is a result of inadequate program implementation, or the measures adopted were not sufficient. Tracking and measuring should be routine, so as to remain aware of the progress Coupeville is making. Incorporate greenhouse gas reduction progress into other reports and planning documents Coupeville is already producing.

F. Re-Inventory

Jurisdictions are encouraged to conduct re-inventory for their Community and Municipal buildings and operations. The re-inventory should be conducted either before the target year or at least at the target year so that Coupeville can quantify the emissions and compare it with the base year emissions and interim year emissions. This will define progress in terms of greenhouse gas reduction and provide an opportunity to implement new measures or improve existing ones. It is recommended that Coupeville conduct a re-inventory in 2012 to determine progress towards the reduction target. A forecast for that date has been included in the software in order to ease this process.

Appendix A - Data Collection Process, Assumptions and Notes

Government Inventory:

Buildings:

Data for all municipal electricity accounts were gathered from utility bills from 2000 and 2005. Gallons of propane & heating oil were also gathered based on bills.

Vehicles: Mayor Conard provided records of mileage and fleet inventory for both 2000 and 2005. Gallons of fuel were determined from fuel accounts (see attached).

Employee Commute: Based on a survey with a 55% response rate in 2000, and an 82% response rate for 2002 (see attached).

Streetlights: No kWh were given on the PSE bills after April of 2000. Electricity usage was determined based on the wattage method in conjunction with the assumption that streetlights were on for the same number of hours per day in 2005 as they were in 2000. For "area lights" no wattage or kWh information at all is given on the bills after April of 2000. To estimate the energy usage for "area lights" it was assumed that the average cost per kWh for area lights was the same in 2005 as it was in 2000.

Water/ Sewage: Data for all water and sewage electricity use were gathered from utility bills from 2000 and 2005 PSE bills

Waste: Government waste was determined from bills from Island County Solid Waste, Island Disposal, and for biosolids hauling (note: tons of biosolids were not included in the greenhouse gas emission inventory but were examined for purposes of determining cost savings opportunities). Government recycling tonnages were based off of estimates made by Coupeville's public works director and Mayor Conard.

Community Inventory:

Residential, Commercial & Industrial:

Electricity:

All electricity figures for the residential and commercial sectors in 2000 and 2005 were reported to us by PSE. Which accounts to include in this report was determined by whether the facility was located within the city boundaries.

Propane, Heating Oil, Kerosene[24]:

These numbers were estimated based on 2000 census data for the number of homes using propane or heating oil/ kerosene as their primary heat source. This number was used in conjunction with the United States Department of Energy's statistics for the average number of gallons used for space heating with each energy source in 2001. The commercial numbers were extrapolated based on the assumption that the ratio of Coupeville's residential propane or heating oil/kerosene consumption to Washington State's is the same as the ratio for commercial consumption of these fuels. All data acquired from the 2000 census and the DOE EIA.

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[24] http://www.ofm.wa.gov/census2000/profiles/default.asp#place
http://www.eia.doe.gov/emeu/recs/byfuels/2001/byfuel_lpg.pdf,
http://www.eia.doe.gov/emeu/recs/byfuels/2001/byfuels_2001.html
http://www.eia.doe.gov/emeu/states/sep_use/com/use_com_wa.html
http://www.eia.doe.gov/emeu/states/sep_use/res/use_res_wa.html

See Excel spreadsheets and Word document entitled propane methodology for a more detailed explanation.

Transportation:

Coupeville's annual vehicle-miles traveled for 2000 and 2005 were based on AADT traffic counts acquired from City Engineer Ryan Goodman multiplied by the miles of road in Coupeville by functional class. Since no traffic counts existed for local roads, estimated data from State Department of Transportation was used for 2000 and 2004 under the category of "small urban." For more details please see the Excel spreadsheets for VMT.

Waste:

Community Waste for Coupeville was estimated based on the assumption that the per capita recycling rate for Island County was the same as the per capita rate for Coupeville. Hence the per capita MSW disposal rate for Island County in 2000 and 2005 was multiplied by Coupeville's respective population. Waste Characterization data was not available for Island County. It was determined that the most thorough and reliable waste characterization that would be applicable to Coupeville was available in the widely cited 1999 California Integrated Waste Management Board's study[25]. The data used is from the overall waste stream percentages found on page 11. Note: all Naval Base waste was subtracted from the Island County totals before a per capita rate was determined.

Recycling:

Recycling data was based on two spreadsheets faxed to me by Jerry Mingo (see attached). These sheets provided data on the tons of recyclables by type for 2000 and 2004. 2005 data was estimated based on the assumption that the recycling rate for 2004 applied to 2005 (this rate was applied to the data for the total tons of MSW disposed in 2005). The recycling rate per capita for Island County for 2000 and 2005 was applied to the population of Coupeville in 2000 and 2005 to get an estimate of the tons recycled by type for each year. The difference between the tons recycled in 2005 and the tons recycled in 2000 was then used to get an estimate of the percent increase in recycling that occurred. Some materials increased, others decreased, which was entered into the software. However, the net result was an increase, resulting in an overall carbon sink.

Forecasting:

Community:

Forecasting for the community was determined by taking the intermediate projected population growth statistics for Island County from the Growth Management Act[26] for 2000–2020 (and 2000-2012). Based on these figures an average annual percent population growth was determined. It was determined that the County's population growth could be used as a proxy for the Town of Coupeville. This figure was then used to determine the expected growth rate of consumption by fuel type in both the residential, commercial and transportation sectors based on several years of data trends for the pacific region. See Excel spreadsheet "Community Forecasting Tool" for a more detailed explanation.

Government:

For the government forecast two different methodologies were used and

[25] http://www.ciwmb.ca.gov/Publications/LocalAsst/34000009.doc
http://www.ciwmb.ca.gov/wastechar/Study1999/

[26] http://www.ofm.wa.govpopgmacountypop.pdf

the average of the results taken because 2005 is expected to be a high outlying year due to construction on the wastewater treatment plant and the installation of a new energy intensive ultra-violet treatment method. This may be the reason why the 2005 data is higher than the forecast for government emissions in 2020 generated by the population method (which assumes government emissions will grow in proportion to the population they serve). The second methodology used is based on the observed growth trends between 2000 and 2005. But again, as 2005 numbers are expected to be unusually high, the results of this methodology are probably biased considerably upwards. Hence, an average of the two methodology results was taken in an attempt to make the best estimate possible given the circumstances.

Data Source Contacts:
(Note: Mayor Conard had me go through her to access all city staff, therefore I had no contact with any city personnel, other than Ryan Goodman)
Nancy Conard, Mayor of Coupeville, (360) 678-4461 ext. 2
Jerry Mingo, Recycling Coordinator, Island County Solid Waste, (360) 679-7386
Kelly Keilwitz, Whidbey Sun & Wind, (360) 678-7131
Ryan Goodman, City Engineer/ Island Clean Energy, (360) 221-4246
Stacey Wickett of the Washington Department of Transportation, WicketS@wsdot.wa.gov
Frank Vande-Werfhorst, Operations Manager at Island Transit, frank@islandtransit.org