City Of Bellingham

Greenhouse Gas Inventory and Climate Protection Action Plan

May 2007

How can state and local leadership make a meaningful difference, at the scale of the climate challenge?

Isn't it too big? Isn't it beyond the scope of things that I can reasonably expect to influence?

- *We cause it locally, with our decisions about land use patterns and transportation choices and energy consumption.*
- *We feel the impacts locally. Nobody lives in the global average temperature. We live in our places, where our natural and human systems are elaborately and expensively adapted to the prevailing climate.*
- *Above all, when we roll up our sleeves and think concretely about solutions, the action is largely at the state and local level. State and local officials and agencies make many of these decisions about energy, transportation, and land use*

Most insiders on climate understand that the cutting-edge of the climate protection movement is at the state and local level.

Local & state action has inspired the rest of the world to keep working, in spite of lack of action at the federal level here in the U.S.

In a very real way, Seattle's leadership helped salvage Kyoto.

Local action – the many Kyoto cities and especially all of those that have been implementing lots of smart, forward thinking actions for years – are inspiring millions of Americans, generating a wave of new public will. This has the potential to overcome once and for all the denial and confusion that has stifled progress in the states.

--Excerpts from a Speech given by Paul Horton, Executive Director of Climate Solutions, April 27, 2006.

Mayor's Preface

Global warming may be the most serious long-term challenge in front of our society. Almost every week we learn more about the certainty of the science and the seriousness of the consequences of inaction. It can be easy to lose sight of the good news: this is a problem that is well understood. There is no mystery about what is causing the warming. And the solutions are also well understood. We have much of the technical know-how we need. What we need now is the political will to implement it.

While there is no substitute for federal action, all levels of government have important roles to play. Local government makes the planning decisions that effect how people drive and how energy is used in this community. Through permitting we have an influence on the efficiency of buildings. Municipal operations are a critical opportunity to set an example. There is no one big fix, that too is a blessing. Big fixes can go wrong in a big way. Instead what we need is a portfolio of smaller solutions that add up.

Cities will be the first to feel the consequences of inaction. Consequently, it is appropriate for us to take the lead. For example, Bellingham will have to plan to meet drinking water needs in the summer without the snowpack upon which we have traditionally relied. We have to anticipate and plan for the impacts of rising sea levels along our own shorelines.
Yet we should not view global warming as only a threat. It is also an opportunity to:

- reduce our dependence on insecure energy sources
- protect our air quality
- make smart budget decisions that save us money in the long term
- reduce traffic and plan our city for alternatives to cars as our only way of getting around
- preserve farmland and forests by making their natural resource uses profitable
- invigorate our economy by helping our region become a global center for the emerging clean energy industry

Most of all, climate change offers us an opportunity to demonstrate leadership and innovation as a community.
This simply crystallizes our vision.

Bellingham's Greenhouse Gas Emissions Inventory and Local Action Plan create a flexible framework that puts us well on our way toward achieving emissions levels that the best science says are necessary. Parts One, Two and Three of this document provide a definition of the problem and what others are doing about it. The Emissions Inventory in Part Four gives us a clear picture of where Bellingham is right now. With the forecast in Part Five, we know what the emissions are likely to be if we continue with business as usual.

However, Bellingham will not continue with business as usual. Part Six proposes aggressive, but achievable reduction targets. And the Climate Action Plan in Part
Seven lays out urgently needed, clear next steps.

We already have started on this path. Bellingham is the most successful Green Power Community in the EPA's green power partnership. We have proven that coordinated efforts between business, residents and local government work. For example, Bellingham's residents are among the national leaders in use of energy-saving compact fluorescent light bulbs and hybrid cars. These values are a part of our culture and put us in a unique position to show the rest of the country how it can be done.

If we step up to this plan, we will ensure a better future for both our kids and successive generations. It's clearly up to us!

Mayor Tim Douglas, April 2007

Acknowledgements

This report is the culmination of a year-long effort, which would not have been possible without the assistance of many people. The principal author would like to express his gratitude to all those who helped in so many ways:

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Executive Summary

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

Human beings are causing global warming, but we also know how to stop it. Solutions to global warming are available; we just have to choose to employ them. Bellingham has recognized that many of the most effective solutions have to originate at the local level because they stem from choices about how land is used, where our energy comes from and how we use it, and what we do for transportation. We are recognizing that when we make the best choices for the climate we also make Bellingham a healthier, more enjoyable place to live and work. When we take the long view, we see that protecting the climate will save us money: through reduced energy costs from conservation, through reduced reliance on volatile fossil fuel markets and by positioning ourselves to succeed in a future low carbon economy.

Bellingham will do its part. The City of Bellingham has a history of showing environmental leadership. In March of 2005 the Bellingham City Council unanimously passed resolution 2005-08 initiating the Cities for Climate Protection Program. The Cities for Climate Protection Program is a five milestone process to help solve 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

In April of that year, Bellingham Mayor Mark Asmundson joined with hundreds of other mayors around the country by signing the Mayors Climate Protection Initiative and pledging to strive to meet goals established by the international community. In August, Environmental Resources staff began to implement the Cities for Climate Protection Program. In July of 2006, Bellingham took a national leadership role and raised the bar for local governments by resolving to purchase 100% of the electricity for municipal operations from renewable sources. We have the opportunity to make Bellingham a model community. To do so we must focus on getting the entire community engaged and keeping it involved. Municipal leadership is an important step, but significant change will require the participation of the community. City government actions will serve as a catalyst for that participation.

This report is the culmination of the first year of the Cities for Climate Protection Program. It includes:

- A brief overview of the science of global warming, including expected local impacts
- A survey of the policy response to global warming, ranging from the international to the local
- An inventory of the greenhouse gas pollution emitted by Bellingham (Cities for Climate Protection Milestone 1)
- A forecast of expected increases in that pollution over the next 14 years

- A recommendation for a reduction target (Cities for Climate Protection Milestone 2)
- A three-phase action plan that will achieve the target (Cities for Climate Protection Milestone 3)

Inventory Results. Greenhouse gas emissions were inventoried for the base year of 2000 and for the interim analysis year of 2005. Emissions from the whole community were calculated and specific attention was paid to municipal operations. In 2000 the Bellingham community emitted about 950,000 tons of carbon dioxide and by 2005 this had climbed to more than 997,000 tons. Transportation, burning gasoline and diesel fuels, accounted for the largest share of this pollution: 45% in 2000 and 42% in 2005. The city government's operations accounted for a little over 2% of this total: 19,945 tons of carbon dioxide in 2000 and 20,632 tons in 2005. Electricity use was the largest share of the city government's contribution.

The inventory is intended as a tool to focus policy makers' and community attention on the areas with the largest room for improvement. By clearly delineating the scope and nature of the problem, we are able to direct our attention where efforts will have the most effect.

Bellingham's population is growing, and our per capita energy use is increasing. If nothing is changed, these trends will cause a significant growth in pollution over time. In order to establish reasonable goals we needed to account for this growth. In order to align our efforts with other communities across the country and around the world, it was deemed useful to have an estimate of pollution levels in 1990. To answer these questions, a forecast and backcast of community and municipal emissions was conducted using historical and predicted population growth in Bellingham and historical and predicted trends in regional energy use obtained from the U.S. Energy Information Administration. The results paint a clear picture not only of our current status, but of our place in a long-term trend extending from 1990 to 2020.

Bellingham should establish an achievable but ambitious goal for reducing our climate pollution. The second Milestone in the Cities for Climate Protection program is to establish a reduction target; a quantifiable goal will give structure, pace and momentum to the diverse set of actions that are each a part of the solution.

Based on the findings of the inventory, a survey of existing and possible measures and a review of other community's targets, combined with a focus on ambitiousness and achievability, Environmental Resources staff are recommending that Bellingham establish a series of targets for municipal operations and for the entire community.

The recommended target for city government is substantial:
Reduce our pollution by 64% from 2000 levels by 2012 and by 70% by 2020.

Scientists believe emissions reductions, on the order of 70-80% from current levels, will be needed in order to stabilize the Earth's atmosphere and reverse global warming. Achieving this target will demonstrate that success at this magnitude is possible. While it will take a concerted effort, by buying green power, city government has already achieved pollution reductions equal to 83% of the 2012 goal.

For the community, staff recommends that Bellingham strive for:
Reductions of 7% from 2000 levels by 2012 and 28% from 2000 levels by 2020.

This will achieve the target percentage established by the international community in the Kyoto Protocol by 2020. These goals will not only define success, they will help drive us to achieve it.

To achieve these targets a three-phase action plan is proposed. The Bellingham community has a strong and vibrant environmental ethic, and there are numerous manifestations of that ethic that are already moving us towards our goals. Within municipal operations, energy efficiency has been an important part of the culture of municipal employees. The proposed Action Plan is grounded in existing actions within the community and is intended primarily to direct the city's resources towards assisting and complimenting those efforts.

- Phase I enumerates and attempts to quantify existing actions that have been developed since the year 2000.
- Phase II is composed of actions that are the clear next steps, and build on existing momentum. Phase II is our central focus at this time, and is composed of 13 measures, that impact the community as a whole and ten measures that will impact pollution created by municipal operations. There are also several proposals that will not have a direct impact on the amount of pollution that we emit, but that will have an indirect effect by influencing the development of the Cities for Climate Protection Program itself.
- Phase III is envisioned as the remaining steps that will be taken, but have not yet begun. Phase III measures will require more effort to initiate and should originate outside of Environmental Resources staff. At the end of this report is a list of possible components of Phase III.

Next Steps: The Action Plan contains a number of recommendations regarding future city policy and efforts. While all of these recommendations are important, three recommendations stand out as top priorities:

1. *Work with Puget Sound Energy to fund a resource conservation management program for city operations.*
2. *Begin public education efforts regarding climate protection.*
3. *Become a member of ICLEI-Local Governments for Sustainability.*

The adoption of these three steps will facilitate and advance all of the remaining steps of the Action Plan.

Bellingham has chosen to act responsibly in the face of a serious global problem. This report provides the tools needed to take action. In doing so, we will continue to build our community's reputation as a progressive leader on environmental issues and simultaneously build the local economy and protect our quality of life.

Part I: Scientific Background

Climate Disruption: A Global Problem

Since the 1970s scientists have recognized that human behavior is changing the composition of the atmosphere. Several types of gases are known to trap heat near the Earth's surface in a process that has become known as the "greenhouse effect." Among these gases are water vapor, carbon dioxide (CO_2), methane, and others. These gases are commonly known as "greenhouse gases" or "GHGs." When these gases are generated by human sources and contribute to the disruption of the climate, they are properly identified global-warming pollutants.

The naturally occurring concentrations of these gases keep the Earth warm enough for human life. The sun's energy, in the form of short-wave electromagnetic radiation (light), passes through the atmosphere and warms the surface of the Earth. Much of this energy is reradiated back into the atmosphere as thermal (long-wave, infrared) radiation. As this thermal radiation passes through the atmosphere, it heats the air. Greenhouse gases block the escape of some of this warming energy, deflecting the radiation. Radiation that is deflected in this way heats the atmosphere and surface more than it otherwise would. The net result is that a greater percentage of the sun's energy is transformed into atmospheric heat. The Earth's ability to support life is dependent upon the natural levels of these gases; without them the Earth would be far too cold for human habitation.

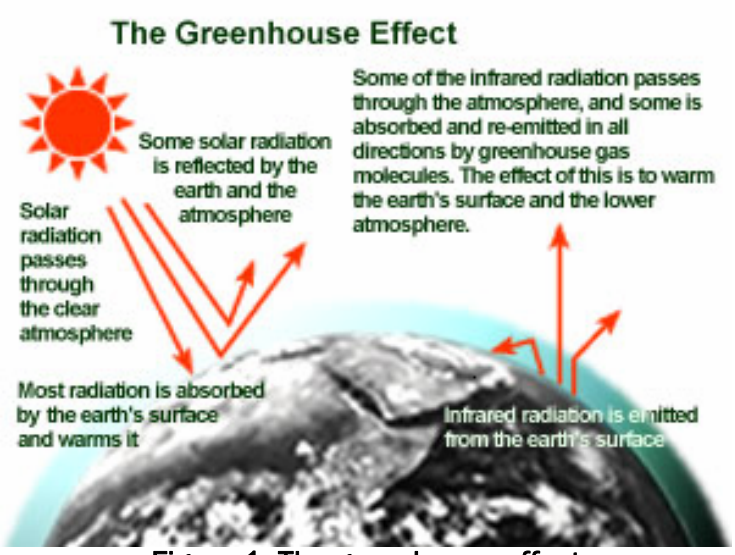

Figure 1: The greenhouse effect
Source: US Environmental Protection Agency, 2005

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 365 PPM today[1]. In that same period, methane concentrations have increased from 700 parts per billion (PPB) to more than 1745 PPB, and nitrous oxide, (N_2O) concentrations have increased by 270 PPB to 314 PPB.[2] In addition to these naturally occurring gasses, humans have introduced hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Though relatively low in concentration, these gasses are of particular concern because they are so potent in terms of heat trapping capacity.

Figure 2 shows direct measurements of atmospheric CO_2 concentrations at the Mauna Loa Observatory since 1958. Figure 3 shows atmospheric CO_2 concentrations over the last 1000 years and several models depicting the expected increase over the next century.

> *"The unprecedented increases in greenhouse gas concentrations, together with other human influences on climate over the past century and those anticipated for the future, constitute a real basis for concern."*
>
> -- American Geophysical Union, 2003.

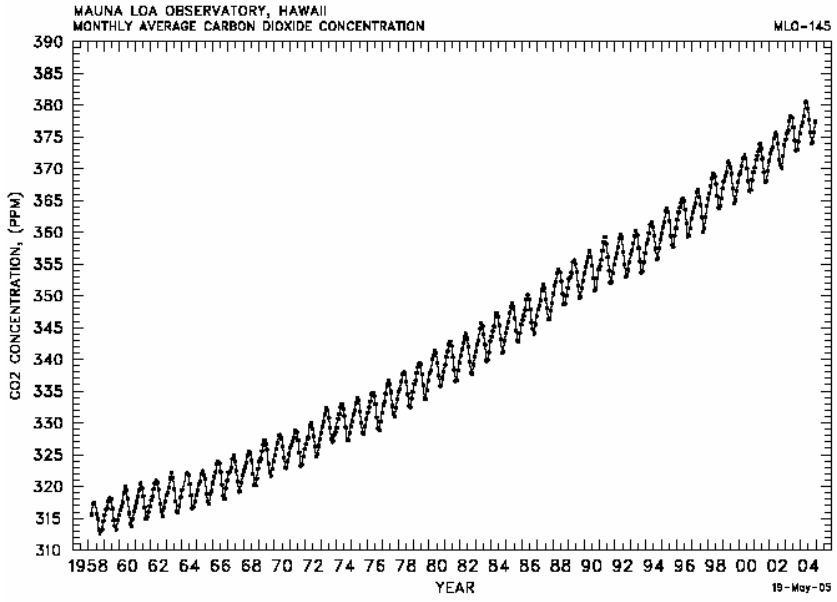

Figure 2: Atmospheric concentration of CO_2 over time

Source: Keeling, C.D. and T.P. Whorf. 2005.[3]

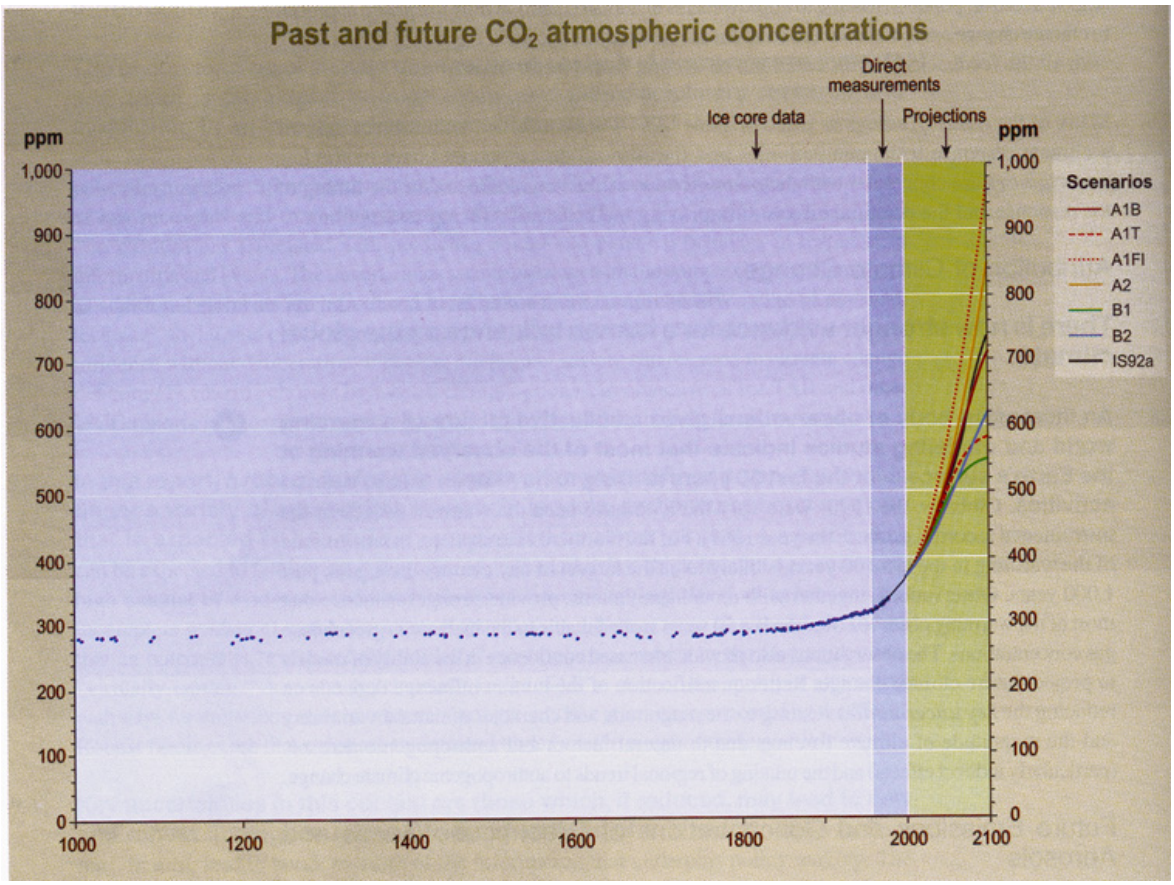

Figure 3: Past and future CO_2 atmospheric concentrations
Source: International Panel on Climate Change, Third Assessment, Synthesis Report, 2001

Scientific modeling has long indicated that these changes would result in a higher proportion of thermal energy being trapped in the earth's atmosphere and a corresponding increase in the average global temperature. As time has passed, there has been a steady increase in the average global surface temperature. Evidence has mounted and the vast majority of informed scientists now agree that we are experiencing exactly this effect. Over the past century, the average temperature has increased by more than one degree Fahrenheit with the preponderance of that warming occurring since 1950. The 10 highest average annual global temperatures on record have all occurred since 1990[4]. Figure 4 shows the average surface temperature of the Earth (expressed as departure from the long-term mean) since 1880.

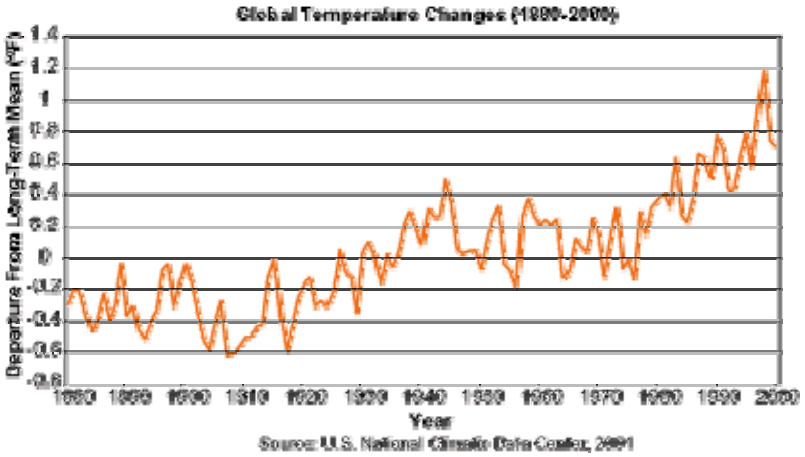

Figure 4: Global temperature changes (1800-2000)

Consideration of global climate over a much longer time frame is possible through the examination of ice cores. Scientists drill sample cores from ancient ice sheets and examine the air bubbles trapped in each layer. The concentration of greenhouse gases can be measured, with the relative concentrations of oxygen isotopes indicating the prevailing temperatures at the time the air was trapped. These data paint a clear picture of the relationship between climate and the composition of the atmosphere. Figure 5 shows the correlation between temperature, and atmospheric concentration of greenhouse gases. The upper graph depicts carbon dioxide (CO_2) and the lower graph depicts methane (CH4).

It is important to note that the time scale represented in Figure 5 does not include the present (industrial) era. As stated before, current atmospheric CO_2 concentrations are above 365 PPM, that is, too large to fit on the graph's scale. And current CH4 concentrations are above 1745 PPB, which would not fit on the graph even if it was twice its current size.

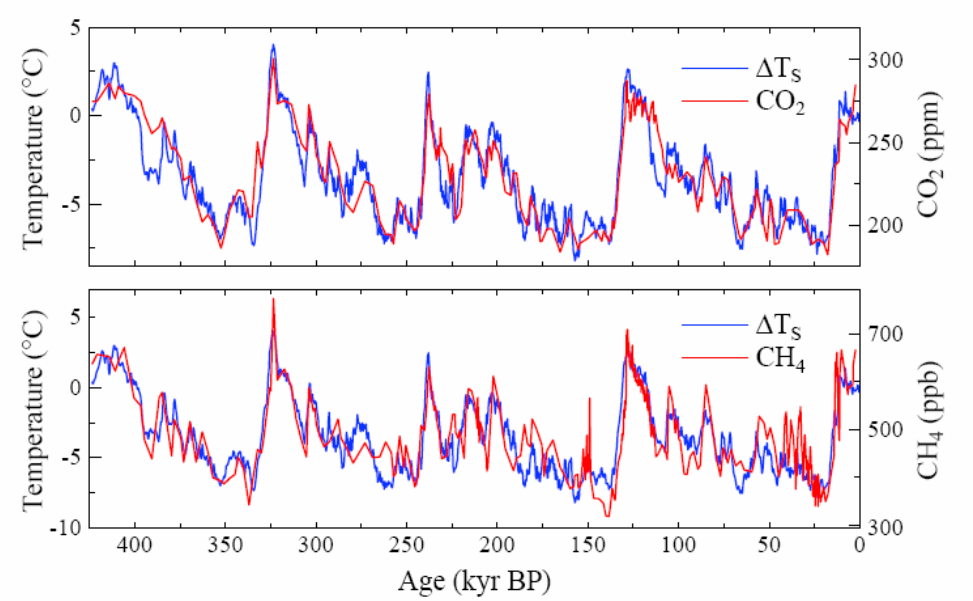

Figure 5: Antarctic ice core records of temperature and greenhouse gases
Source: Goddard Institute for Space Studies. 2005.[5]

It has been suggested that the observed changes in temperature in the last 50 years might be the result of natural changes or are part of larger climate cycles. While the existence of such cycles is not contested, it is clear that the recent changes are well beyond the scale of the normal range of climate fluctuation. The current warming trend differs from historical warming periods in two significant ways:

1. The warming is much greater, and
2. The warming is occurring much more rapidly.

The community of informed scientists harbors no doubt that human behavior is the underlying cause of the majority of observed and predicted climate change. The International Panel on Climate Change, in the *Third Assessment, Synthesis Report, and Summary for Policy Makers,* found that "there is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities."[6] In 2003, the American Geophysicist Union issued a position statement saying "Scientific evidence strongly indicates that natural influences cannot explain the rapid increase in global near-surface temperatures observed during the second half of the 20th century."[7]

> *"Scientific evidence strongly indicates that natural influences cannot explain the rapid increase in global near-surface temperatures observed during the second half of the 20th century.[i]"*
>
> -American Geophysicist Union, 2003

Warming of the air temperature is only the first step in the process of global warming. There is a wide array of secondary effects that are resulting from the general pattern of warming. The changes in temperature are disrupting the natural climate patterns. In particular, a number of changes that have been predicted by climatologists have now been observed:

- Tide gauge data indicate that global sea level has risen between 3.9 and 7.9 inches during the 20th century.[8]
- During the 20th Century there has been "widespread retreat of mountain glaciers in non-polar regions."[9]
- Between the 1950s and the present there has been a 10-15% decrease in spring and summer sea-ice in the northern hemisphere.[10]
- Satellite data indicate that there has been a 10% decrease in the extent of snow cover since the 1960s.[11]
- There is strong evidence to suggest that precipitation has increased during the 20th Century in the Northern Hemisphere and in the Tropics.[12]
- Comparing the period between the 1970s and the present to the previous 100 years, warm El Nino-Southern-Oscillation events have been "more frequent, persistent and intense."[13]

Secondary impacts are more difficult to predict, as there are multiple factors affecting them and they vary by region. It is 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. Figure 6 shows the locations of studies that document some of the secondary impacts that are consistent with expected climate change patterns.

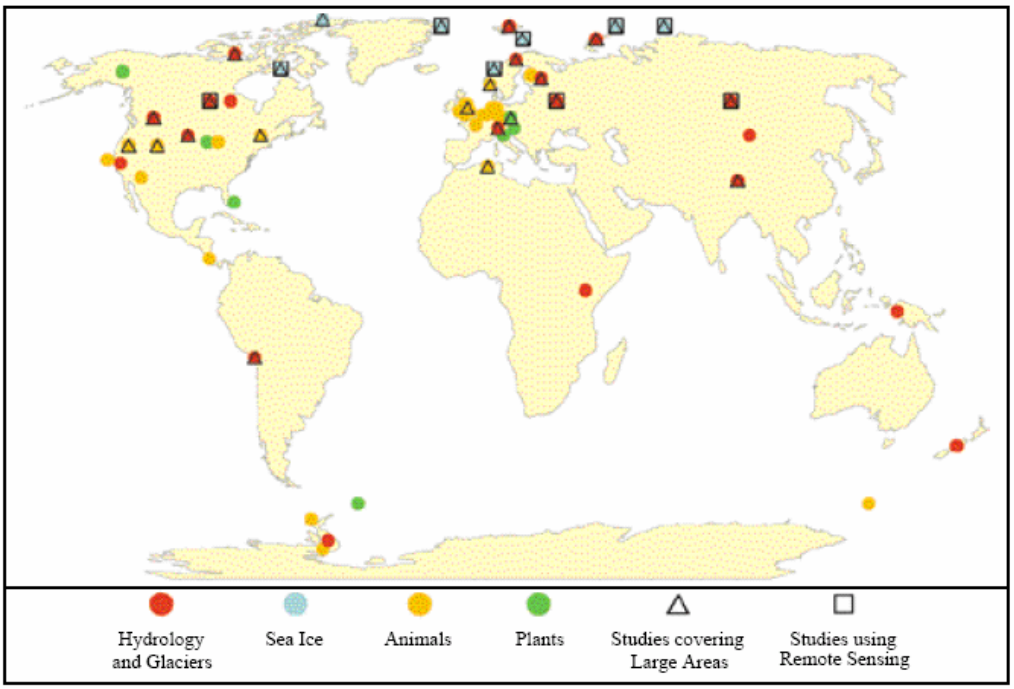

Figure 6: Locations of studies documenting the observed effects of global warming

Source: IPCC 2001 Synthesis Report, Summary for Policy Makers [4]

Locations at which systematic long-term studies meet stringent criteria documenting recent temperature-related regional climate change impacts on physical and biological systems. Hydrology, glacial retreat, and sea-ice data represent decadal to century trends. Terrestrial and marine ecosystem data represent trends of at least 2 decades. Remote-sensing studies cover large areas. Data are for single or multiple impacts that are consistent with known mechanisms of physical/biological system responses to observed regional temperature-related changes. For reported impacts spanning large areas, a representative location on the map was selected.

Recently, many extreme or unusual weather events have been popularly attributed to global warming. From a scientific perspective, however, it is nearly impossible to attribute anthropogenic causation (human causes) to any particular weather event. Individual events can serve as anecdotal evidence at best. A pattern of extreme events, however, can be characterized as suggesting a relationship between predicted and observed climate change. It is accurate to say that a pattern of increased frequency and severity of extreme weather events is generally consistent with the patterns predicted by climate change models. Figure 7 shows significant climate anomalies and events that occurred in 2005.

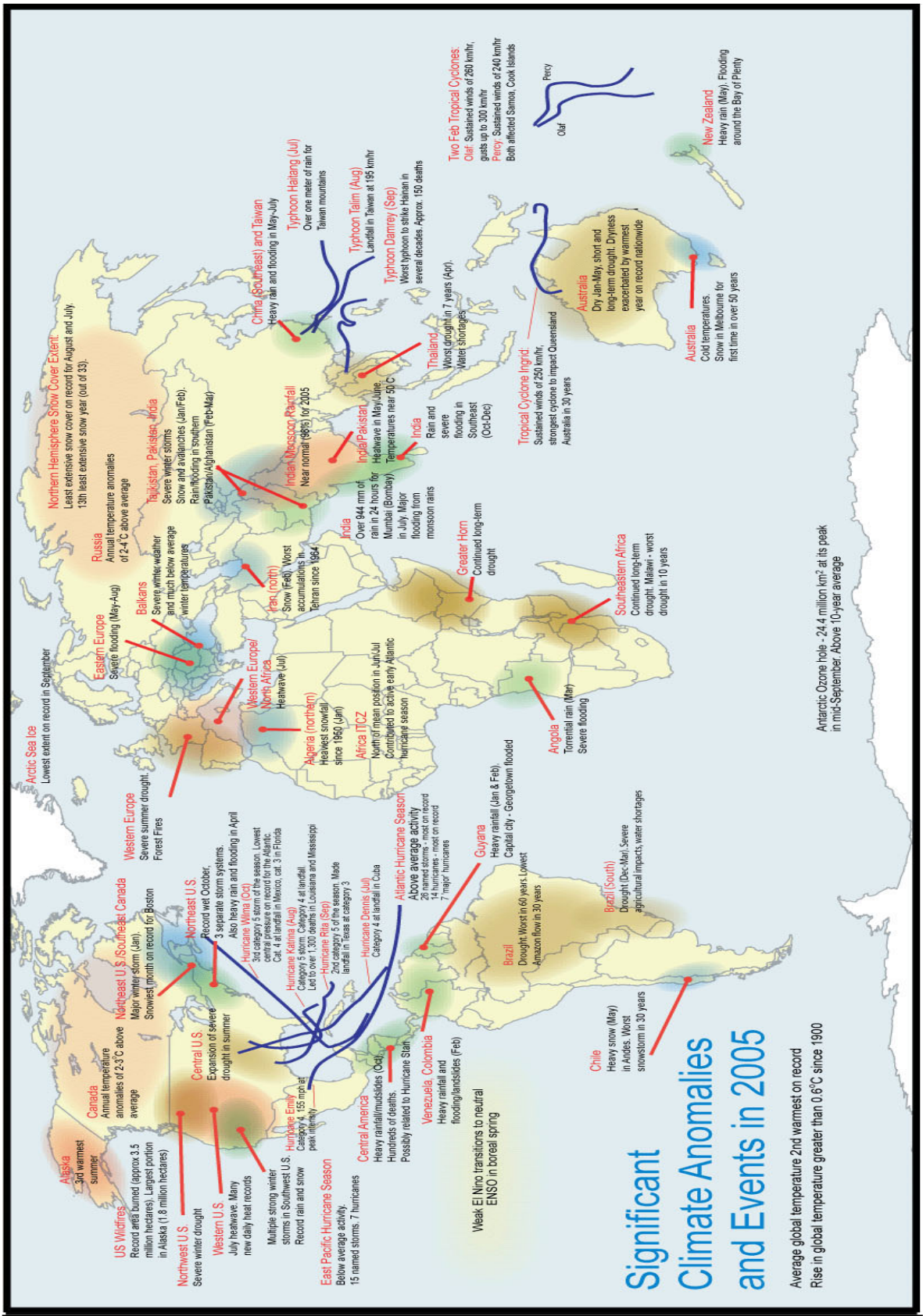

Figure 8: Significant Climate Anomalies and Events in 2005

Source: NOAA, 2006

Climate Disruption: A Regional Problem

> "*They go on in strange paradox, decided only to be undecided, resolved to be irresolute, adamant for drift, solid for fluidity, all powerful to be impotent. . . The era of procrastination, of half measures, of soothing and baffling expedience of delays, is coming to a close. In its place we are entering a period of consequences*."
>
> -Winston Churchill

Global warming will impact our infrastructure, our ecosystems and our economy. City and county governments will likely be the level on which much of the burden of those impacts will fall. The American Geophysical Union, in the 2003 *Position Paper on Human Impacts on the Climate* stated that scientists are confident in these predictions:

- Mid-continent warming will be greater than over the oceans.
- There will be greater warming at higher latitudes.
- Some polar and glacial ice will melt and the oceans will warm; these effects will contribute to higher sea levels.
- The hydrologic cycle will change and intensify, leading to changes in water supply as well as flood and drought patterns.
- There will be considerable regional variations in the resulting impacts.[14]

In October 2005, the Climate Impacts Group, an interdisciplinary group of researchers from the University of Washington, published a report entitled *Uncertain Future: Climate Change and Its Effect on Puget Sound*. This report, commissioned by the Puget Sound Action Team, details the expected consequences of global warming on our local region. These expected impacts include:

- Continued increases in average air temperatures
- Continued increases in stream temperatures
- Decreased winter snowpack and earlier snowmelt, causing changes in river and stream flows
- Increased risk of flooding
- Sea level rise in the Pacific Northwest is likely to occur faster than the global average
- Nearshore habitat, such as coastal wetlands and salt marshes, at risk
- Further pressures on salmon at all different lifecycle stages
- Increased likelihood of algal blooms and low-dissolved-oxygen events[15]

Each of these impacts will have secondary implications. In 2004, fifty climatologists and related researchers from around the region convened and developed a *Scientific Consensus Statement on the Likely Impacts of Climate Change on the Pacific Northwest*. In addition to highlighting the above impacts, these researchers agreed that a number of consequences would very-likely follow:

- Higher elevation tree line
- Changes in growing seasons
- Increased drought stress

- Increased forest vulnerability to insects and disease
- Longer fire seasons
- Earlier animal and plant breeding
- Longer and more intense allergy season
- Changes in vegetation zones
- Decreased summer water availability
- Changes in our ability to manage flooding
- Shifts in hydro-power production
- Decreased water quality due to higher temperatures
- Increased salinity in fresh water
- Exacerbated water quality issues
- Increased maximum wave heights
- Increasing erosion in coastal areas
- Increases in the magnitude and duration of coastal upwelling

More recently these expected impacts have been explored in greater detail in the *Impacts of Climate Change on Washington's Economy: A Preliminary Assessment of Risks and Opportunities* produced by the Climate Leadership Initiative for the Washington State Departments of Ecology and Community, Trade and Economic Development in December 2006.[16] Many of these impacts are already happening and are expected to increase over time as the levels of global-warming pollution continue to increase. Figure 9 shows (a) temperature trends; (b) precipitation trends; and (c) trends in April 1 snow pack. Figure 10 shows the rate of recession of glaciers in the North Cascades. In Figure 11 it is possible to see the extent of glacial recession that has occurred since 1985 in the Boulder Glacier on Mount Baker.

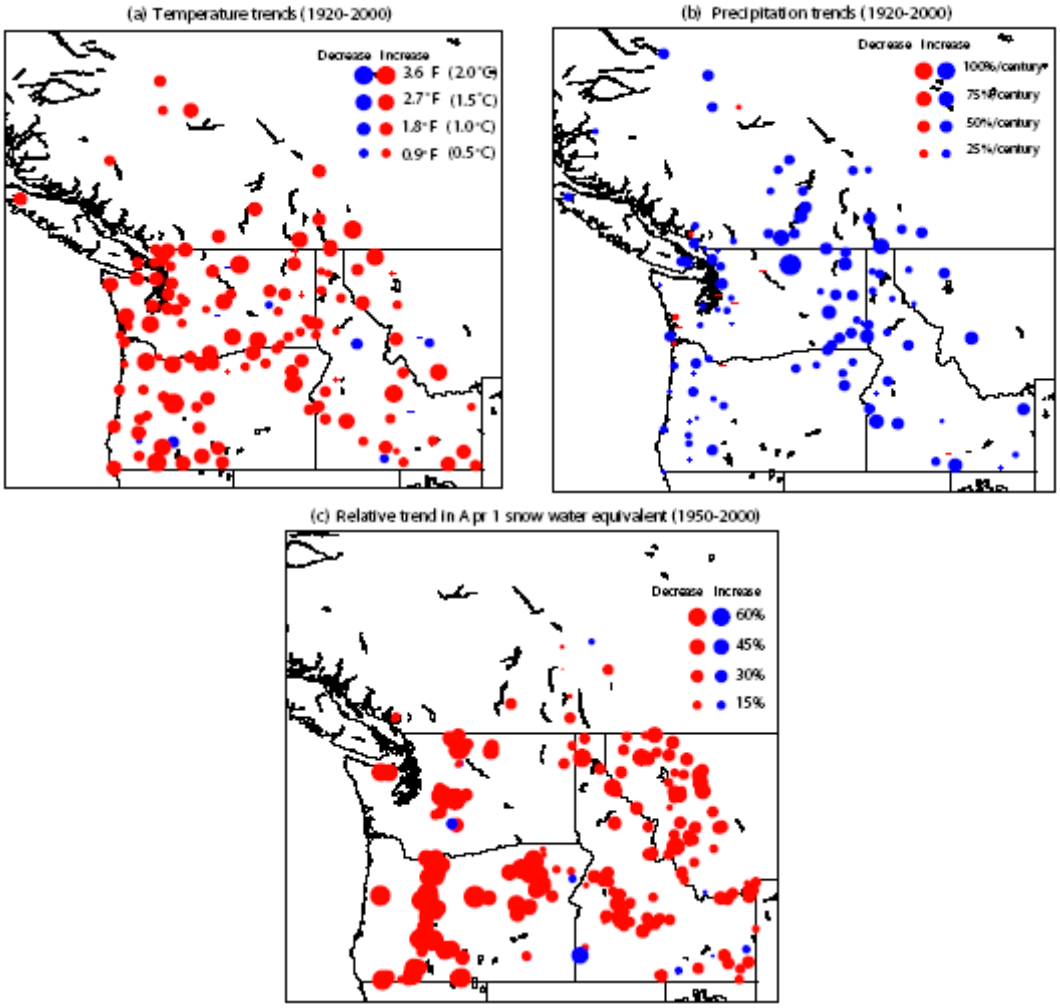

Figure 9: 20th century trends in (a, b) average annual PNW temperature and precipitation (1920-2000) and (c) April 1 snow water equivalent (1950-2000)
Source: Climate Impacts Group, University of Washington, 2006[17]

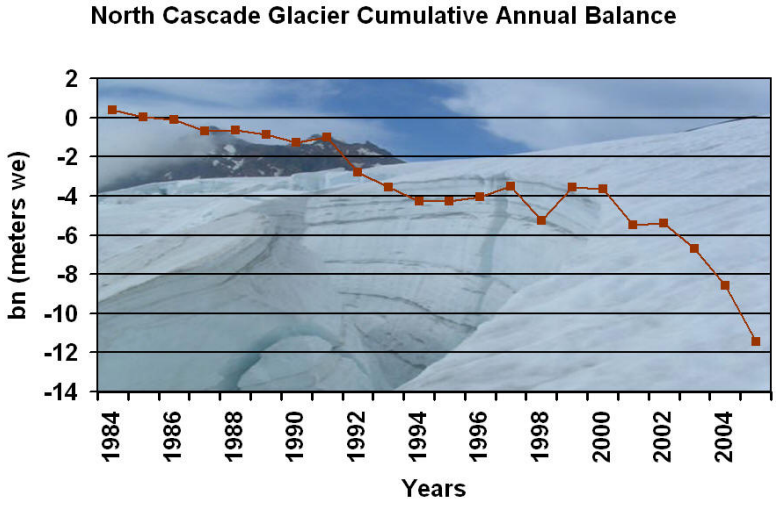

Figure 10: Loss of glacier volume since 1984 represents 20-40% of entire glacier volume
Source: North Cascades Glacier Climate Project[18]

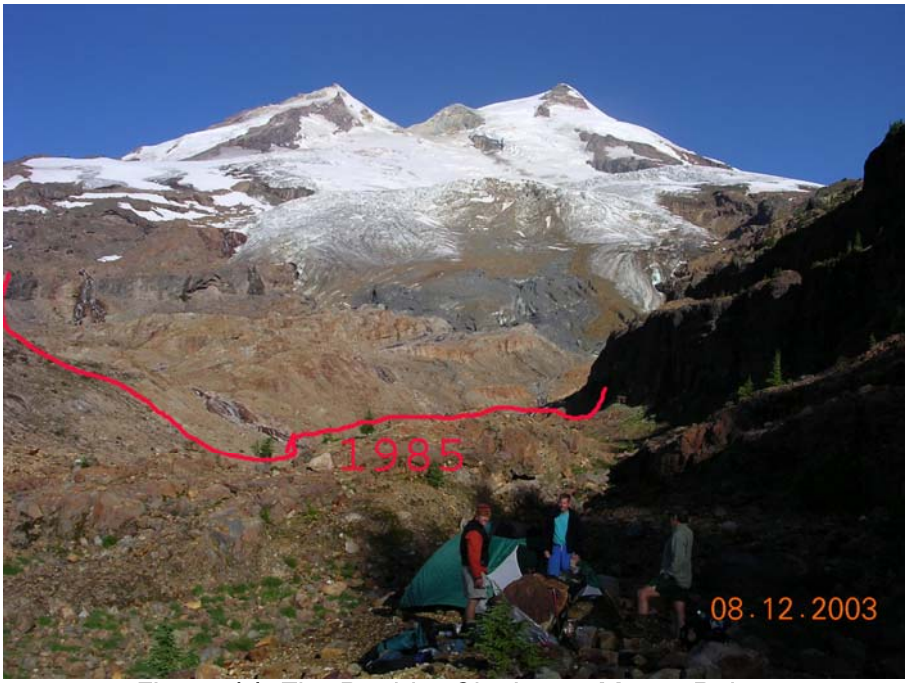

Figure 11: The Boulder Glacier on Mount Baker
Source: North Cascades Glacier Climate Project[19]

While it is certain that some impacts are occurring and will continue to occur, it is important to remain conscious that human beings are causing global warming and that human beings know how to stop it. Figure 12 illustrates the predicted increase in average temperature of ten different climate change study scenarios. Each scenario makes different assumptions about the levels of global-warming pollution that humans will emit over the next 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 the prediction of average global temperature in the next twenty to thirty years. This is because there is significant inertia in the climate system; gases already in the atmosphere will continue to have an effect for a long time. Moreover, power plants and vehicles that have already been created will continue to be used. The short- and medium-term implications of global-warming are unavoidable. But the long-term impacts, those occurring between 2040 and 2100, have a high range of variability. The eventual outcome will be governed by the decisions made by people over the next several decades.

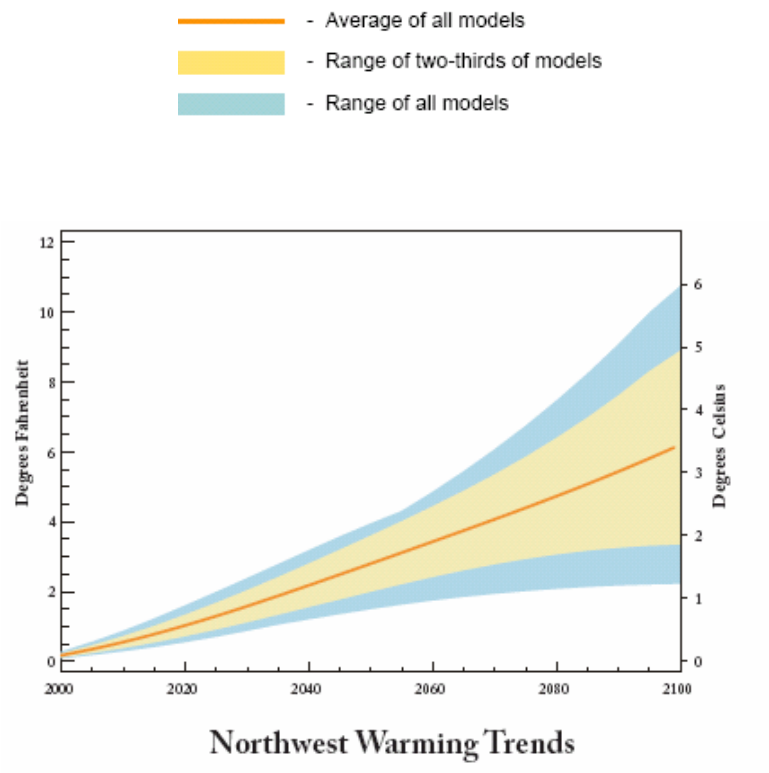

Figure 12: Northwest warming trends
Source: Climate Impacts Group. 2005

The short- and medium-term implications of global-warming are unavoidable. But the long-term impacts, those occurring between 2040 and 2100, have a high range of variability. The eventual outcome will be governed by the decisions made by people over the next several decades.

Part II: Policy Background

Global warming has been a concern among scientists for more than thirty years, and the global community has agreed for more than fifteen years that the issue needs to be addressed. Still there is no sufficient or mature system for controlling the pollution that is causing it, neither at the state, national nor international level. Global warming is a complex and politically difficult issue; there are a number of interrelated reasons that this has been the case. Abundant, inexpensive energy is widely agreed to be an important part of a healthy economy. Historically, the most abundant and inexpensive types of energy have been fossil fuels, the single largest source of global-warming pollution. Reducing global-warming pollutants has therefore been linked, erroneously, to reducing the availability or increasing the cost of energy, thereby damaging the economy. Even though this analysis fails to explore the lifecycle or true costs of extensive fossil fuel use, most parties have believed that there is a significant disincentive toward reducing their global-warming pollutants. At the same time, the global-warming pollution created by these parties affects the entire global climate system, rather then just the region where it is emitted. For example, the United States produces about one-quarter of the global-warming pollution in the world, but this does not translate into more rapid warming in North America. These two elements, in conjunction, create a classic "Tragedy of the Commons" situation. Tragedy of the commons occurs when each actor (nations, cities, businesses, etc.) has a strong incentive to continue behaving in a way that is damaging to the whole group because they are able to reap all of the rewards of their actions, while suffering only a small portion of the consequences.

This situation has made negotiation of a political solution very difficult, resulting in a fractured and fragmented approach that still fails to cover many of the most significant sources of pollutants. This does not mean that the existing systems and programs are not of value; on the contrary, many of these programs are having substantial and valuable effects. However, assuming the goal of "stabilizing atmospheric CO_2 concentrations at a level that will prevent dangerous anthropogenic interference in the climate system" (established by the International Framework Convention of Climate Change), there is not yet a sufficient legal structure in place.

It is clear that the problem of global warming will only become more pressing with time. As such, it seems reasonable to assume that eventually a workable structure for controlling the problem will be developed and implemented. The outlines of such a structure are becoming increasingly agreed upon. It is one goal of Bellingham's Cities for Climate Protection Program to position the city to be successful economically and ecologically as our world and our nation begin that transition to a low-carbon economy.

> *The ultimate objective is to achieve … the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.*
>
> *—The International Framework Convention on Climate Change, 1992*

It is worth noting that most of the programs and policies that exist are focused not only on achieving emissions reductions "in-house," but also on leveraging those in-house reductions as part of an

agreement to get other parties to achieve similar reductions. Thus each Kyoto Protocol participant agrees to accept binding reduction targets as long as all other participants do so as well. This same form is seen in the New England Governors and East Canadian Premiers Climate Change Action Plan, and in the U.S. Mayors Climate Protection Agreement. This is an elegant, cooperative solution to the aforementioned tragedy of the commons. Future efforts, whether initiated by local governments, by Washington State or by the United States, can be expected to have this same quality. We in Bellingham, too, should consider not only how we can make improvements ourselves, but how our improvements can be coordinated with other jurisdictions and with larger regional efforts.

A sufficient, long-term solution will undoubtedly require full United States participation, mandatory targets for developed and developing nations, and an intra- and inter-national carbon-trading system. It is important to recall that the International Panel on Climate Change (IPCC) has stated that "Stabilization of CO_2 concentrations at any level requires eventual reduction of global CO_2 net emissions to a small fraction of the current level."[20] To achieve this goal will require substantial, sustained effort at all levels of society and government, and will require unprecedented worldwide cooperation. Bellingham's current program will not, at least in the near future, be able to achieve a reduction of that magnitude, even within our city limits. We can, however, begin a process of shifting away from our dependence on fossil fuels. And by focusing on the city's own operations, we will be able to set an example proving such measures are not only possible but desirable. As people begin to experience the multiple benefits of these actions, more ambitious steps will become increasingly acceptable. Our leadership as a community may prove invaluable to the future goal of stabilization.

International Initiatives

International efforts to address global warming have been largely coordinated by the United Nations. These efforts include the Intergovernmental Panel on Climate Change (IPCC), the United Nations Framework Convention on Climate Change (UNCCC), the Kyoto Protocol and subsequent Meetings of the Parties (MOP).

The IPCC was created by the UN Environment Programme and the World Meteorological Organization in 1988. The IPCC is charged with "assessing, on a comprehensive, open, objective and transparent basis the scientific, technical and socio-economic information relevant to understanding the risk of human induced climate change."[21] The IPCC develops an array of special reports on various aspects of climate change. These reports are generally authored by hundreds of experts and, prior to publication, are reviewed by hundreds more. In addition to the topic-specific reports, the IPCC has created three Assessment Reports (1990, 1995 and 2001), which are intended to provide comprehensive scientific, technical, and socio-economic information on climate change, its causes, possible impacts and related response measures. These Assessment Reports are widely considered to be the definitive source for consensus data on climate change. A fourth Assessment Report is scheduled to be completed in 2007.

The United Nations Framework Convention on Climate Change (UNFCCC) was initially negotiated and signed at the 1992 Rio de Janeiro Conference on Development and the

Environment. The UNFCCC is modeled on the largely successful Framework Convention on Ozone Depleting Substances in that it focuses on achieving consensus on the existence of the problem and establishes agreement on the non-binding nature of the eventual solution. The binding requirements were intended to be negotiated as an addendum, or protocol, to the framework convention. This strategy allowed negotiation to be broken into more manageable, achievable elements. Parties to the UNFCCC agree to the ultimate goal of stabilizing greenhouse gas emissions "at a level that would prevent dangerous anthropogenic interference with the climate system."[22] Furthermore, industrialized countries agreed to conduct regular inventories of their emissions of climate disrupting pollution. The United States signed the UNFCCC and in October of 1992 became the first industrialized nation to ratify the UNFCCC.

The Kyoto Protocol, negotiated in 1997, modifies the UNFCCC by creating binding reduction targets for industrialized (called Annex I) countries. Most Annex I countries accepted reduction targets of between 6% and 8% from 1990 levels by 2012. The United States, under the Protocol, was to reduce its emissions from 1990 levels by 7% by 2012. The Kyoto Protocol included the provision that its rules would take effect once ratified by parties totaling 55% of the total emissions among the Annex I nations. The United States signed the Protocol. The U.S. Senate never ratified it. In 2001, President Bush announced he would not seek ratification of the Protocol. In 2004, the Russian Federation joined the list of countries to have ratified the Protocol, yielding the necessary 55%, and consequently in 2005 the Protocol went into effect for those parties that have ratified it. Currently, there are 162 countries that have signed and ratified the protocol, including 37 Annex I countries that accept emissions targets. Three countries have signed, but have not yet ratified, and two more (the United States and Australia) have signed, but do not intend to ratify it.

Subsequent negotiations under the UNFCC, including the 2005 Meeting of the Parties (MOP 1) in Montreal, have focused on clarifying the details of the reduction targets, crafting markets to allow parties to purchase carbon offsets (reductions outside of their own borders that would be less expensive than available domestic reductions) and on reengaging the United States in the discussion.

National Efforts

At present, the United States has very little in terms of a cohesive, national policy on global warming. In 2001, the President ordered a cabinet level review of national climate change policy. The primary outcome of this review was a new mechanism to be used to measure progress: the greenhouse gas intensity of the economy. This system would compare national emissions to the gross domestic product (GDP), allowing net increases in pollution as long as the GDP continues to rise at a faster rate. Following the national policy review, the President set the goal of reducing the greenhouse gas intensity of the economy by 18% over ten years[23]. A number of strategies are being proposed to meet this goal: "enhanced emission reduction registry; creation of transferable tax credits for emission reduction; tax incentives for investment in low-emission energy equipment; support for research for energy efficiency and sequestration technology; emission reduction agreements with specific industrial sectors, with particular attention to reducing transportation emissions; international outreach, in tandem with funding, to promote climate research globally; carbon

sequestration on farms and forests; and, most important, review of progress in 2012 to determine if additional steps may be needed."[24] In general these policies rely heavily upon voluntary measures and support for technological innovation and implementation.

In 2004, the UNFCCC Secretariat published a report on the in-depth review of the United States' commitments under the UNFCCC.

> The national climate policy of the United States continued to be developed through a cooperative inter-agency process, including more than 20 agencies of the Federal Government and several offices linked to the Executive Office of the President. A new high-level management structure was set up in November 2002 to coordinate climate change science and technological development. This was partly in response to the outcome of the 2001 Cabinet-level review of climate change policy. The Office of the President heads this structure, while the Cabinet Committee on Climate Change Science and Technology Integration and associated working group is entrusted with coordination of federal research on global climate change and advanced energy technologies. The working group develops policy recommendations for the President and oversees two programmes: the Climate Change Science Program (CCSP) and the Climate Change Technology Program (CCTP). Several agencies, including the Department of Energy (DOE), the Environmental Protection Agency (EPA), the Department of Transport (DOT) and the Department of Agriculture (USDA) continued to be involved in the implementation of domestic climate policies and programmes, while actively participating in the new high-level management structure.[25]

Senators John McCain, Joseph Lieberman and others have been attempting to pass the Climate Stewardship Act for several years. This bill, if passed, would set mandatory limits on climate disrupting pollution; capping emissions at 2000 levels by 2010. It would also create a system of tradable allowances, much like the EPA's successful SO_2 tradable permit program. Under this program a regulated entity, such as a power plant, would have incentives to reduce their emissions by as much as was economically feasible. Power plants that can inexpensively make reductions below the required cap could then sell their excess reductions to parties for which reductions are more difficult or expensive. The SO_2 trading program has resulted in reduction in pollution below the legal requirements, while achieving those reductions for substantially less cost than many industry analysts had expected. The Climate Stewardship Act failed to pass in the Senate again in 2005.

Despite the failure of the McCain-Lieberman legislation, some government policy observers[26] believe there has been a meaningful change in the way top lawmakers in Washington DC view the issue. In 1997 the Senate passed a resolution stating strong opposition to the Kyoto Protocol. Observers have expected that the greatest challenge in developing a cohesive, national global-warming policy would be overcoming Senate opposition.

Following the McCain-Lieberman vote, Sen. Bingaman offered an amendment to the Energy Policy Act of 2005. The amendment passed, stating the view of the Senate that:

It is the sense of the Senate that Congress should enact a comprehensive and effective national program of mandatory, market-based limits and incentives on emissions of greenhouse gases that slow, stop, and reverse the growth of such emissions at a rate and in a manner that-

(1) will not significantly harm the United States economy; and
(2) will encourage comparable action by other nations that are major trading partners and key contributors to global emissions.[27]

It is believed this statement signals a greater pro-activity on the part of the national legislature on this issue, and that there will be more substantive action in the near future. Indeed, the Chair and Ranking Minority Member of the United States Senate Committee on Energy and Natural Resources have published a white paper on the *Design Elements of a Mandatory Market-Based Greenhouse Gas Regulatory System*. The stated purpose of the paper is to "lay out some of the key questions and design elements of a national greenhouse gas program in order to facilitate discussion and the development of consensus around a specific bill."

The fact that the majority party in Congress reversed in 2007 has prompted significant speculation about the possibility of significant climate change legislation in the next year. At the time of the preparation of this report there was no clarity as to the approach that might be taken.

A key component of Bellingham's Cities for Climate Protection Program is the attempt to position the city to thrive under a future regulatory system. There are two components to this effort:

1. Reducing emissions and documenting such reductions in a way consistent with expected future regulatory requirements; and
2. Providing stakeholder comment on the nature of those regulatory requirements so our interests can be adequately considered.

State Actions

> *"On global warming, we still come up short. We've made progress in everyone agreeing it's a serious problem. But unless we set specific goals and targets with specific ways to measure our performance, a resolution won't mean very much.... My friends, it's long past the time when it's OK to just talk about these problems."*
>
> –Governor Arnold Schwarzenegger, 2006

Many individual states have begun to consider global warming in various ways. The U.S. Environmental Protection Agency State and Local Climate Change Program has provided technical and financial assistance to at least 38 states and Puerto Rico.[28] In addition, 28 states and Puerto Rico have developed, or are developing, action plans to begin the process of reducing emissions and enhancing sequestration.[29] A survey published in 2003 found that legislatures in twenty-one different states had passed legislation specifically directed at climate change.[30] The most common laws call for: studies of the impacts of

climate change, inventories of the state's greenhouse gas emissions, and creation of commissions to study the possible implications of greenhouse gas trading schemes.

One piece of state legislation stands out as particularly progressive: California's AB 32 passed and signed in the fall of 2006. "AB 32 requires the California Air Resources Board (CARB) to develop regulations and market mechanisms that will ultimately reduce California's greenhouse gas emissions by 25 percent by 2020. Mandatory caps will begin in 2012 for significant sources and ratchet down to meet the 2020 goals. In the interim, CARB will begin to measure the greenhouse gas emissions of the industries it determines as significant sources of greenhouse gas emissions. The bill also provides the Governor the ability to invoke a safety valve and suspend the emissions caps for up to one year in the case of an emergency or significant economic harm."[31]

In addition to the many individual state actions, there are now two cases of regional coalitions coordinating an interstate global-warming agenda: the Regional Greenhouse Gas Initiative of the Northeastern and Mid-Atlantic States and the West Coast Governor's Global Warming Initiative.

Late in 2005, the nine states in the Northeast announced the creation of the Regional Greenhouse Gas Initiative (RGGI) and signed a memorandum of understanding that defines the scope and method of the initiative. The RGGI sets reduction targets for heat trapping pollution emitted from the generation of electricity. It also establishes a regional cap-and-trade program with market based emissions trading. The program is set to take effect in 2009.[32]

In 2003, the governors of Washington, California and Oregon created the West Coast Governor's Initiative to Address Global Warming. The Initiative establishes a number of goals and attempts to synchronize the various measures each of the states is independently taking. Examples include coordinating 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 participants also agree to continue to work together on these issues, and invite other states to join in their efforts.

Washington State

Over the past few years the Washington State Legislature has passed several bills that will have a significant impact on the reduction of greenhouse pollution.

SHB 3141 passed in 2004. According to the House Bill Report, "Fossil fueled thermal power plants with a generating capacity of 25 MW or more must provide mitigation for 20 percent of the CO_2 emissions produced by the plant over a period of 30 years."[33] This is considered to be a significant step because it begins the process of regulating CO_2 pollution.

ESHB 1397 was passed in 2005 and is commonly called the "clean cars bill." The bill adopts the California emissions standards for new cars sold in Washington. There are several qualifiers in place, but assuming those are met, this bill will have significant impact on air quality, and may have a dramatic impact on heat trapping pollution. According to a report by the Puget Sound Clean Air Agency, "the federal government is generally responsible for

establishing emissions standards for new motor vehicles. However, in some instances, California's Motor Vehicle Program is allowed to set motor vehicle requirements that may be stricter than the federal standards."[34] The California standards, as they now stand, will have a significant impact on the ambient air quality in our region, but will have only a minor impact on the amount of CO_2 emitted. Recent legislation in California, however, known as the Pavley Amendment, would change the standards to include "maximum feasible and cost-effective reduction of GHG emissions from passenger vehicles and light-duty trucks."[35] Under ESHB 1397, these updated California standards would automatically be applied in Washington State. The legality of this amendment has been challenged in court and implementation of the rule awaits the verdict. If the rule were to go into effect, however, it "would result in a 17% overall reduction in GHG emissions for Puget Sound light duty vehicles by 2020."[36]

SSB 6508 was passed in 2006. This bill creates a renewable fuel standard, requiring that a small percentage of all diesel sold in Washington State be biodiesel and all gasoline sold be blended with a small percentage of ethanol. The proportion of the renewable fuels will be increased over time as the Department of Agriculture determines that farmers in Washington State have the capacity and the infrastructure to meet the demand.

In fall of 2006 Washington voters passed I-937 which will create a renewable portfolio standard for large electric utilities in Washington. This initiative will require a steady increase in the utilization and development of renewable energy by electric utilities. By 2020 renewables will have to comprise 15% of the supply.

Notably absent is a comprehensive approach to global-warming pollution. These, and other individual actions, are important and meaningful steps. Many observers, however, believe it is critical for long-term effectiveness that the state establish comprehensive policy framework including an inventory, reduction targets and timetables, not unlike California's AB 32. Only by setting a goal and carefully tracking results can progress be gauged. In April of 2006, the members of Seattle's Green Ribbon Commission sent a letter to Governor Christine Gregoire calling for such a comprehensive approach. They stated, "To drive and sustain this progress over time, we need a clear and simple state climate policy framework, including ambitious goals and timelines for reducing global-warming pollution and carbon markets to help us build our clean energy economy."

Puget Sound Clean Air Agency

In 2004 the Puget Sound Clean Air Agency (PSCAA) convened a group of twenty-five stakeholders, representing a variety of organizations, industries and agencies to form the Climate Protection Advisory Committee. This committee developed a detailed report entitled *Roadmap for Climate Protection: Reducing Greenhouse Gas Emissions in Puget Sound*. The report's recommendations were intended for use within the PSCAA's jurisdiction, but at the request of then Governor Locke, the recommendations were also used to inform the state's participation in the West Coast Governor's Climate Initiative.

The report describes a list of policy recommendations and steps for both the PSCAA region and the state as a whole. Many of these recommendations have now been implemented and others are likely to be implemented soon.

Mayors Climate Protection Agreement

In March 2005 a resolution endorsing the U.S. Mayors Climate Protection Agreement was circulated among members of the U.S. Conference of Mayors. To date, more than 370 mayors have signed the resolution, Bellingham's mayor among them. The Agreement itself has three parts:

(1) It urges the Federal and State governments to enact policies that will achieve the goals of the Kyoto Protocol (7% reduction in climate changing pollution from 1990 levels).
(2) It urges Congress to pass the Climate Stewardship Act and to create a market based system of tradable allowances.
(3) Signatories agree to strive to achieve emissions reductions to meet or exceed the Kyoto targets within their own communities.

As a signatory to the Mayors Climate Protection Agreement, Bellingham is striving to meet its obligations through the Cities for Climate Protection program.

Cities in Washington that Have Signed the Mayors Climate Protection agreement:

- Auburn
- Bainbridge Island
- Battle Ground
- Bellingham
- Burien
- Edmonds
- Everett
- Issaquah
- Kirkland
- Lacey
- Lynnwood
- Lake Forest Partk
- Olympia
- Redmond
- Renton
- Sammamish
- Seattle
- Shoreline
- Tacoma
- Vancouver

ICLEI—Local Governments for Sustainability and the Cities for Climate Protection Program

The International Council for Local Environmental Initiatives (ICLEI) is a non-profit organization whose membership is comprised of more than 475 municipalities. Among the programs ICLEI administers is the Cities for Climate Protection (CCP) Program. More than 600 cities around the world participate in the program. (A municipality does not have to be a member of ICLEI to participate in the CCP.). CCP is a voluntary program, in that local governments commit to achieving five milestones:

(1) Conduct a baseline emissions inventory and forecast emissions growth;
(2) Set an emissions reduction target;
(3) Develop an action plan to meet the target;
(4) Implement the actions in the plan; and
(5) Monitor and verify emissions reduction progress

ICLEI provides training, software, technical support, information and expertise to governments as they progress through the milestones.

In 2005, the Bellingham City Council adopted Resolution 2005-08, committing the city to participation in the program and to achieving the above milestones. In August of 2005 the Environmental Resources Division began to implement the first milestone. This report

represents the culmination of that step, as well as recommendations for achieving milestones 2 and 3. City staff has worked closely with ICLEI staff in the collection of this data and the development of this report.

Becoming a member of ICLEI is a priority recommendation of the Climate Action Plan.

Northwest Clean Air Agency

In 2006, the Northwest Clean Air Agency (NWCAA) initiated a regional Energy Conservation and Climate Protection Project. NWCAA contracted with ICLEI to implement the project. Money was dedicated to fund the initial steps of CCP in nine local governments within the NWCAA's jurisdiction.

- Bellingham
- Whatcom County
- Ferndale
- Lynden
- Anacortes
- La Conner
- Oak Harbor
- Coupeville
- Langley

A regional coordinator and local interns worked in each jurisdiction for ten weeks and presented their findings to recommend further action. It is expected that coordination among the local governments will inspire more ambitious action and will also allow participants to take advantage of economies of scale such as shared staff, cooperative bulk purchases or coordinated education campaigns.

Bellingham was able to take part in this program as an early adopter. Some staff time for the development of the Climate Protection program has been paid for by the Northwest Clean Air agency through ICLEI.

Part III: Global Warming and Bellingham's Role

Each individual and organization in our society will choose whether or not to address the problem of global-warming. The resolution committing Bellingham to participate in the Cities for Climate Protection Campaign states that Bellingham will adopt an emissions reduction target, it has not been determined what that target will be. And while the resolution states we will develop an action plan, the contents of that action plan have not been decided upon. We have agreed to implement strategies to reduce our part in global-warming pollution, but we have not yet agreed on how bold and forward thinking those strategies will be. "What is our share?" and "Why should we act decisively when others don't seem to be doing anything?" are reasonable and expected questions.

"The pervasiveness of inertia and the possibility of irreversibility in the interacting climate, ecological and socio-economic systems are major reasons why anticipatory adaptation and mitigation actions are beneficial. A number of opportunities to exercise adaptation and mitigation options may be lost if action is delayed."

– International Panel on Climate Change, 2001

While the full range of future consequences of global warming are not yet fully understood, there is sufficient certainty about their magnitude to warrant immediate action. The Precautionary Principle, as described in the Earth Charter, endorsed unanimously by resolution of the Bellingham City Council (Resolution 2002-44) states that:

> [Preventing harm is] the best method of environmental protection and, when knowledge is limited, [it is necessary to] apply a precautionary approach.
>
> > a. Take action to avoid the possibility of serious or irreversible environmental harm, even when scientific knowledge is incomplete or inconclusive.
> > b. Place the burden of proof on those who argue that a proposed activity will not cause significant harm, and make the responsible parties liable for environmental harm.
> > c. Ensure that decision-making addresses the cumulative, long-term, indirect, long distance, and global consequences of human activities.[37]

The Precautionary Principle should govern the response to global warming. The options before us, as a global society, are to gamble that the scientific community is wrong, while waiting for further evidence, or take immediate actions to reverse our impact. Within that clear and compelling global need, the question remains: "What is one small city's part?"

While it is not possible for Bellingham to unilaterally end global warming, it is also not possible for the problem to be solved without effective and meaningful leadership. Citizens and governments in developed nations and in the United States in particular, have a

responsibility to consider both their own role in causing this global problem and their relative capacity to solve it. Due to our high per capita contribution to global-warming and high ability to respond or make changes (relative wealth) we have a responsibility to take a leadership role in the solution to this problem.

Environmental justice compels us to recognize that our nation has been and continues to be the world leader in emissions of greenhouse gases and we are second only to Australia in emissions on a per capita basis. At the same time, we are among the least vulnerable to the impacts of global warming because our relative wealth gives us a much greater capacity to adapt. The World Health Organization has stated that "The best available evidence suggests that climatic change since the 1970s may already be causing over 150,000 deaths annually, and unmitigated greenhouse gas emissions would increase disease burdens in the coming decades. The risks are concentrated in the poorest populations, who have contributed least to the problem."[38] Appendix B includes two charts; one depicts the historical contribution to greenhouse gas concentrations and to observed temperature change of the top twenty-five emitting countries. The United States is responsible for causing nearly 30% of the observed temperature changes. The second chart shows the results of one attempt to characterize the relative vulnerability of countries to climate change. Among the factors considered were sanitation, literacy, maternal mortality, caloric intake, government effectiveness and life expectancy. The most vulnerable countries are Ethiopia, Burkina Faso, Pakistan and Haiti. The least vulnerable are Australia and the United States.

> *"In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."*
>
> - The Rio Declaration on Environment and Development, 1992

In early 2006, a statement on climate change, issued by ninety-one prominent evangelical leaders, called on individuals and governments to begin the process of reducing emissions because "poor nations and poor individuals have fewer resources available to cope with major challenges and threats. The consequences of global warming will therefore hit the poor the hardest, in part because those areas likely to be significantly affected first are in the poorest regions of the world. Millions of people could die in this century because of global warming, most of them our poorest global neighbors."[39] Our understanding of our relatively high contribution to the global problem, coupled with the inequitable distribution of the burden of global warming, ought to be considered in the process of determining the extent of our commitment to the solution.

But perhaps more compelling than questions of consequence, need, and responsibility, is the increasingly well-documented fact that actions to reduce global-warming pollution have net positive effects on budgets and the economy. These benefits include:

- Job creation
- Reduced energy costs
- Improved health of workforce and general population
- Decreased vulnerability to fossil fuel market fluctuations
- Decreased vulnerability to future carbon pollution regulations
- Ability to participate in carbon-trading systems
- Reduced traffic congestion
- Energy-efficiency and renewable-energy investments keep our energy dollars circulating in the local economy.

Many policies that reduce emissions are already in place, originally established for a different purpose: cost savings, reducing traffic congestion, improving local air quality, protecting farm and forest lands, or increasing the livability and character of neighborhoods. Many greenhouse gas emission reduction measures will add to or enhance these existing programs. Perhaps the most exciting opportunity is that of making the Pacific Northwest a global leader in clean, renewable energy. In 2000 a renewable energy market analysis was commissioned by a group of Pacific Northwest utilities and economic development agencies. In a report entitled *Poised for Profit* they concluded that "the Pacific Northwest has the opportunity to be a global leader in the technology-based, clean-energy industry. This emerging industry will bring valuable jobs and economic development benefits to the region."[40] In a sense, this capacity to lead in the implementation of solutions is the other side of the responsibility implied by questions of environmental justice.

> [Clean energy technologies] *have the potential to add thousands of new jobs and billions of dollars in sales into the region's economy. Helping these businesses grow is not necessarily complicated … but will require commitment from governments throughout the region."*
>
> —Poised for Profit, 2000

Achieving a significant and meaningful reduction target, 20-30% or more, will require some investment on the part of city government. The mounting consequences of global warming are showing themselves first as local problems, so it is appropriate that the global solution will also begin to show itself at the local level. The longer we wait, the more pollution accumulates in the atmosphere. On the other hand, actions taken now will begin to pay for themselves. Payback and environmental benefits can be quickly realized and eventually the clean energy industry will become an economic anchor in our region.

Now let us begin. Now let us rededicate ourselves to the long and bitter - but beautiful - struggle for a new world. This is the calling of the sons of God, and our brothers wait eagerly for our response. Shall we say the odds are too great? Shall we tell them the struggle is too hard? Will our message be that the forces of American life militate against their arrival as full men, and we send our deepest regrets? Or will there be another message, of longing, of hope, of solidarity with their yearnings, of commitment to their cause, whatever the cost? The choice is ours, and though we might prefer it otherwise we must choose in this crucial moment of human history.

-Rev. Martin Luther King, Jr., 1967

Part IV: Emissions Inventory

This report is the culmination of the efforts of the first CCP milestone: conduct an inventory of greenhouse gas emissions. The inventory was conducted between August 2005 and August of 2006. The ICLEI's Cities for Climate Protection methodology allows local governments to systematically estimate and track greenhouse gas emissions from energy- and waste-related activities on a community-wide scale as well as those resulting directly from municipal operations. The inventory serves several purposes:

1. It can be a policy-making tool to design cost-effective reduction measures.
2. It is a reference point against which to measure future progress towards our goals.
3. With some additional effort, it could be used to document future emissions trading potential.

The inventories provide the basis for creating an emissions forecast and reduction target, and enable the quantification of emissions reductions associated with existing and proposed measures.

CACP Software and Inventory Method

To facilitate local government's efforts to identify and reduce greenhouse gas pollution, 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 inventory focuses on the two most abundant greenhouse gases: carbon dioxide and methane. Nationally, these two gases together represent more than 90% of greenhouse gas emissions. The other gases, though more potent in terms of global-warming potential, are not thought likely to be a significant portion of Bellingham's contribution to global warming. It is important to be clear that even though CO_2 has a lower global-warming potential than many other greenhouse gases, it is so much more abundant that it remains the most significant in terms of the amount of warming caused.

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 Greenhouse Gas Reporting Guidelines (EIA form 1605).

The CACP software has been and continues to be used by over 170 U.S. cities and counties to inventory and monitor their greenhouse gas pollution. It is worth noting, however, that although the software provides Bellingham with a sophisticated and useful tool, calculating

emissions from energy use with precision is difficult. The model depends upon numerous assumptions, and 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.

The inventory is composed of two categories, which are analyzed independently: municipal government emissions and community-wide emissions. The inventory of the community emissions explores all sources within the Bellingham city limits. The municipal operations inventory includes only those sources that are under the direct control of the Bellingham City Council. These two categories are explored independently for several reasons. The community-wide inventory explores sectors (residential, commercial, etc,), while a much finer resolution is possible in the municipal operations portion of the inventory. Energy use in the government is calculated on a building-by-building basis. When attention is turned to the question of where emissions reductions are possible, there will be a different set of options for city-owned facilities than for private sector emissions. For example, the city might opt to implement a procurement policy requiring that certain vehicles in the city fleet be replaced by hybrid vehicles, whereas in the private sector an education program about hybrids or an incentive program would be appropriate. Note that these two portions work synergistically as the city's leadership helps establish its credibility as a messenger, and public education provides increased public support for continued city action.

It is important to be clear that these two categories are not additive. The community-wide inventory is the total, and the municipal government category is a specific subset of the community-wide total.

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, propane, diesel, gasoline, and landfill methane. Sectors are the portion of the community of government operations to which the emissions are attributable. In the community the sectors considered were residential, commercial, industrial, transportation and waste. In city operations the sectors considered are buildings, vehicle fleet, employee commute, lights, water/sewer and waste.

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, the main sources of data were Puget Sound Energy (electricity), Cascade Natural Gas (natural gas), the Washington State Department of Transportation (total vehicle miles traveled), and the Sanitary Services Corporation (waste generated). For the municipal inventory, the primary data sources were Puget Sound Energy (electricity), Cascade Natural Gas (natural gas), vehicle fuel records, and the Commute Trip Reduction survey. A variety of other sources were used to calculate waste and indicator inputs and to supplement these sources.

Both sections of the inventory are based on the year 2000. It was determined that an interim-year inventory from 2005 would be useful for both the community and municipality

for two reasons. First, an interim-year inventory provides a more up-to-date report on emission levels; second, it provides an opportunity to gauge the impact of energy-efficiency measures and programs put in place since the base year.

The data collected do not include all emissions that could be identified or quantified. Rather, the focus is on those areas over which the city government has the most influence. For example, data regarding Bellingham International Airport was not collected even though, on a per capita basis, air travel is often one of the most significant sources of greenhouse gas pollution. City government exerts relatively little influence over individual residents' air travel choices, and, moreover, much of that travel is associated with other, larger regional airports. The accuracy of any attempt to quantify such emissions would be highly questionable, and its utility as a policy tool would be relatively minimal. The following sources of emissions are not included in this data set:

- Air travel
- Non-road fuel use (riding lawn mowers, off-road vehicles, construction vehicles, etc.)
- Water travel
- Upstream energy from consumer products and food
- Other greenhouse gases including N_2O, CFCs and SH_6

Detailed records have been kept to document all data sources, assumptions made, and decisions regarding how to characterize information. These choices have been carefully considered by Environmental Resources staff, and have been reviewed for consistency, methodology and accuracy by ICLEI. For ease of understanding, these assumptions and decisions have not been included in this report, but are available from Environmental Resources staff. A short description of the methodology is available in Appendix A.

The waste sector of both the municipal and community inventories deserves additional explanation. The CACP Software is designed to be used in communities with a variety of waste disposal methods including open dumps and incineration. The calculations are based on the EPA's Waste Reduction Model (WARM). WARM was developed to assist solid waste managers in determining the GHG impacts of their waste management practices. WARM compares GHG and energy impacts of landfilling, recycling, incineration, composting, and source reduction. Bellingham's inventory is consistent with this national standard. When organic matter like food scraps and yard waste decompose deep in a landfill where there is not enough oxygen, it can create methane (CH_4), which traps more than twenty times as much heat as CO_2 does. In some cases, waste disposal can be a significant part of a community's climate pollution profile. In the case of Bellingham, the majority of our waste is sent to two landfills, which both have a system in place to capture and burn most of the methane. In the case of Roosevelt Landfill, the methane is burned to generate electricity. 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 eCO_2 emissions from our waste sector are reported as negative. Of course, this does not mean that creating additional garbage is part of the solution to global warming. Reducing the amount of waste we create is part of the solution for a variety of reasons, but in Bellingham it is not as high a priority as in other locations. It is also important to note that while the waste-reduction effect of recycling is not a priority for climate protection, recycling also saves a substantial amount of energy by reducing the need for virgin inputs, and so recycling does have a net benefit for the climate

and is an important part of the solution and of the proposed Action Plan. Figure 13 shows greenhouse gas sources and sinks in the waste sector.

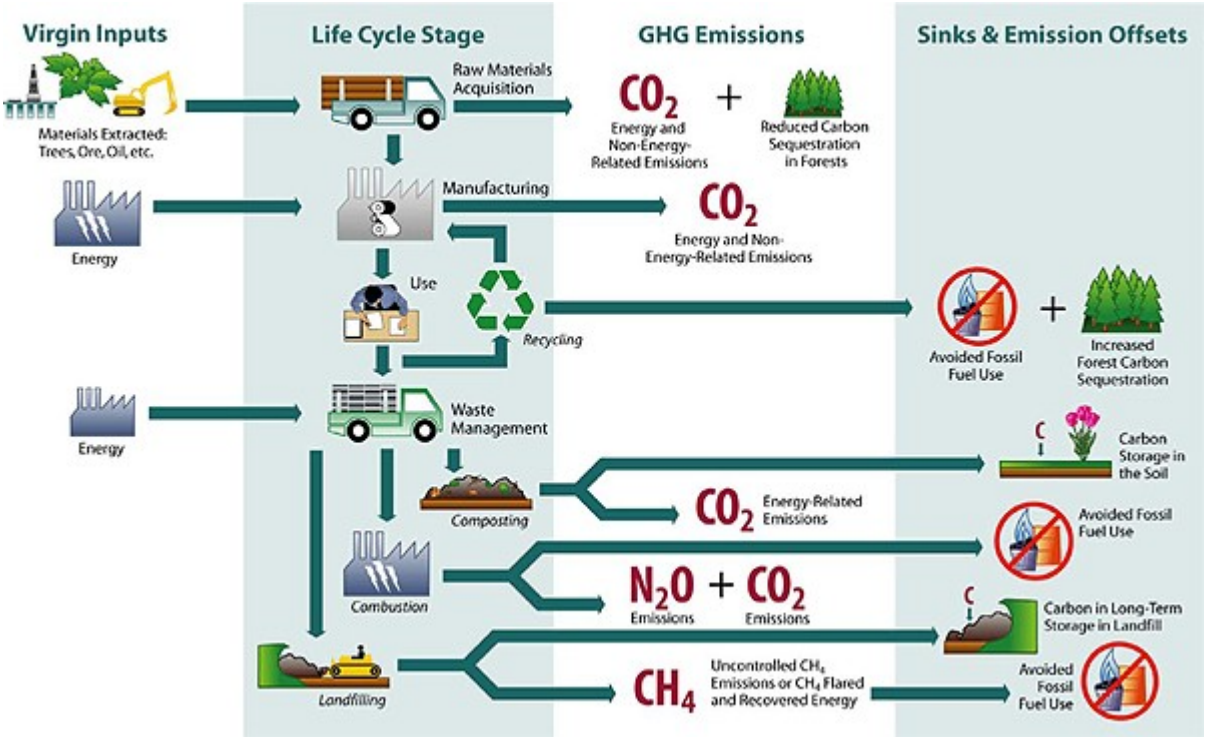

Figure 13: Greenhouse gas sources and sinks in the waste sector

Source: U.S. EPA[41]

Municipal Operations Inventory

Base Year Inventory

In the base year of 2000, Bellingham's municipal operations generated 19,945 tons of eCO_2. The largest source of municipal emissions was electricity, which resulted in 64.2% of those emissions. Water and wastewater treatment was the most significant sector, accounting for 45.5%. Table 1 and Figure 14 show the breakdown of municipal emissions by source type and sector. Figure 15 shows the costs associated with Bellingham's energy use in 2000.

Table 1: Bellingham Municipal Emissions Summary for 2000

Sources and Sectors	Equiv CO_2 (tons)	%of total	Energy (million Btu)	Cost ($)
Buildings – electricity	*3,572*	*18%*	*23,802*	*$478,760*
Buildings – natural gas	*1,759*	*9%*	*28,464*	*$182,519*
Vehicle Fleet – gasoline	*1,161*	*6%*	*13,644*	*$136,875*
Vehicle Fleet - diesel	*772*	*4%*	*8,903*	*$96,319*
Employee Commute	*1,625*	*8%*	*18,873*	*n/a*
Streetlights	*2,012*	*10%*	*13,406*	*$463,818*
Water /Sewage - Electricity	*7,228*	*36%*	*48,157*	*$795,670*
Water/Sewage – Natural Gas	*1,842*	*9%*	*29,820*	*$218,171*
Waste	*-27*	*0%*	*n/a*	*n/a*
TOTAL	***19,945***	***100%***	***185,069***	***$2,299,788***

Source: CACP Model output

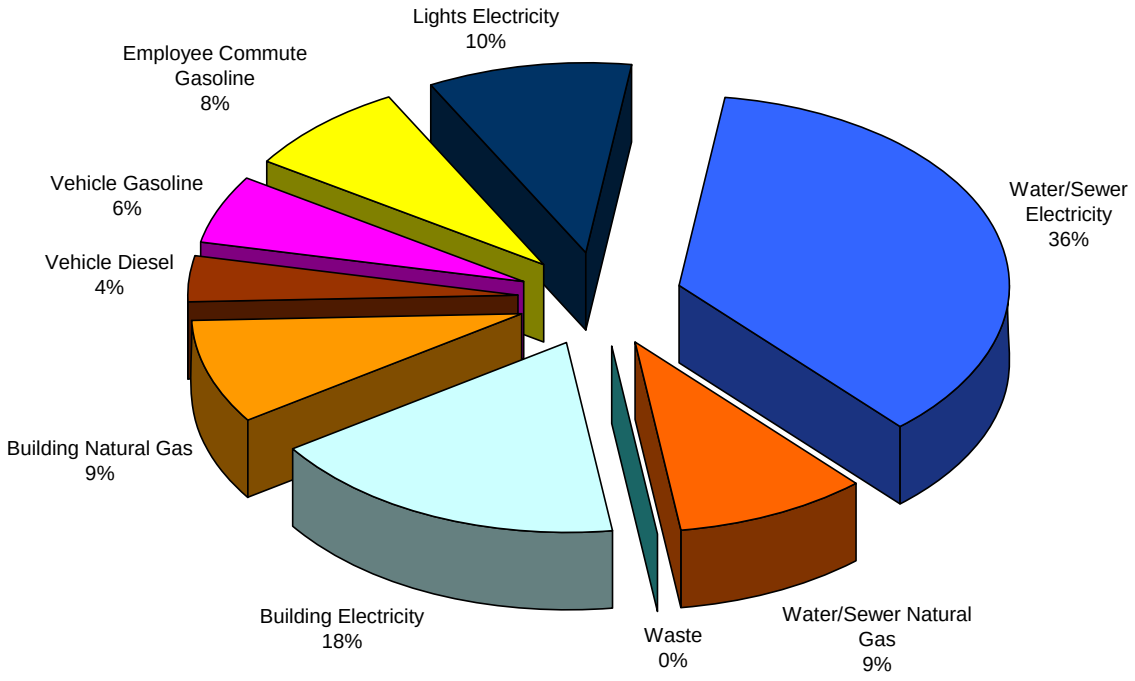

Figure 14: Bellingham's municipal greenhouse gas emissions—2000
Source: CACP Model output

In 2000, municipal emissions in Bellingham constituted about 2.05% of the community's total emissions. Local government emissions typically fall between 2 and 5 percent of overall community levels. As a minor contributor to total emissions, actions to reduce municipal energy use will have a limited impact on Bellingham's overall emissions levels. Municipal

action does have symbolic value, however, and demonstrates leadership that extends well beyond the magnitude of emissions actually reduced.

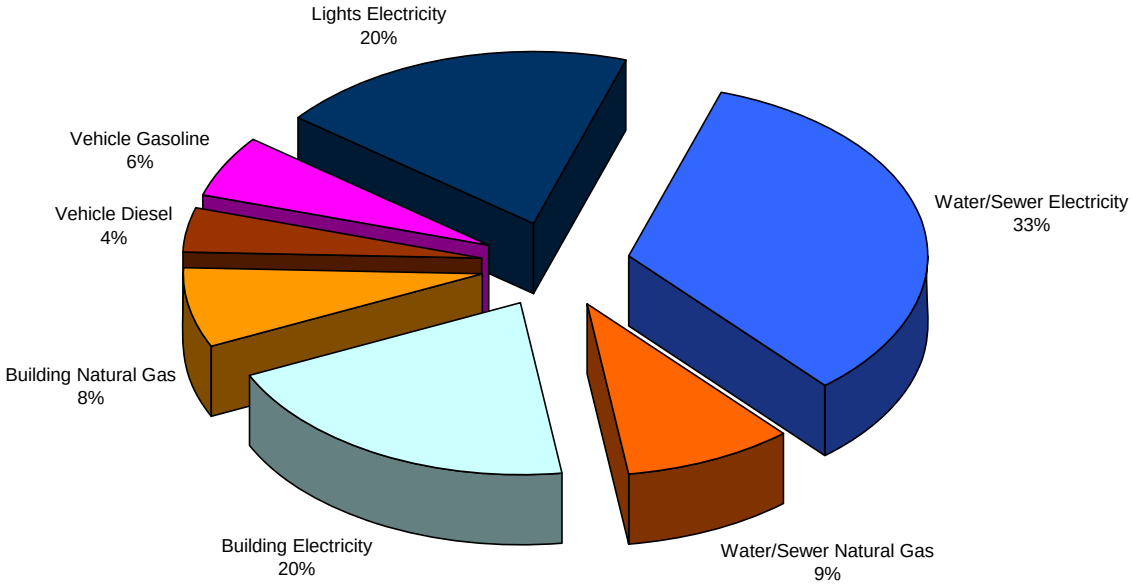

Figure 15: Cost of Bellingham's energy use by source and sector—2000
Source: CACP Model output

Interim-Year Inventory

In the interim analysis year of 2005, Bellingham's municipal operations generated 20,632 tons of eCO_2. As in 2000, the largest source of emissions was electricity, which resulted in 66.1% of those emissions. Water and wastewater treatment was the most significant sector, accounting for 46.2%. Table 2 and Figure 16 show the breakdown of municipal emissions by source type and sector. Figure 17 shows the costs associated with Bellingham's energy use in 2005.

Table 2: Bellingham Municipal Emissions Summary for 2005

Potential Sources	Equiv CO_2 (tons)	% of Total	Energy (million Btu)	Cost ($)
Buildings – electricity	*3,623*	*18%*	*23,325*	*$526,390*
Buildings – natural gas	*1,724*	*8%*	*27,898*	*$235,098*
Vehicle Fleet – gasoline	*1,122*	*5%*	*13,148*	*$232,585*
Vehicle Fleet - diesel	*714*	*3%*	*8,234*	*$124,132*
Employee Commute	*1,640*	*8%*	*19,165*	*n/a*
Streetlights	*2,265*	*11%*	*14,584*	*$527,666*
Water /Sewage - Electricity	*7,735*	*39%*	*49,804*	*$945,413*
Water/Sewage – Natural Gas	*1,661*	*8%*	*26,877*	*$202,816*
Waste	*-28*	*0%*	*n/a*	*n/a*
TOTAL	***20,632***	***100%***	***185,902***	***$2,734,929***

Source: CACP Model output

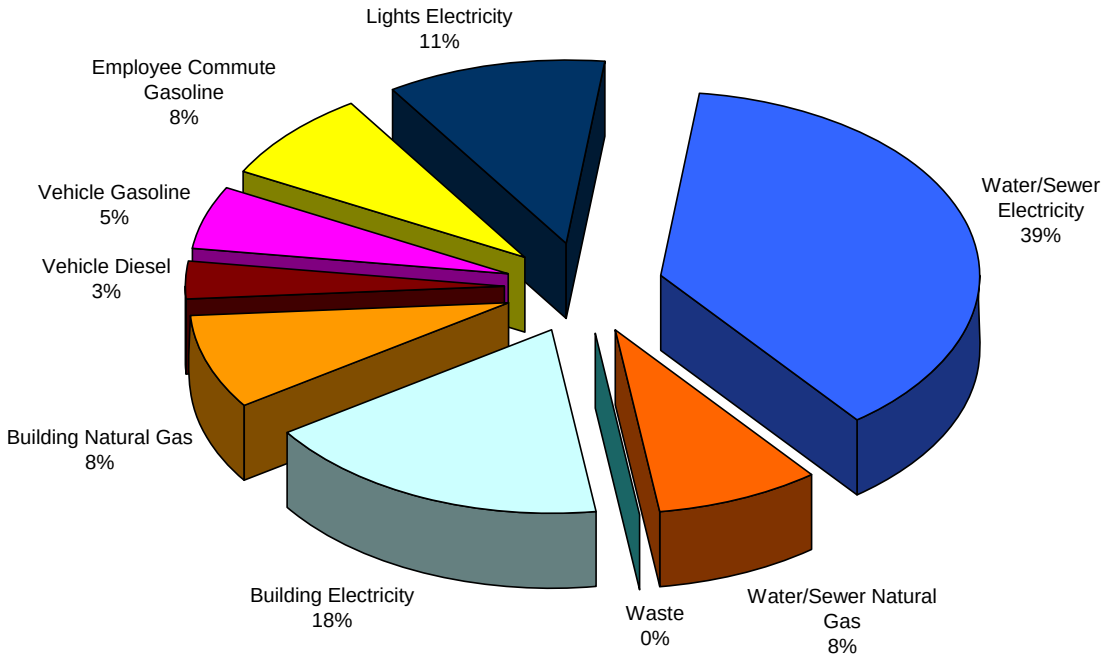

Figure 16: Bellingham's municipal greenhouse gas emissions—2005

Source: CACP Model output

In 2005, municipal emissions in Bellingham constituted about 2.06% of the community's total emissions. As stated above, local government emissions typically fall between 2 to 5 percent of overall community levels.

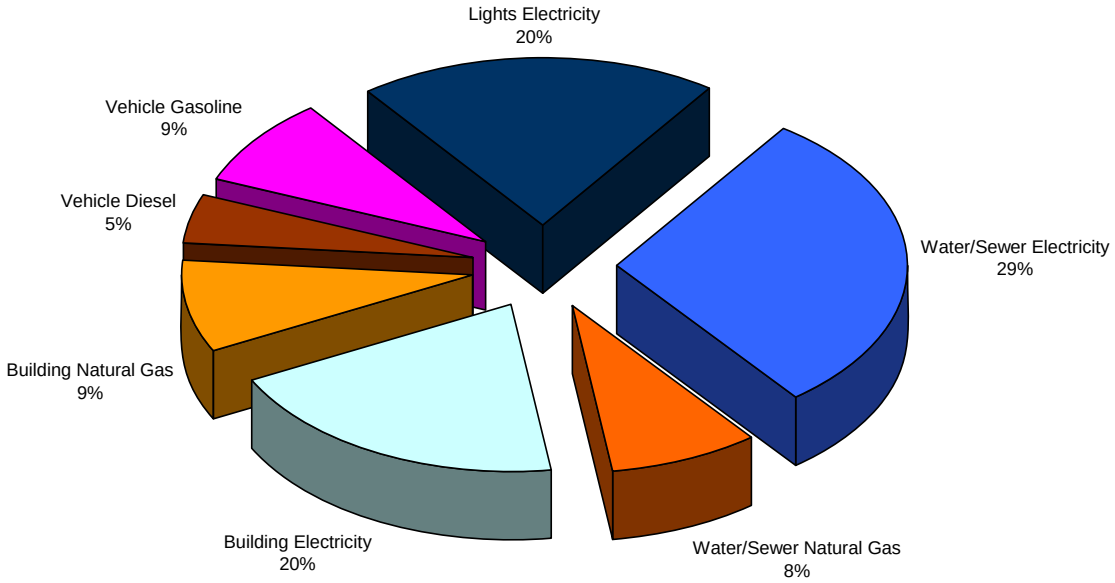

Figure 17: Cost of Bellingham's energy use by source and sector—2005
Source: CACP Model output

Summary of Sectors and Sources for Municipal Emissions

Buildings Emissions

The relative contribution to municipal greenhouse gas emissions among buildings and parks is highlighted in Figure 18. Figure 19 shows the costs of energy use among these same facilities. Note that for purposes of this analysis, separate facilities were often combined. For example, the Police category includes the central Police Station as well as several storage facilities.

A number of facilities show reduced energy use between 2000 and 2005. Some of this can be attributed to energy conservation measures; however, 2005 experienced a warmer winter than 2000, therefore reducing demand. Fire station #1 showed a substantial increase despite an extensive conservation retrofit in 2004. This is attributed to increased staffing and use of the building.

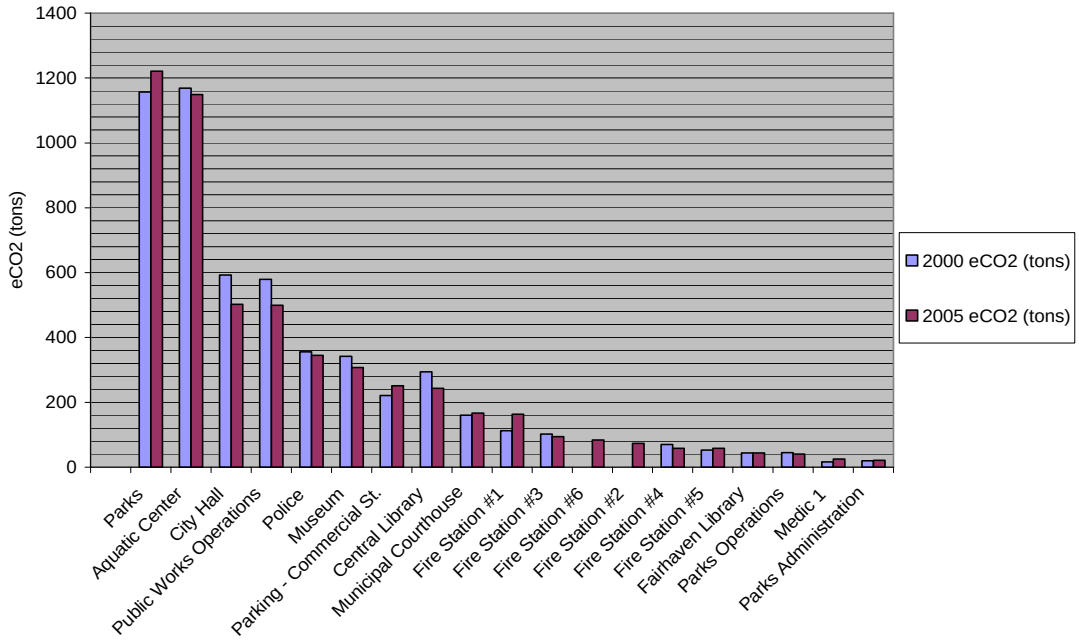

Figure 18: Greenhouse gas emissions among municipal buildings and facilities in 2000 and 2005
Source: CACP Model Output

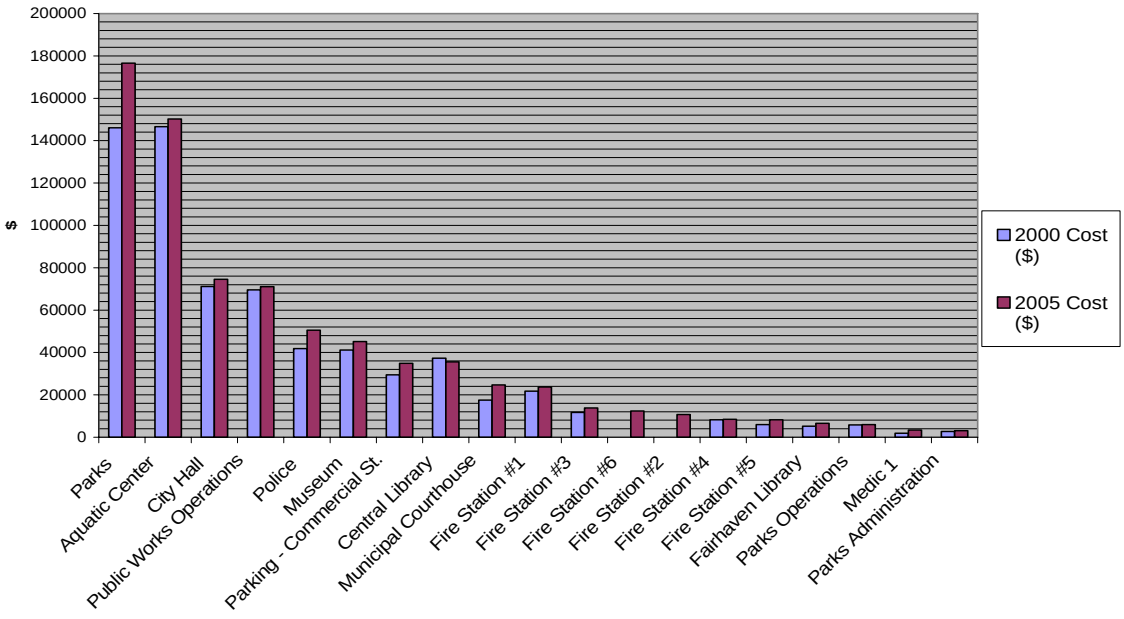

Figure 19: Cost of energy among municipal buildings and facilities in 2000 and 2005
Source: CACP Model output

Vehicle Fleet Emissions

The relative contribution to municipal greenhouse gas emissions from the vehicle fleet is outlined in Figure 20. Figure 21 shows the cost of fuel by division in 2000 and 2005.

Comparing 2000 and 2005 reveals several significant changes. The decrease in usage in Public Works Streets was a shift due to the number of vehicles moved to the newly created Surface and Stormwater division. However, significant emissions reductions did occur in several divisions. Police saw a decline of about 2.5%. This may be a result of increased call load, requiring officers to spend more time parked and investigating than patrolling. The fire department (not including Medic 1) showed a nearly 18% decrease in vehicle related emissions. This number is somewhat anomalous because the call volume and number of responses increased. It may be a result of the addition of the Deemer Road Fire Station, which would allow for less travel distance for many calls. In addition, Parks showed a decrease of more than 8%, which may be attributable to the use of the Squalicum Park site as secondary base of operations, allowing for less travel distance for many activities.

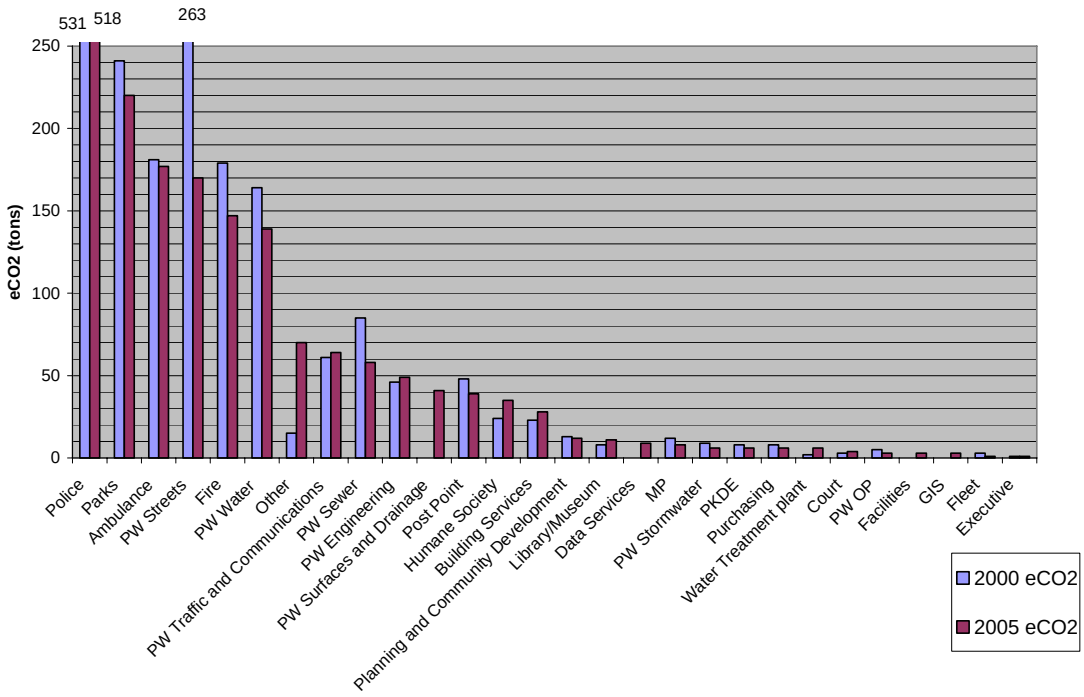

Figure 20: Greenhouse gases among municipal vehicle fleet in 2000 and 2005
Source: CACP Model output

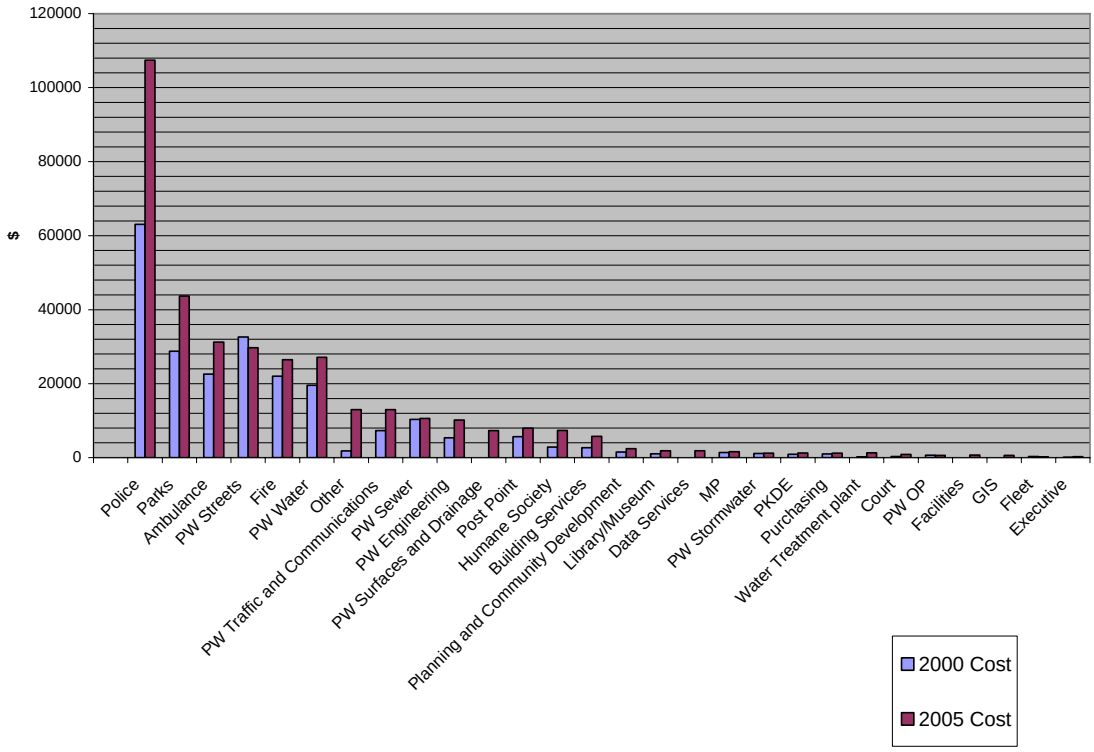

Figure 21: Cost of fuel in municipal vehicle fleet in 2000 and 2005
Source: CACP Model output

Streetlights and Traffic Signal Emissions

The contribution of greenhouse gases from traffic signals and street lights is outlined in Figure 22. Traffic signal related emissions are shown to increase between these two years. This reflects the increased number of signals installed in the community.

The city recently finished replacing incandescent traffic signals with more efficient LED lights. This process was approximately 50% complete in 2005, but the majority of traffic signals are billed based on installed wattage, rather than a meter reading. The installed wattage had not been updated for any accounts in 2005. Puget Sound Energy will rebate the city the difference now that the project is complete. In 2005 this is estimated to account for about $30,000, and a reduction of 454,000 kWh of electricity and 232 tons eCO_2 (reduced from the levels indicated). With the completion of the project, annual savings are expected to be even higher.

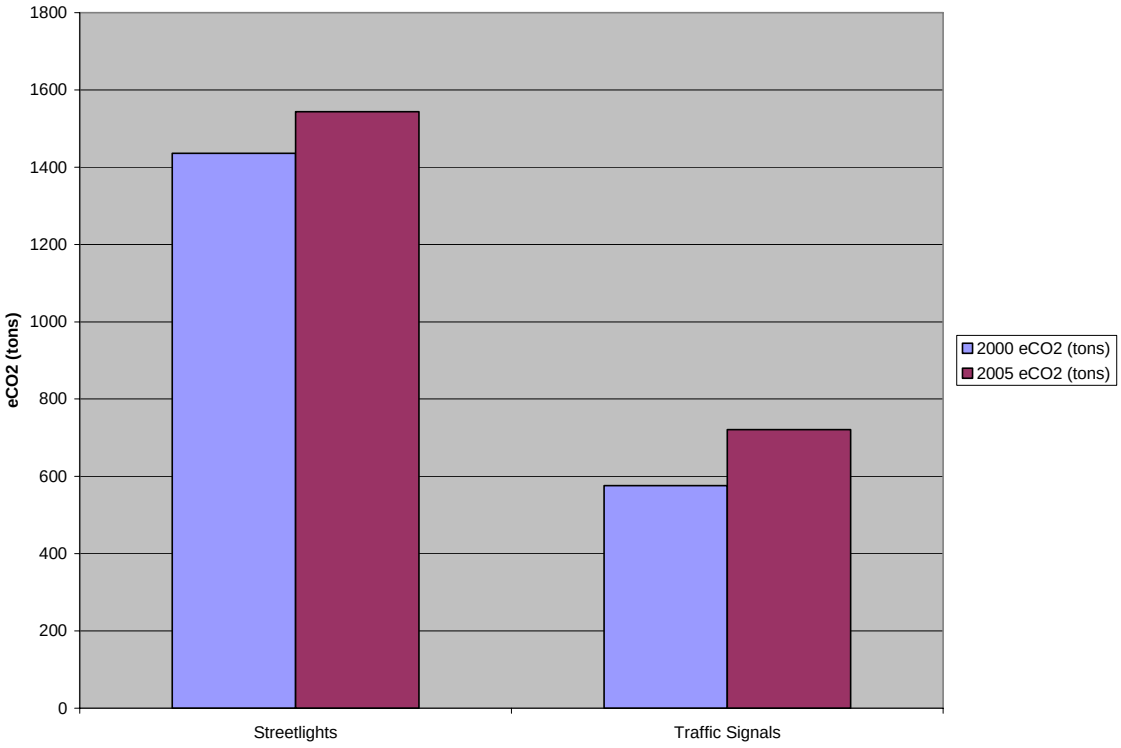

Figure 22: Greenhouse gas emissions in municipal lighting in 2000 and 2005
Source: CACP Model output

Water and Wastewater Emissions

The relative contribution of greenhouse gases from municipal water treatment and distribution and wastewater collection and treatment, is outlined in Figure 23. Water and wastewater operations account for the largest share of the municipal greenhouse gas emissions. While the indicated emissions are significant, it is important to note that management practices implemented in the 1990s have dramatically reduced the natural gas used at Post Point. These reductions are outside the scope of this analysis because they predate the baseline, but should be recognized as significant.

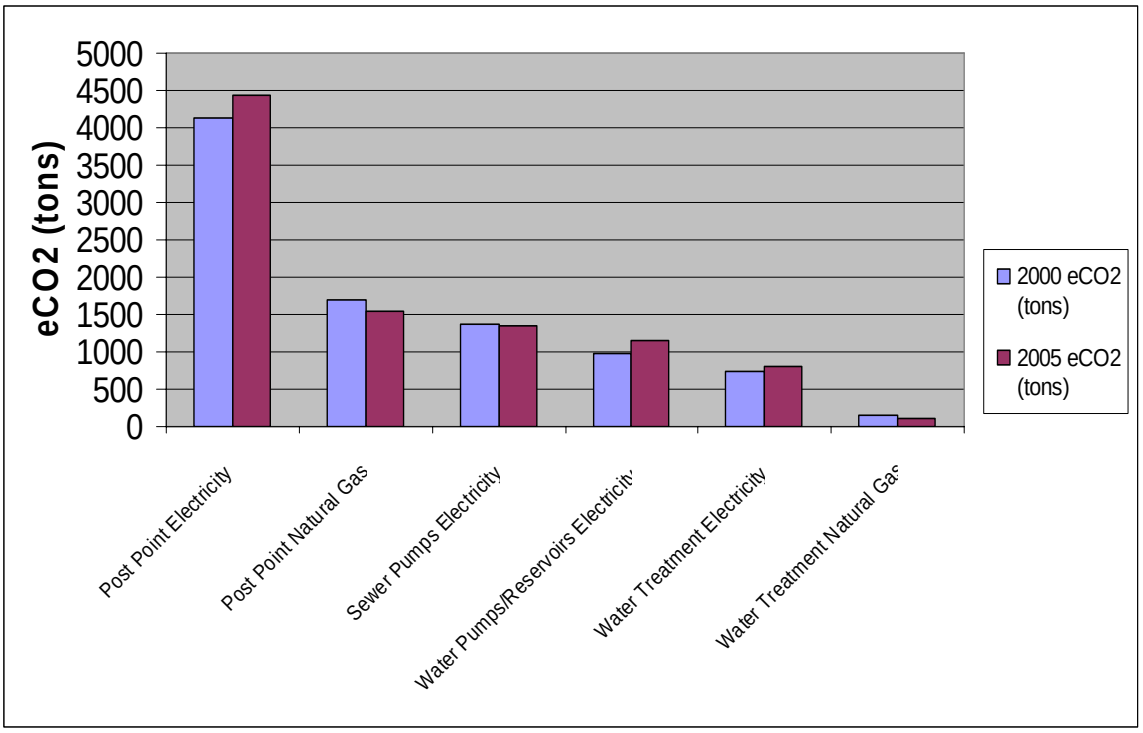

Figure 23: Greenhouse gas emissions in municipal water and sewage operations in 2000 and 2005

Source: CACP Model output

Solid Waste Emissions

The waste generated from municipal employees is not a significant source of greenhouse gas emissions. This is a result of the high proportion of methane recovered at landfills where Bellingham's waste is shipped combined with the landfill carbon sink effect. For a more complete description see page 40.

Community Emissions Inventory

The Community Emissions Inventory explores the pollution resulting from any activities occurring within the Bellingham city limits.

Georgia Pacific – In 2001 Georgia Pacific West Inc. ceased pulping operations at its facility in Bellingham. This has significant implications for the community's energy consumption because pulping operations are very energy-intensive. The net result is community energy consumption in the baseline year, 2000, is higher than in subsequent years. For a variety of reasons it has been determined that this effect should not be included in the final community analysis. The reduction is the result of market forces beyond the control of city government. Moreover, presence of the Georgia Pacific data overshadows the most relevant results of the study. Finally, the reduction is not characteristic of the desirable outcomes of the Cities for Climate Protection Program; emission reductions should be achieved by increasing efficiency, not by eliminating businesses. The results have been modified so as to exclude the footprint of Georgia Pacific Pulping operations. All results of the Bellingham emissions inventory are presented as though the Georgia Pacific Pulping operations were outside of the Bellingham city limits.

Base Year Emissions Inventory

In the base year 2000, the community of Bellingham emitted approximately 950,793 tons of eCO_2. By far the largest single sector was transportation in which diesel and gasoline emissions together accounted for 44.2% of all emissions in Bellingham in 2000. Gasoline emissions alone accounted for 37.3% of total community emissions. When electricity based emissions from residential, commercial and industrial sectors are combined, they accounted for 34.7% of the total community emissions. Table 3 and Figure 24 below show the breakdown of community emissions by sector and source type.

Table 3: Bellingham Community Emissions Summary 2000

Potential Sources	Equiv CO_2 (tons)	% of Total	Energy (million Btu)
Residential – electricity	*124,164*	*13%*	*827,267*
Residential – natural gas	*104,883*	*11%*	*1,697,618*
Residential – propane	*1,770*	*<1%*	*24,455*
Commercial – electricity	*164,631*	*17%*	*1,069,893*
Commercial – natural gas	*61,724*	*6%*	*999,062*
Commercial – propane	*307*	*<1%*	*4,245*
Industrial – electricity	*40,443*	*4%*	*269,460*
Industrial – natural gas	*39,139*	*4%*	*633,507*
Transportation – gasoline	*354,405*	*38%*	*4,132,429*
Transportation - diesel	*65,466*	*7%*	*754,239*
Waste	*-6,140*	*0%*	*n/a*
TOTAL	***950,793***	***100%***	***10,439,174***

Source: CACP Model output

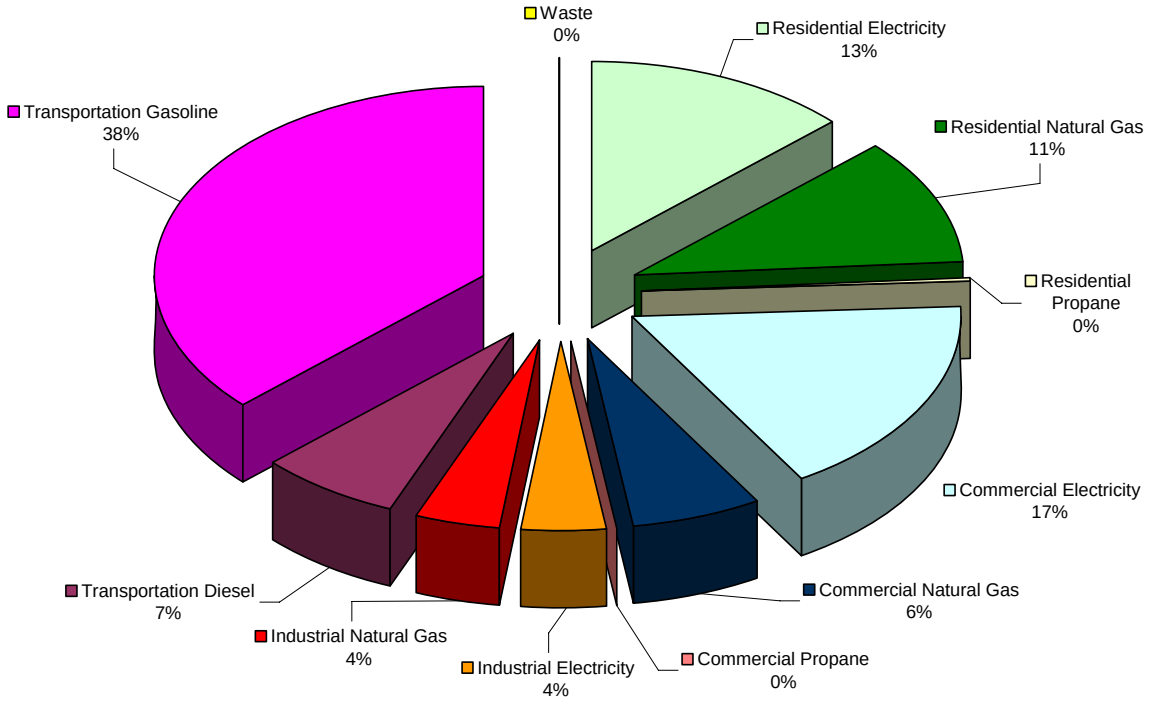

Figure 24: Bellingham community greenhouse gas emissions—2000
Source: CACP Model output

Interim Year Inventory

In the interim year 2005, the community of Bellingham emitted approximately 997,373 tons of eCO_2. Again the largest single sector was transportation, this time diesel and gasoline emissions together accounted for about 42% of all emissions in Bellingham, which is a decline from 44.2% in 2000. When electricity based emissions from residential, commercial and industrial sectors are combined it accounted for 39.1% of the total community emissions, up from 34.7% in 2000. Emissions from natural gas declined from 21.6% in 2000 to 19.5% in 2005. This represents an absolute decline in emissions from natural gas of about 6%. This may be due to several factors, but probably the most significant is the fact that there were less heating degree days in 2005 than in 2000 (over the course of the winter less heating was required to maintain a comfortable temperature). Table 4 and Figure 25 show the breakdown of municipal emissions by source type.

Table 4: Bellingham Community Emissions Summary 2005

Potential Sources	Equiv CO_2 (tons)	% of Total	Energy (million Btu)
Residential – electricity	*136,575*	*14%*	*879,358*
Residential – natural gas	*100,380*	*10%*	*1,624,735*
Residential – propane	*1,925*	*<1%*	*26,601*
Commercial – electricity	*189,717*	*19%*	*1,221,518*
Commercial – natural gas	*54,427*	*5%*	*880,953*
Commercial – propane	*307*	*<1%*	*4,245*
Industrial – electricity	*63,977*	*6%*	*411,928*
Industrial – natural gas	*38,486*	*4%*	*622,926*
Transportation – gasoline	*346,114*	*35%*	*4,044,221*
Transportation - diesel	*72,398*	*7%*	*834,120*
Waste	*-6,935*	*0%*	*n/a*
TOTAL	***997,373***	***100%***	***10,550,604***

Source: CACP Model output

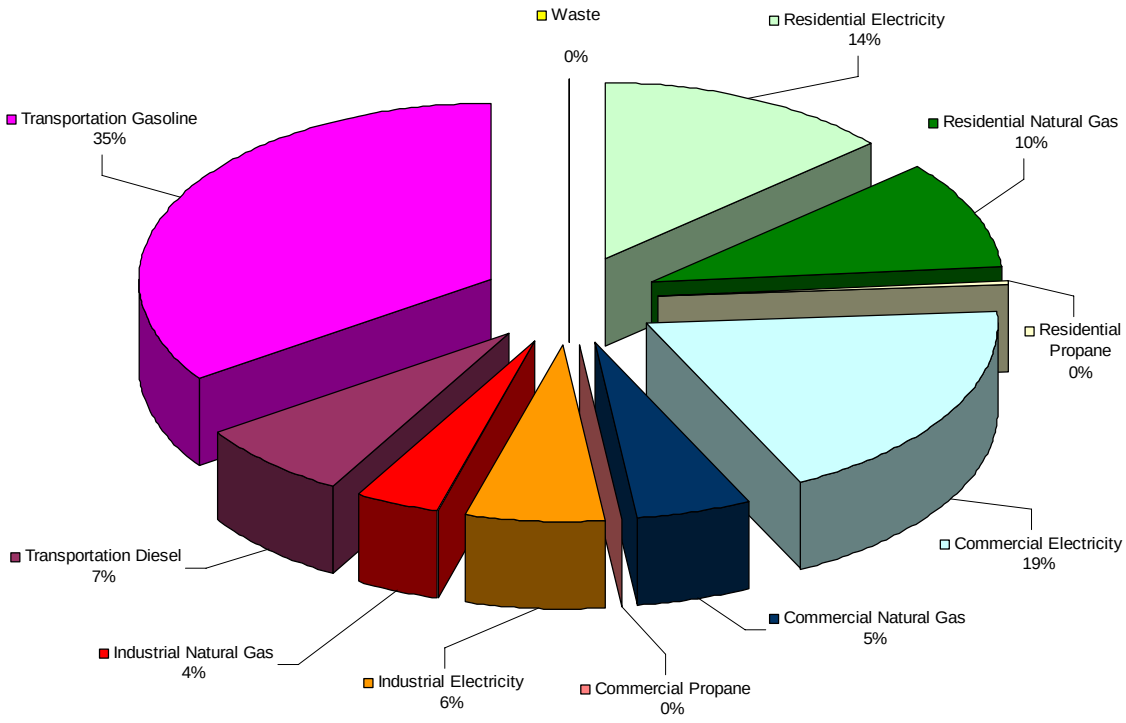

Figure 25: Bellingham community greenhouse gas emissions—2005

Source: CACP Model output

Part V: Forecast and Backcast

Bellingham's pollution emissions are not stationary. The general trend of population growth coupled with increasing per capita energy use, and the local government's attempt to keep services apace with that growth, result in a steady increase in annual emissions. Any attempt to achieve an absolute reduction must first take into account and overcome this growth.

Based on the community and municipal operations emissions inventories developed for Bellingham for the base year 2000, the next step was to forecast future emissions generated in the community and by municipal operations. The emissions forecast represents a business-as-usual prediction of how greenhouse gas emissions are likely change over time. Two forecast years were selected: 2012 and 2020. The use of two years will hopefully facilitate a more complete approach to a pollution reduction policy, thereby creating benchmarks for the achievement of both short- and medium-term goals.

Emissions were also backcast to 1990. While detailed data was not available to inventory the emissions for years prior to 2000, it was considered of value to have an estimate of 1990 emissions, as this is the base year against which most national and international reduction targets are measured. Most notably, this is the base year for measuring achievement of the Kyoto Protocol target and is therefore relevant to our achievement of the goals established by the Mayors Climate Initiative. For the future, it may also prove valuable as a tool for measuring credit for carbon reductions, which are typically counted against 1990 emissions.

Emissions forecasting was done with the CACP software. Different methods were used as a basis for estimating future and historical emissions in the community versus municipal operations sectors.

Community forecast and backcast were based on data published by the U.S. Energy Information Administration for regional energy use by energy source and by economic sector. These data were then scaled down to reflect known or expected population changes specific to Bellingham. It important to note that the effects of the recently passed renewable portfolio standard (I-937) were not included in the forecast methodology.

The municipal emissions forecast and backcast were based on several sets of proxy data: changes in the total number of full time equivalent (FTE) employees, growth the city's population and the trend between the inventories of 2000 and 2005.

Conducting an emissions forecast is essential for setting the reduction target, since the amount of GHG emissions Bellingham will pledge to reduce will be derived from projected emissions. Table 5 and Figures 26 and 27 show changes in annual emissions over time in the community and in municipal operations, respectively.

Table 5: Bellingham Emissions Summary (A)

	Community Analysis	Municipal Operations Analysis
Base Year	2000	2000
eCO_2 emissions in the base year -2000 (tons)	950,793	19,970
Backcast Year	**Community -1990**	**Municipal Government - 1990**
Estimate of eCO_2 emissions in 1990 (tons)	736,094	18,780
Target Year	**Community - 2012**	**Municipal Government - 2012**
Business-as-usual projection of eCO_2 emissions in 2012 (tons)	1,083,474	22,583
Target Year	**Community -2020**	**Municipal Government -2020**
Business-as-usual projection of eCO_2 emissions in 2012 (tons)	1,192,794	24,794

Source CACP Model Output

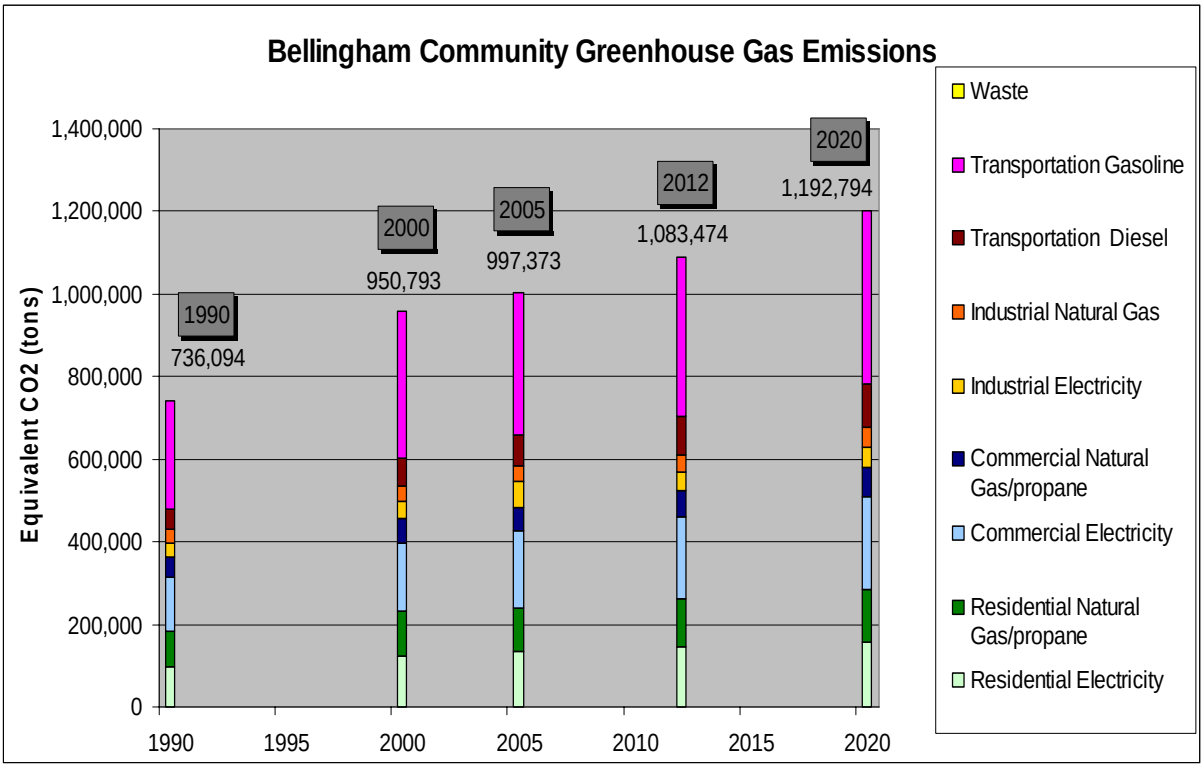

Figure 26: Community greenhouse gas emissions 1990-2020

Source CACP Model Output

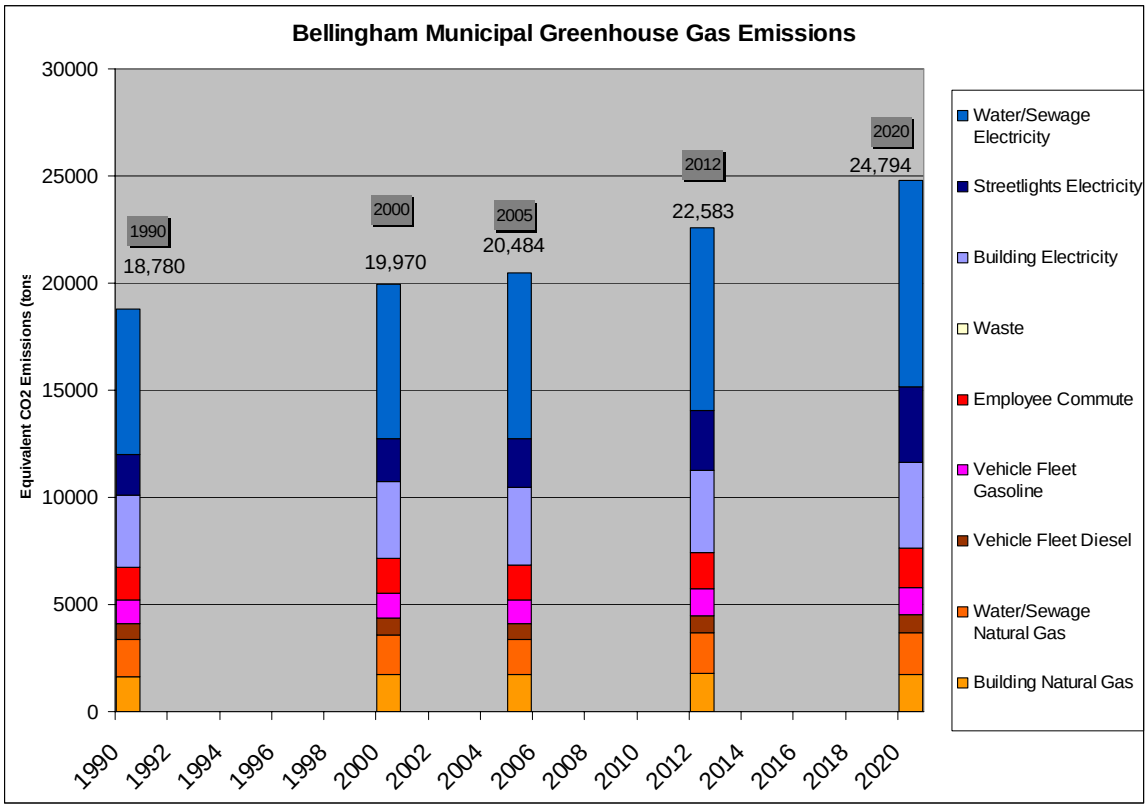

Figure 27: Municipal greenhouse gas emissions 1990-2020
Source CACP Model Output

Part VI: Greenhouse Gas Emissions Reduction Target

Many factors were considered in recommending Bellingham's reduction target.

- The target should be both aggressive and achievable, given local circumstances.
- The Kyoto Protocol target of 7% below 1990 levels was the target the United States agreed to in principle at the 1997 United Nations Council of Parties meeting, but has yet to ratify in Congress. Many other nations have set similar goals and have begun action towards meeting them.
- The US Mayors Climate Protection Agreement states that signatories will "strive to meet or exceed Kyoto Protocol targets for reducing global-warming pollution by taking actions in our own operations and communities."
- IPCC research suggests that worldwide we would need to achieve a 60% to 80% reduction below 1990 levels in order to reverse global warming and stabilize the climate.
-

Local factors considered in selecting the target-reduction percentage included:

- Estimation of the effects of current or implemented programs and policies (Action Plan Phase I);
- Estimation of the effects of planned or expected programs and policies (Action Plan Phase II);
- Expectation of future, as yet undetermined, opportunities to reduce emissions (Action Plan Phase III);
- Emissions reductions expected to be consequences of existing State legislation; and
- Targets adopted by peer communities.

Environmental Resources staff recommends that Bellingham establish a separate reduction target for the community and for local government in each of the forecast years, for a total of four targets. This will allow for implementation of both short- and medium-term policies and will allow local government to set a more challenging target based upon its greater capacity to achieve immediate reductions. Table 6 shows the recommended targets as a percentage of 2000 emissions levels and the emissions reductions from the target year needed to achieve that level.

Table 6: Recommended Bellingham Reduction Targets

	Year	2012	2020
City Government	Forecast emissions (tons)	22,583	24,794
	Recommended Target (percentage reduction from 2000 levels)	**64%**	**70%**
	Recommended Target (tons less than forecast emissions)	15,394	18,804
Community	Forecast Emissions (tons)	1,083,474	1,192,794
	Recommended Target (percentage reduction from 2000 levels)	**7%**	**28%**
	Recommended Target (tons less than forecast emissions)	200,000	508,227

Source CACP Model Output

The target recommended for the municipal government is dominated by the effect of the city's decision to begin purchasing 100% of municipal electricity from renewable sources. This one action achieves emissions reductions of more than 60%. The recommended target for 2012 is based on achieving all emissions-reduction measures recommended in Phase I and II of the action plan. The goal of 70% for 2020 continues those efforts beyond 2012 and assumes the implementation of some additional Phase III measures yet to be determined. This goal will move the city government operations well into the range considered safe by the IPCC and sets a strong example of what is possible. Figure 28 shows city government emissions and targets over time.

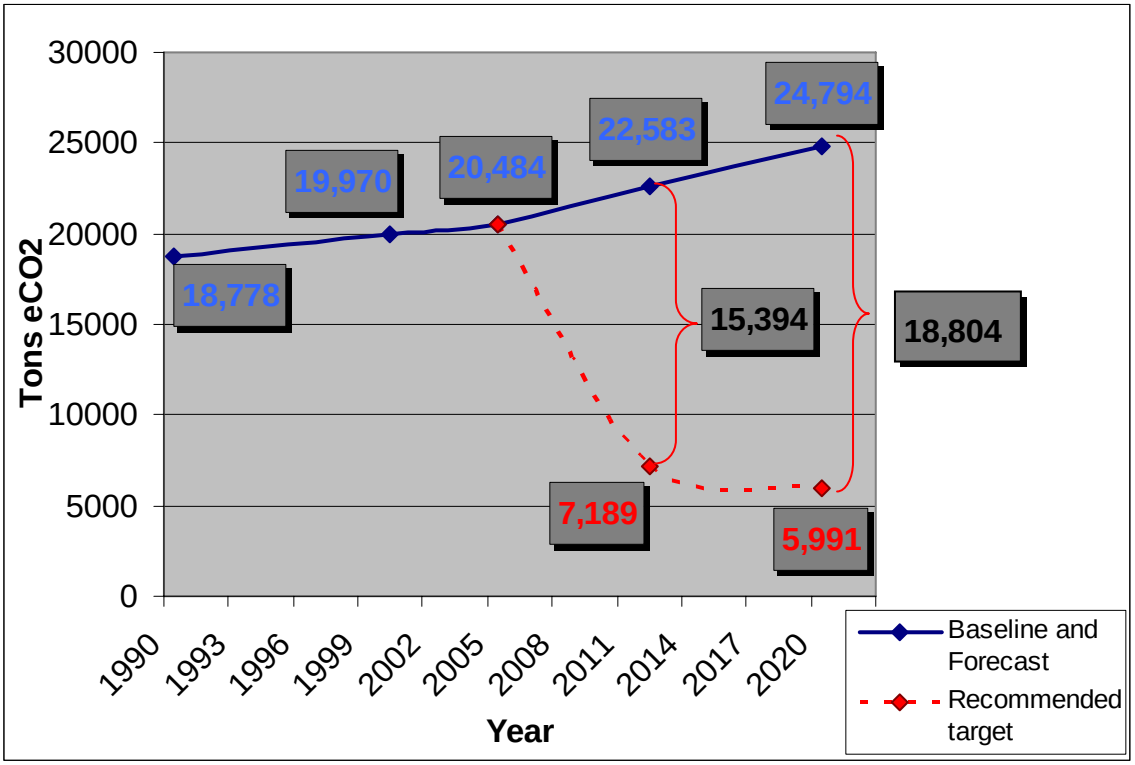

Figure 28: Municipal government emissions and targets over time
Source CACP Model Output

Community emissions goals were derived from the attempt to achieve the Kyoto Protocol target. Ultimately it was determined that decisions that can be made by city government alone are not likely to be able to achieve the Kyoto target within the next five years. This target might be achieved with substantial changes in policy at the state and federal levels. Without counting on those changes, it is recommended that the city adopt the target of 7% below 1990 levels by 2020—the same goal as the Kyoto Protocol target but achieved over a longer timeline. Because of substantial growth in emissions over the 1990s, this works out to be a 28% reduction from 2000 levels. The 2012 interim goal was then established based on the expectation that city would implement all measures in Phase I and II of this action plan and develop and implement additional Phase III measures, which will achieve additional emissions reductions of approximately 50,000 tons. Figure 29 shows Bellingham community emissions and targets over time.

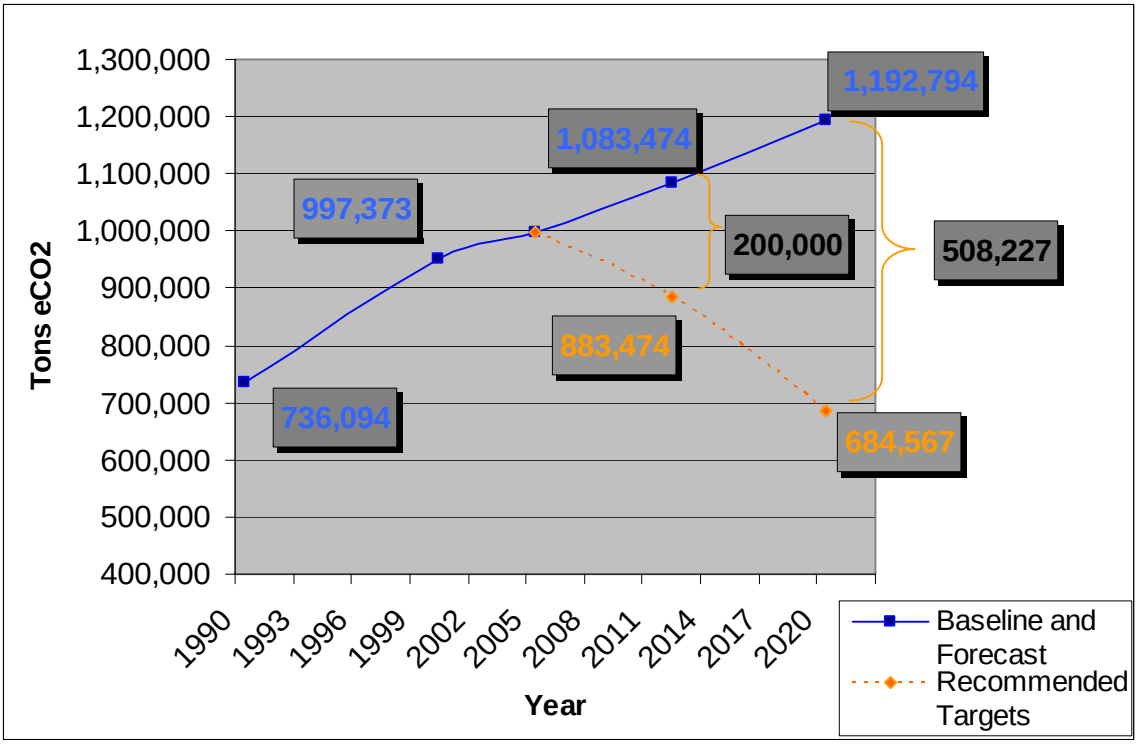

Figure 29: Bellingham community emissions and targets over time
Source CACP Model Output

Part VII: Local Action Plan

Action Plan Phase I — Existing Measures

Phase I of the Action Plan consists of existing actions (measures) Bellingham, both the government and the wider community, has undertaken a number of measures and initiatives that will result in the reduction of greenhouse gas pollution from the base-year (2000) level. These measures are an excellent first step towards significant reduction of greenhouse gas pollution. While an extensive attempt to identify existing measures was made, it is nearly certain that some have been overlooked, while others were difficult to quantify. If identified, missing measures could be included for consideration in future analysis.

It is also important to note that a significant shift in the accounting method being used occurred as a result of City Council's decision to begin buying renewable energy credits for 100% of municipal electricity used. Because of that decision, all electricity use is considered emissions-free beginning in 2007. Typically, any conservation measures that reduce electricity use are also counted as reducing the emissions associated with that use. Following Bellingham's choice to begin purchasing green power, there are no emissions to reduce. This does not mean these efforts are without value. *A preliminary survey of these measures found lighting upgrades and other electricity conservation measures, which are saving the city in excess of $80,000 each year.* It is likely that, under more extensive review, additional savings would be uncovered. While no longer reducing pollution, these efforts are a wise use of resources nonetheless.

To help compare the effectiveness of various measures, a simple rating system has been employed. Municipal measures are compared with the municipal target, and community measures are compared with the community target.

 - expected to achieve less than 1% of the 2012 target

 - expected to achieve between 1% and 5% of the 2012 target

 - expected to achieve more than 5% of the 2012 target

Existing Municipal Measures

The CACP Software models indicate that existing municipal measures already account for 12,998 tons eCO_2 reduction, or 69% towards Bellingham's 2020 reduction goal. These measures have been broken down by sector and are outlined below.

Table 7: Phase I: Existing Municipal Greenhouse Gas Emissions Reduction Measures

Measure	Rating	Year Initiated	Tons eCO_2 Reduction by 2012	% of 2012 Goal	Project Lead/Contact and Department
Buildings					
Purchase 100% Green Power		2007	3577	23%	Environmental Resources
LEED Buildings		2005	21	<1%	Public Works Engineering
Fleet					
Biodiesel Pilot Project		2005	(3) 0	0%	Fleet Maintenance
Hybrid Vehicles		2004	6	<1%	Fleet Maintenance
Employee Commute					
Commute Trip Reduction Program		1999	43	<1%	Public Works, Engineering
Lighting					
Purchase 100% Green Power		2007	2,015	13%	Environmental Resources
Water/Sewer					
Purchase 100% Green Power		2007	7,237	47%	Environmental Resources
Best Management Practices		2000 (ongoing)	86	<1%	Public Works Operations
Waste					
City Hall Recycling		2006	13	<1%	Environmental Resources
Total			12,998 tons	84%	

Source CACP Model Output

Buildings

Purchase 100% Green Power *(3577 tons of eCO_2 per year)*

In July of 2006, the Bellingham City Council voted unanimously to begin buying Green Power for 100% of the electricity used by the city government. This measure reduces the pollution generated by electricity use to zero. While a large number of electricity conservation measures have been taken at city facilities, the effect of those measures cannot be added to the effect of the green-power purchase.

LEED Buildings *(21 tons of eCO_2 per year)*

In 2005, the City Council resolved to use LEED (Leadership in Environmental and Energy Design) standards in the development of all future municipal buildings. At present two projects are considered: the recently completed Depot Market Square (7000 square ft.) and the Children's Museum (35,918 sq ft.), projected to be completed in 2008. As energy performance data are not yet available regarding these buildings, estimates are based on performance of similar buildings in the region. A study done by the Cascadia Chapter of the U.S. Green Building Council studied the performance of eleven LEED-certified buildings. The average LEED building's Energy Use Intensity (EUI) was 54.8 kBTU/square foot/year as opposed to the EPA-determined average building of 65 kBTU/square foot/year. Note that these estimates include only the on-site energy savings and do not include upstream or downstream energy saved by using recycled or reused building materials.

Fleet

Biodiesel Pilot Project *(3 tons of eCO_2 per year)*

In 2005, four Public Works vehicles were run on B-20 biodiesel (a blend of 20% biodiesel and 80% petrodiesel) as a pilot program. Unfortunately, the fuel injector in one vehicle became clogged and the problem was not covered under the manufacturer's warranty because of the use of B-20. At this time, the use of blends of more than 5% biodiesel may void the warranty. Once it was learned that the use of biodiesel can void the manufacturer's warranty, the program was canceled.

Hybrid Vehicles *(6 tons of eCO_2 per year)*

The city currently operates six hybrid gas-electric vehicles; all but one are Toyota Priuses. Through substantial increase in fuel economy these vehicles each reduce carbon emissions by approximately one ton each year, depending on use.

Employee Commute

Commute Trip Reduction Program *(43 tons of eCO_2 per year)*

As part of the Commute Trip Reduction Program (CTR), the city conducted an employee commuter survey in 1997 and every other year thereafter. The program also establishes reduction goals of 25% in 2003 and 35% in 2009. The 2005 survey showed a 28% reduction in vehicle miles traveled (VMT) per employee at the Civic Center and a 27% increase per employee VMT at the Public Works Operations facility. A weighted average of these shows an overall 9.8% decrease in per capita VMT among city employees from 1999 levels. Assuming this trend reflects all city employee commuting patterns, this indicates a reduction of 70,087 miles per year. Note that this is a reduction from what the 2005 VMT would

otherwise have been. Actual 2005 VMT was slightly higher than 2000 because of an increase in the total number of employees.

Lighting

Purchase 100% Green Power  *(2015 tons of eCO_2 per year)*
In July of 2006, the Bellingham City Council voted unanimously to begin buying Green Power for 100% of the electricity used by the city government. This measure reduces the pollution generated by our electricity use to zero. While the city has taken a number of electricity conservation measures, including the replacement of traffic signals with much more efficient LED bulbs, the effect of those measures cannot be added to the effect of the green-power purchase.

Water/Sewer

Purchase 100% Green Power  *(7237 tons of eCO_2 per year)*
In July of 2006, the Bellingham City Council voted unanimously to begin buying Green Power for 100% of the electricity used by the city government. This measure reduces the pollution generated by our electricity use to zero. While city facilities have seen a large number of electricity conservation measures, including a lighting upgrade and other efficiency measures taken at Post Point, the effect of those measures cannot be added to the effect of the green power purchase.

Post Point Best Management Practices  *(86 tons of eCO_2 per year)*
A number of best management practices to reduce the need for natural gas have been explored and implemented at the Post Point pollution control plant; these include using only one incinerator and leaving the second off unless needed as a backup, allowing the incinerators to cool to a lower temperature over the weekend, adjusting incinerator temperatures based on quantity of sludge, and adjusting the space-heating thermostat dependent upon need.

The value of these measures is difficult to track over time as they have been implemented incrementally over a number of years, and because annual variations in outside air temperature, rainfall and other variables make it challenging to correlate total sludge burned to total natural gas used. Larry Bateman, Operations Supervisor for Post Point, estimates that since 2000 these measures have allowed the plant's natural gas usage to remain constant (relative to the annual variables described above) despite approximately 1% growth per year in amount of sludge burned. This is a savings of 13,940 therms.

Worthy of note, but not formally included herein, is the significant savings these efforts yielded in the early years of the Plant's operation. Between 1994 and 1996 the incinerator's gas use declined by 255,000 therms/year.

Waste

City Hall Recycling  *(13 tons of eCO_2 per year)*
In 2006, Environmental Resources staff initiated an expansion of the City Hall recycling program to include mixed-container recycling. A "Green Team" was created, enlisting one or two representatives from each department, to help facilitate the implementation of the

recycling program and disseminate information to City Hall employees. The effort has been quite successful and it is estimated that each year it will divert just over two tons of recyclables from the landfill.

Existing Community Measures

Community measures have achieved a reduction of about 45,945 tons or 9% of the community-wide 2020 goal. These measures have been broken down by sector and are outlined below.

Table 8: Phase I: Existing Community Greenhouse Gas Emissions Reduction Measurers

Measure	Rating	Year Initiated	Tons eCO_2 Reduction by 2012	% of 2012 Goal	Project Lead/Source
Residential					
Existing Green Power Purchases		2002	2204	1%	Heather Mulligan, Puget Sound Energy
Green Power Community Challenge		2006	1846	1%	Heather Mulligan, Puget Sound Energy
Current LEED Buildings		2006	52	<1%	Brennan Schumacher, Be Green Consulting
Commercial					
WWU Green Power		2005	17,952	8.9%	Tim Wynn, WWU
Green Power Community Challenge		2006	3312	1.7%	Heather Mulligan, Puget Sound Energy
County Green Power		2007	2230	1.6%	Christina Reeves, Whatcom County
Federal Building Energy Star		2000	330	<1%	U.S Department of Energy
County Courthouse Efficiency		2000	533	<1%	Christina Reeves, Whatcom County

LEED Buildings		2004	179	<1%	Brennan Schumacher, Be Green Consulting
Industrial					
BCS Energy Efficiency		2001	5,129	2.6%	Doug Thomas, BCS
Transportation					
Hybrid Cars		2003	664	<1%	Washington State Dept. of Licensing
Yorkston Biodiesel		2004	255	<1%	Yorkston Oil
Whole Energy Biodiesel		2004	73	<1%	Whole Energy
Community Car Share		2006	13	<1%	Lorraine Wilde, Community Car Share
SSC Biodiesel		2005	165	<1%	SSC
Waste					
Construction and Demolition Recycling		2000[1]	7253	3.6%	Whatcom County Recycling Potential Assessment
ReStore		2000[1]	2963	1.4%	Dean Fearing
Food Plus!		2004	792	<1%	SSC
Total			45,945	24.7%	

Source CACP Model Output

Residential

Existing Green Power Customers *(2204 tons of eCO_2 per year)*

Even before the advent of the Bellingham Green Power Community Challenge (see below), Bellingham had significant participation in Puget Sound Energy's Green Power Program. Electricity in the program replaces conventional power sources and is produced using a combination of wind, solar and biomass energy. In July of 2005, 1,281 customers were participating in the program. They purchased approximately 4,297,896 kWh/yr. This figure includes all customers, business and residential, in 2005 except for Western Washington University.

Green Power Community Challenge *(1846 tons of eCO_2 per year)*
The Bellingham Green Power Community Challenge is an effort to increase local participation in Puget Sound Energy's Green Power Program. Electricity in the program replaces conventional power sources and is produced using a combination of wind, solar and biomass energy. In 2006 the City of Bellingham, Puget Sound Energy and Sustainable Connections partnered to promote participation in the program among Bellingham businesses and residents. This reduction estimate is based on achieving the Challenge goal of 1000 new residential customers.

Current LEED Building s *(52 tons of eCO_2 per year)*
The use of LEED (Leadership in Environmental and Energy Design) standards is a widely used method that accounts for environmental decisions in design and construction. At present, two LEED-certified residential projects are considered: the recently completed Chestnut Street Housing (43,678 sq ft.) and Mathi Place (12,702 square ft.) projected for completion in 2007. As energy performance data are not yet available regarding these buildings, estimates are based on performance of similar buildings in the region. A study done by the Cascadia Chapter of the U.S. Green Building Council analyzed the performance of eleven LEED-certified buildings. The average LEED building's Energy Use Intensity (EUI) was 54.8 kBTU/square foot/year as opposed to the EPA-determined average building of 65 kBTU/square foot/year. Note that these estimates include only the on-site energy savings and do not include upstream or downstream energy saved by using recycled or reused building materials.

Commercial

WWU Green Power *(17,952 tons of eCO_2 per year)*
Beginning in 2005, Western Washington University began purchasing 100% of its electricity through the Puget Sound Energy Green Power Program. This decision followed a vote by the student body to increase quarterly fees to pay the premium cost; the measure passed with overwhelming support. Students each pay approximately $10 more each quarter and the University is able to buy approximately 35 million kWh/year of Green Power. Electricity in the program replaces conventional power sources and is produced using a combination of wind, solar and biomass energy.

Green Power Community Challenge *(3312 tons of eCO_2 per year)*
The Bellingham Green Power Community Challenge is an effort to increase local participation in the Puget Sound Energy Green Power Program. Electricity in the program replaces conventional power sources and is produced using a combination of wind, solar and biomass energy. In 2006 the City of Bellingham, Puget Sound Energy and Sustainable Connections partnered to promote participation in the program among Bellingham businesses and residents. This emissions-reduction estimate is based upon achieving the goal of fifty new business customers.

Federal Building Energy Star Certification *(330 tons of eCO_2 per year)*
Several energy-efficiency measures were implemented in the Federal Building prior to city ownership. These upgrades contributed to the award of the Energy Star label for buildings. Measures include a lighting retrofit and installation of an Energy Management System (EMS). In addition, load-reduction strategies were implemented to reduce the amount of heating, cooling and electricity used. These energy-efficiency initiatives cost approximately $230,000, providing an annual energy cost savings of $45,000. Thus, the project has a payback time of approximately five years.

Whatcom County Courthouse Energy Efficiency *(533 tons of eCO_2 per year)*
This category includes a number of measures taken at county facilities, which have been documented by Christina Reeves, ICLEI program assistant. Most of this reduction has been achieved through lighting and HVAC upgrades and intense energy management at the County Courthouse and jail facilities.

Whatcom County Green Power Purchase (2322 *tons of eCO_2 per year)*
In September 2006, the Whatcom County Council voted to begin buying Green Power for 100% of the electricity used by county government. This measure is scheduled to go into effect in January 2007.

LEED Buildings *(158 tons of eCO_2 per year)*
The use of LEED (Leadership in Environmental and Energy Design) standards is a widely used method documenting environmental decisions in design and construction. At present, several LEED-certified commercial projects are considered: the recently completed Wade King Recreation Center at Western Washington University (95,775 square ft.), the Whatcom Educational Credit Union Lending Center (9000 square ft.) and the Community Food Coop's Second Store (18,600 square ft.). As energy performance data are not yet available for these buildings, estimates are based on performance of similar buildings in the region. A study done by the Cascadia Chapter of the U.S. Green Building Council studied the performance of eleven LEED-certified buildings. The average LEED building's Energy Use Intensity (EUI) was 54.8 kBTU/square foot/year as opposed to the EPA determined average building of 65 kBTU/square foot/year. Note that these estimates include only the on-site energy savings and do not include upstream or downstream energy saved by using recycled or reused building materials.

Industrial

Bellingham Cold Storage Energy Efficiency *(5129 tons of eCO_2 per year)*
Over the past several years, Bellingham Cold Storage (BCS) has implemented a number of energy-efficiency measures. These include an integrated energy management system, increased insulation, automatic doors, lighting upgrades and installation of variable speed drives. These measures have allowed the business to grow without a significant increase in energy consumption. It is believed that without these measures BCS's annual electricity use would be 10-20 million kWh more than it is currently. It is expected that these measures will pay for themselves over time.

Transportation

Hybrid Cars *(664 tons of eCO_2 per year)*

The Department of Licensing provided a database of all vehicles registered in Bellingham in October 2005, 168 of which were various hybrid gas-electric models. An analysis of the hybrid vehicles' fuel economy relative to the average fuel economy in that vehicle class (assuming 15,000 miles/year) indicates a reduction of more than 61,000 gallons of gasoline. Note that on a per-vehicle basis this is much greater than the savings from vehicles in the municipal fleet. This is because vehicles in the municipal fleet travel fewer miles than most vehicles in the community.

Yorkston Biodiesel *(255 tons of eCO_2 per year)*

Switching from fossil fuels to agriculturally based fuels reduces global-warming pollution because biofuel emissions are part of the natural carbon cycle. In March 2005, Yorkston Oil began to offer B-20 biodiesel (a blend of 20% biodiesel and 80% petrodiesel) at two service stations in Bellingham. In 2005, they sold approximately 116,000 gallons (in addition to that sold to Sanitary Services Corporation, which is considered separately).

Whole Energy Biodiesel *(73 tons of eCO_2 per year)*

Switching from fossil fuels to agriculturally based fuels reduces global-warming pollution because biofuel emissions are part of the natural carbon cycle. Whole Energy sells B-100 (100% biodiesel) at the Bellingham Farmers' Market. They estimate that in 2005 they sold approximately 7,000 gallons.

Community Car Share *(13 tons of eCO_2 per year)*

Community Car Share offers Bellingham residents access to the use of a shared vehicle, which they pay for on a per-use basis. Such a program allows occasional needs for a vehicle to be met without the burden of ownership. Such a program can facilitate two- or three-car households becoming one-car households, or even provide for all of the private vehicle needs for some residents. Pollution reduction estimates are based on a first-year business plan that calls for two vehicles and around forty members, and on the observed behavior of participants in a similar program in Portland.

SSC Biodiesel *(165 tons of eCO_2 per year)*

Switching from fossil fuels to agriculturally based fuels reduces global-warming pollution because biofuel emissions are part of the natural carbon cycle. In 2005, Sanitary Services Corporation began running sixty garbage trucks on B-20 biodiesel. This was later changed to B-5 (5% biodiesel, 95% petrodiesel) because of concerns about the use of greater concentrations voiding the manufacturer's warranty.

Waste

Construction and Demolition Recycling  *(7253 tons of eCO_2 per year)*
The 2003 Whatcom Recycling Potential Assessment shows Construction and Demolition waste recycling in Whatcom County totals 11,361 tons of wood waste each year. This calculation assumes that 50% of this amount, or 5680.5 tons, can be attributed to Bellingham.

RE Store  *(2963 tons of eCO_2 per year)*
The Bellingham RE Store sells used building and home improvement materials at prices that are up to 50% off of new items. It is estimated that in 2005 they diverted over 875 tons of material from the landfill.

FoodPlus!  *(792 tons of eCO_2 per year)*
Sanitary Services Corporation began offering FoodPlus! organic food waste recycling opportunities in 2004. The program has been made available to a wider and wider range of customers since its inception. In 2005, the program diverted about 1600 tons of food waste from the landfill.

Curbside Recycling
Bellingham's curbside recycling program has been in action since well before the baseline year of 2000, so the impacts of the program are not a change from the baseline. But this does not mean that there is no benefit to the climate. In 2004, Bellingham's residential curbside recycling program diverted about 1912 tons of mixed containers, 614 tons of cardboard, 1691 tons of mixed paper and 1180 tons of newspaper. This program is preventing more than **19,000 tons of eCO2** each year.

After quantifying the emissions reductions achieved from existing measures, it is possible to determine how far Bellingham has come towards achieving the targets and how much further it is necessary to go. Table 9 shows Bellingham's emissions baseline, targets and the results of existing (Phase I) measures.

Table 9: Bellingham Emissions Summary – Phase I

Base Year	Community Analysis 2000	Municipal Operations Analysis 2000
eCO_2 Emissions in the Base Year -2000 (tons)	950,793	19,970
Target Year	**Community - 2012**	**Municipal Government - 2012**
Business-as-usual projection of eCO_2 emissions in 2012 (tons)	1,083,474	22,583
2012 Targeted emissions level (% of 2000)	7%	64%
2012 targeted emissions level (tons)	883,474	7,189
Difference from forecast level (tons)	200,000	15,394
Total eCO_2 emissions reduction achieved to date (Action Plan Phase I)	45,945	12,998
% eCO_2 emission reduction target achieved to date	23%	84%
Quantity of eCO_2 emission reduction pending to reach the goal (tons)	154,055	2,396
Target Year	**Community -2020**	**Municipal Government -2020**
Business-as-usual projection of eCO_2 emissions in 2012 (tons)	1,192,794	24,794
2020 targeted emissions level (% of 2000)	28%	70%
2020 targeted emissions Level (tons)	684,474	5,991
Difference from forecast level (tons)	508,227	18,804
Total eCO_2 emissions reduction achieved to date	45,945	12,998
% eCO_2 emission reduction target achieved to date	9%	69%
Quantity of eCO_2 emission reduction pending to reach the goal (tons)	462,282	5,806

Source CACP Model Output

Proposed Measures—Action Plan Phase II

Phase II is comprised of municipal government and community measures proposed by staff based on easily identifiable logical next steps, i.e., the "low-hanging fruit." These measures are generally based on similar efforts in other jurisdictions, and, in many cases, can be coordinated with other governments, local or regional non-profit organizations and the private sector. Action Plan Phase II is focused on identifying the most effective use of city resources to leverage the maximum pollution reduction possible. By working with a broad range of partners in the community and around the region, Bellingham can lend its support and its credibility without having to develop each project from scratch.

These measures are a logical extension of the existing vision for Bellingham's future and are rooted in the Comprehensive Plan. Visions, policies and goals in the Comprehensive Plan, which support the enactment of each measure, are included. To save space these are listed by number only. The complete text of all referenced visions, goals and policies can be found in Appendix C.

In general, emissions-reduction estimates are conservative. Broad community support, state or federal legislation or significant changes in economic structures could dramatically shift the actual results.

To help compare the effectiveness of various measures the same rating system used in Phase I (Tables 7 and 8) has been employed. Municipal measures are compared with the municipal target and community measures are compared with the community target.

 - expected to achieve less than 1% of the 2012 target

 - expected to achieve between 1% and 5% of the 2012 target

 - expected to achieve more than 5% of the 2012 target

Proposed Municipal Measures

Table 10: Proposed Municipal Greenhouse Gas Emissions Reduction Measures

Policy	Rating	Start Year	Tons eCO_2 Savings by 2012	% of 2012 goal	Tons eCO_2 Savings by 2020	% of 2020 goal	Project Lead/Contact and Department
Buildings							
1.Conservation Resource Management		2007	339	2%	339	1.8%	Environmental Resources
2. Environmental Procurement Program		2007	n/a	n/a	n/a	n/a	Environmental Resources
Fleet						%	
3.Hybrid vehicles		2003	15	<1%	42	<1%	Fleet Services
4. B5 for all city vehicles		2006	39	<1%	43	<1%	Fleet Services
4. B20 for all city vehicles[i]		n/a	118	<1%	127	<1%	Fleet Services
5. 10% ethanol for city fleet		2006	119	<1%	125	<1%	Fleet Services
Employee Commute							
6. 35% reduction in employee VMT[ii]		1999	144	<1%	144	<1%	Public Works Engineering
Water/Sewer							
7. Sludge Pyrolysis at Post Point		2008	1,624	10.5%	1,624	8.6%	Post Point
Waste							
8. All city facility can/bottle recycling[iii]		2007	52	<1%	52	<1%	Environmental Resources
9. All city facility organics recycling		2007	25	<1%	25	<1%	Environmental Resources
Total			2,475	16%	2521	13.4%	

Source: CACP Model output

[i] Totals for use of B20 indicate the difference between using B05 and B20 so that these columns are additive. Use of concentrations above 5% requires resolution of warranty concerns.

[ii] Indicates an increase over current CTR program

[iii] Numbers provided represent an increase above the current recycling programs.

1. Resource Conservation Management (339 tons of eCO_2)

Importance/Context—There are many simple, economical and effective ways to minimize energy use in buildings. Recognizing this, Puget Sound Energy has created a Resource Conservation Management Program, which is available to large electricity customers. This program includes software to track energy use, technical assistance, partial funding for staff training and time, and a guarantee that the program will pay for itself. The combination of funding from Puget Sound Energy and expected (guaranteed) cost savings will help fund other portions of the action plan. This is a priority recommendation since Puget Sound Energy has offered a grant contract to Bellingham for participation in this program.

Implementation Scenario—Environmental Resources and Facilities staff will work together to fill a part time Resource Conservation Technician position and implement a Resource Conservation Management Program. Implementation will be a joint responsibility of Environmental Resources and Facilities.

Comprehensive Plan Support for Action—FLU-8, PUG-4, PUP-21

Resource Savings—The Conservation Resource Technician will implement measures that conserve electricity, heating fuel and water, as well as reduce waste.

Emissions Reductions—Puget Sound Energy estimates resource conservation efforts can save nearly 10% of the city's electricity use by the end of the third year. If similar savings can be achieved with natural gas, total savings will reduce carbon emissions by 339 tons of eCO_2 per year.

Co-Benefits—In reducing global-warming pollution, resource conservation management is expected to save the city money over time, and do so in a way that is visible to employees. Wise use of resources is an important way for the city to show leadership on environmental issues.

Cost—The primary cost will be for an Environmental Resources limited term staff position and the dedication of some Facilities staff time. Half the responsibilities of the Environmental Resources position will be conservation resource management and it is expected to require about .25 FTE from Facilities personnel.

Available Funding—Puget Sound Energy offers grant assistance in the first year of the Resource Conservation Management Program equal to 25% of the first-year salary. In this case, the grant offer is $15,000. In addition, they provide software and technical support. Much of the funding for the Cities for Climate Protection program has been paid by the Environmental Resources internship budget. This budget would continue to be used to fund the portion of the position not covered by the Puget Sound Energy grant. Finally, there is a guarantee that in the first three years of the program, the city will realize savings equal to or greater than staff costs. If such savings are not realized, Puget Sound Energy will pay the difference.

Available Assistance/Support—Whatcom County is currently working with Puget Sound Energy to implement a Conservation Resource Manager position, and Ferndale and Lynden have considered similar proposals, which will likely provide opportunities for best practices sharing and economies of scale.

Table 11: Cost to City

Capital	*none*
Ongoing	*$60,000/year*
Savings 1st year	*$67,500*
Savings 2nd year	*$132,196*
Savings 3rd year	*$196,008*
Total Net Savings (over three years)	*$215,704*

Source: Puget Sound Energy

Table 12: Internal Responsibility for Implementation

City Council	*Approve program and new position*
Environmental Resources	*Program development, work with PSE to install and utilize software. Track energy use. Develop management plans. Assist in implementation of management plans.*
Facility Manager	*Track energy use. Help identify efficiency measures. Assist in development of management plans. Implement management plans.*

Table 13: Projected Implementation Timeline

Step Toward Implementation	*Time Commitment**	*Lead Department/Staff*
Prepare and submit application	*2 weeks*	*Environmental Resources*
Develop program with PSE	*1 month*	*Environmental Resources*
Approve program and staff time	*2 weeks*	*City Council*
Develop city-wide Resource Management Plan	*3-6 months*	*RCT, Facilities Manager, Environmental Resources*
Develop individual Facilities Management Plans	*4-8 months*	*RCT, Facilities Manager, Environmental Resources*
Implement Plans	*Ongoing*	*RCT, Facilities Manager, Environmental Resources*

**assumes a staff time commitment of a few hours per week*

*2. Environmentally Responsible Procurement Program (*reduction uncertain)

Importance/Context—There are a large number of relatively small decisions made on a regular basis that cumulatively have a significant impact on the city's environmental footprint. As a substantial market force itself, and as an environmental leader, it makes sense that the city should use its purchasing power to further its emissions-reduction goals. An Environmentally Responsible Procurement Policy would provide useful guidance to staff in the application of this principle.

Implementation Scenario—An Environmentally Responsible Procurement Program take a number of forms. The current proposal from Environmental Resources staff is that the Council pass a resolution that encourages a wide range of environmentally responsible purchases, but which focuses immediate efforts on four areas: safe cleaning products, recycled paper products, Energy Star equipment and hybrid or biofuel-compatible vehicles. Such standards would include a provision for availability, accessibility and affordability of the preferred products. Environmentally preferable products that are substantially more expensive or not available through the city's routine suppliers would not be required under the proposed policy.

A city employee group called the Green Team is being organized. There ere are currently members in each department in City Hall, and it is proposed to expand to include all city departments over the course of the next year. These members will be encouraged to identify and help implement procurement of environmentally responsible supplies and equipment. Environmental Resources staff will provide support to the Green Team in identifying cost-effective efforts to lessen each department's ecological footprint.

Comprehensive Plan Support for Action-- FLU-8, PUG-4, PUP-21

Resource Savings—The safer cleaning products being recommended are typically as effective and often less expensive than their alternatives, are healthier for the employees who handle them directly and the employees exposed to them subsequent to application, and are less likely to be associated with upstream or downstream environmental externalities.

Purchasing post consumer, recycled, paper products completes the cycle initiated when we put paper into the recycling bin. While emissions reductions from recycling efforts are calculated at the point where the paper is recycled, it should nonetheless be clear that without a market for recycled paper, recycling alone would not be effective. The complete cycle helps to reduce energy consumption and preserve forests.

The purchase of Energy Star appliances will not have a significant effect on the city's emissions due to the city's purchase of 100% green electricity, which produces zero emissions. Energy Star office equipment, however, has a much-reduced operating cost.

Hybrid and alternative fuel vehicles will be treated separately in this action plan (see below.)

Emissions Reductions—The three specific proposals would not have any global-warming pollution reductions directly attributable to them. It is expected, however, that increasing awareness of environmental issues over time will lead to behavior shifts among staff, which may reduce emissions and lead to cost savings in a variety of ways.

Costs—It is not expected that there would be substantial increases in procurement costs associated with the Environmentally Responsible Procurement Policy. The resolution being

proposed will contain a provision exempting products that are significantly more expensive and will provide guidance on determining the threshold for defining "significantly more expensive." The most expensive portion of the proposal at this time is likely to be 100% post consumer paper products. It is estimated this will cost $2700 above current paper costs.

In the case of Energy Star office equipment, there will often be cost savings over the lifetime of the equipment.

Table 14: Internal Responsibility for Implementation

Environmental Resources	Propose Procurement Policy
City Council	Amend/Adopt Procurement Policy
Environmental Resources	Provide implementation support
Purchasing/ All City Departments (Green Team Members)	Implement purchasing policy as appropriate to individual department

Table 15: Projected Implementation Timeline

Step Toward Implementation	*Time Commitment**	*Lead Department/Staff*
Research Procurement Policy options	*2 months*	*Environmental Resources*
Develop locally appropriate purchasing policy in conjunction with Legal Department and Purchasing Division	*4 months*	*Environmental Resources*
Approve/Amend Policy	*1 month*	*City Council*
Expand Green Team Program to all departments	*2 months*	*Environmental Resources*
Develop department goals and priorities	*4 months*	*Green Team Members/ Environmental Resources*
Begin implementing goals and priorities	*Ongoing*	*Green Team Members/ Environmental Resources*
**assumes a staff time commitment of a few hours per week*		

3. Continue to Invest in Hybrid Vehicles (42 tons of eCO_2)

Importance/Context—Using hybrid gas-electric vehicles has proven to be a cost-effective way to reduce fuel consumption and pollution. In addition to fuel-cost savings, hybrids exceed all pollution control standards. Over the next several years, there is expected to be an increase in the types and styles of hybrid vehicles available. As the vehicles in the city's fleet

are replaced over time, and as hybrids become available, they can fill an increasing number of roles in the fleet. It would be wise to acquire hybrids whenever possible.

Implementation Scenario—As part of the proposed Environmentally Responsible Procurement Policy, hybrids would be considered and used whenever they prove to be a cost-effective option, and fuel efficiency would be considered as a criterion in all vehicle-selection decisions.

Comprehensive Plan Support for Action—FLU-8, VB-44, TG-2, TG-4, TP-86, PUP-21

Emissions Reductions—Fueling and odometer records indicate that each Toyota Prius currently owned by the city prevents about one ton of eCO_2 per year. Currently, there are six in the municipal fleet. If three more are added each year as older vehicles are replaced, and hybrid models that are appropriate for an increasing number of tasks become available, the increased emissions reduction by 2012 would be 15 tons increasing to 42 tons per year by 2020.

Co-Benefits—In addition to reducing climate pollution, hybrid vehicles produce less of other types of air pollution, which helps protect our local air quality. By using less fuel, hybrids help reduce our dependence on unreliable supplies of fossil fuels. Finally, hybrid vehicles bearing the city logo are a highly visible way for the city to demonstrate its commitment to environmental stewardship in the community.

Costs—There is an upfront premium associated with purchase of hybrid vehicles. This varies from model to model. In the case of the Toyota Prius, upfront costs are about $6000 more than a similar all-gas vehicle. Moreover, as hybrids are relatively new to the market, it is not yet clear what the difference in long-term maintenance costs and depreciation may be. Over time, as economies of scale are realized, there is likely to be a decrease in the premium price associated with hybrids.

Resource Savings—Savings and payback period will depend on vehicle use and the cost of fuel. Based on the performance of vehicle #172 (the city's oldest Prius) traveling about 10,000 miles per year and paying $3.00 per gallon, a savings of $600/year per vehicle could be realized.

Table 16: Internal Responsibility for Implementation

Environmental Resources	Propose Procurement Program
City Council	Amend/Adopt Procurement Program
Fleet Maintenance	Include consideration of fuel efficiency in vehicle procurement decisions
All city departments	
Environmental Resources	Support decision making with information and research

Table 17: Projected Implementation Timeline

Step Toward Implementation	*Time Commitment**	*Lead Department/Staff*
Research Procurement Program options	*2 months*	*Environmental Resources*
Develop locally appropriate purchasing program in conjunction with Legal Department and Purchasing Division	*4 months*	*Environmental Resources*
Approve/Amend Program	*1 month*	*City Council*
**assumes a staff time commitment of a few hours per week*		

4. Increase Utilization of Biodiesel in Municipal Fleet (43-127 tons of eCO_2)

Importance/Context—By 2020, the State of Washington will require that the vehicle fuel mix be at least 10% ethanol in gasoline and 5% biodiesel in diesel. Biofuels greatly reduce overall carbon emissions because the resulting carbon was absorbed from the atmosphere during the life of the plant and so it is not new to the carbon cycle. Bellingham can be at the forefront of the advancement of these fuels by achieving these targets ahead of the rest of the state and by striving for even more ambitious goals.

Implementation Scenario—In 2005, four Public Works vehicles were run on B-20 biodiesel (a blend of 20% biodiesel and 80% petrodiesel) as a pilot program. Unfortunately the fuel injector in one vehicle became clogged. Because of the use of B-20, the manufacturer refused to honor the warranty. *It was not established that the biodiesel was responsible for the problem*; at this time, however, the use of blends of more than 5% biodiesel is often cited as a reason not to honor the warranty. Different manufacturers have approached this issue differently, although all allow the use of up to 5% biodiesel. It is expected that over the coming months and years this policy may be changed and standardized across the industry. As long as the warranty does not cover problems that may be considered related to the use of biofuels, it is not recommended the city exceed blends of more than 5% biodiesel.

Comprehensive Plan Support for Action—FLU-8, VB-44, VB-45, TG-2, TG-4, TP-31, TP-32, TP-86, PUP-21

Emissions Reductions—Transitioning to 5% biodiesel in all gasoline-powered fleet vehicles by 2012 will result in an emissions reduction of about 39 tons of eCO_2/year; by 2020, this would be 42.5 tons/year. If the warranty issue can be resolved and other questions adequately answered, use of B-20 will result in the reduction of 157 tons of pollution in 2012 and as much as 170 tons in 2020.

Co-Benefits—The use of biodiesel on a large scale has several co-benefits. Using biodiesel made from Washington-grown products will help the local agricultural economy. Switching to agriculturally based fuels will reduce the U.S. dependence on foreign oil. Burning biodiesel produces less air pollution than burning petrodiesel and thus will help protect our local air quality.

Costs—In 2005, B-20 cost the city about 22 cents/gallon more than traditional diesel. Since that time the cost of petrodiesel has increased substantially and is frequently more expensive than biodiesel. As popularity of biodiesel grows and as the state's requirements take effect, it is likely the cost of petrodiesel and biodiesel will remain relatively similar.

Potential Barriers—The primary barrier to the use of biodiesel is the concern about the manufacturer's warranty.

5. 10% Ethanol in City Fleet (125 tons of eCO_2)

Importance/Context—By 2020, the State of Washington will require that the vehicle fuel mix be at least 10% ethanol in gasoline and 5% biodiesel in diesel. Biofuels greatly reduce overall carbon emissions because the resulting carbon was absorbed from the atmosphere during the life of the plant and is therefore not new to the carbon cycle. Bellingham can be at the forefront of the advancement of these fuels by achieving these targets ahead of the rest of the state and by striving for even more ambitious goals.

Implementation Scenario—Over the next several years, blends containing 10% ethanol will be required in all gasoline sold in Washington State. Achieving this transition early will place Bellingham in a leadership role that paves the way for smooth transitions in other communities. For out-of-house fueling, all ARCO stations in Whatcom County already use a fuel mix with 10% ethanol. Therefore, Bellingham should consider either filling at these stations or making contact with our current fuel supplier (Reisner) to request that ethanol be added to its mix.

Comprehensive Plan Support for Action—FLU-8, VB-44, VB-45, TG-2, TG-4, TP-31, TP-32, TP-86, PUP-21

Emissions Reductions—Transitioning to 10% ethanol in all gasoline-powered fleet vehicles by 2012 will result in an emissions reduction of 119 tons of eCO_2 per year, which by 2020 will be 125 tons per year.

Co-Benefits—As with biodiesel, using ethanol in the fleet fuel mix will help promote local agriculture and reduce our dependence on foreign oil. And because it burns more cleanly than gasoline, it will help protect our air quality.

Police Bicycle Patrols

Beginning again in 2007, the Bellingham Police Department will have one squad patrolling on bicycles. Five officers will use one vehicle and four bicycles.

While this program pre-dates the baseline, it is nonetheless a meaningful contribution to the city's climate protection efforts. If these same officers were patrolling by car, they could use more than 2000 gallons of gasoline per year.

While it would not make sense to discontinue existing police patrols or restructure patrols based exclusively on the impact on CO_2 pollution, it may make sense to increase the bicycle patrols for a variety of reasons. If such a policy were implemented, adding a second bicycle squad and using four fewer cars would prevent 22 tons of eCO_2 per year.

6. Reduce Commuter Vehicle Miles Traveled for All City Employees (144 tons of eCO_2)

Importance/Context—In the mid 1990s the State Legislature established the Commute Trip Reduction (CTR) program, requiring many large employers in the state to work with their employees to help reduce their impact on the transportation infrastructure. As one such employer, the City of Bellingham has monitored employee commuting patterns and encouraged employees to use carpooling and alternative transportation wherever practical. The program also established reduction goals of 25% in 2003 and 35% in 2009. In 2006 the Legislature passed the CTR Efficiency Act amending the CTR program. By fall 2007, Bellingham, working with the Whatcom Council of Governments, will be required to develop an updated plan to meet the requirements of the CTR Efficiency Act.

Implementation Scenario—The goal required by the legislature under the initial program only applies to about 350 city employees (full time, regular work hours, in the Civic Center or at the Public Works Operations facility). Additionally, there is some concern the baseline survey is not an accurate representation due to changes in work schedules that occurred immediately after the beginning of the program.

It is proposed that the city set an internal goal of 35% reduction in VMT from 2001 levels for all municipal employee commutes, and that the city strive to impact the commuting patterns of all of its employees through a combination of education and incentives. This is an ambitious goal, but one that may be achievable through a combination of alternatives including telecommuting and compressed work schedules where appropriate, as well as continued encouragement of the use of carpooling and alternative transportation methods. Establishing the goal would be a valuable way to encourage other employers in the community to follow the city's lead.

It is proposed that, as part of the CTR Efficiency Act Planning process, Environmental Resources and Engineering staff collaborate to develop a menu of recommendations regarding the most effective ways to achieve this ambitious goal.

Comprehensive Plan Support for Action—FLU-8, TG-4, TP-22, TP32, TP-37, TP-45, TP-46, TP-65, TP-92, CFP-67, PUP-21

Emissions Reductions—Assuming all city employee commuting patterns are similar to those of the employees who have responded to the CTR surveys, a 35% reduction in average employee VMT would yield a total emissions reduction of 187 tons of eCO_2 per year. Currently there are 43 tons of emissions reductions already attributed to the CTR program under existing measures (Phase I). The net result is 144 tons of eCO_2 reduction per year beyond what has already been achieved.

Co-Benefits—In addition to eCO_2 pollution reduction, a reduction in individual automobile trips will help protect local air quality. Alternative transportation options will typically save employees money, and may be an important component of healthy lifestyles, which can lead to reduced absenteeism and improved work performance. Compressed work schedules and telecommuting opportunities are often considered job perks by employees. Sustained trip reduction could also lead to a reduced need for employee parking facilities.

Costs—Initial cost will largely be staff time. Additional costs may arise dependent upon the recommendations to be developed.

Available Funding—In developing recommendations, staff will explore available funding options.

Table 18: Projected Implementation Timeline

Step Toward Implementation	*Time Commitment**	*Lead Department/Staff*
Continue to offer employee education and existing CTR program components.	*Ongoing*	*PW Engineering*
Develop policy proposals to expand the CTR program and reduce employee VMT	*6 months*	*PW Engineering*

**assumes a staff time commitment of a few hours per week*

7. Sludge Pyrolysis System at Post Point (1624 tons of eCO_2)

Importance/Context—Ambient Energy LLC has proposed a modular biosolids-to-energy system for use in Post Point. This system would recover the sewage gas that would be used to power micro-turbines in the facility. The system's capacity could be as high as 750 KW, with excess heat used to further reduce the plant's current natural gas requirements (pre-drying sludge and plant heating).

Implementation Scenario—Plant staff is currently exploring the feasibility of the project. If after due diligence the project continues to seem like a good idea, a more complete proposal will be brought to Council.

Resource Savings—Ambient Energy estimates this system could offset approximately 70% of the current natural gas used at Post Point, saving the city approximately $231,000 each year at 2005 natural gas rates. The electricity produced by the project would offset much of Post Point's current demand and excess could be sold to the grid. At $0.06/kWh this could yield savings of nearly $400,000 per year. In addition, the city would likely be able to sell renewable energy credits offsets from the project's electricity.

Comprehensive Plan Support for Action—FLU-8, PUP-21

Emissions Reductions—The emissions reductions from reducing natural gas needs would be approximately 1624 tons per year. Because the city's electricity is already emissions-free, there would be no emissions reduction from the production and substitution of this green electricity. If one were to consider this source of energy a replacement for average grid electricity in the region, however, the emissions reduction would be 3370 additional tons.

Co-Benefits—This project would help protect the region's air quality and reduce our dependence on fossil fuels.

Costs—Total cost for pre-filter system and gasifier system was estimated by Ambient Energy to be $10,100,000.

Available Funding—Puget Sound Energy has contributed to electricity-savings projects at Post Point in the past. It is likely that they will contribute a portion of the installation cost based on a standard formula.

Table 19: Cost to City (preliminary estimates)

Capital: $10,100,000
Annual Savings: $631,000
Payback Period:16 years

8. Expand Can and Bottle Recycling to All City-Owned Facilities (52 tons of eCO_2)

Importance/Context—In 2006 Environmental Resources staff initiated an expansion of City Hall's recycling program. A "Green Team" was created with one or two representatives from each department to help facilitate the implementation of the recycling program and disseminate information among City Hall employees. The effort has been quite successful and it is estimated that each year it will prevent emissions of about 13 tons of eCO_2. Several other City facilities have can and bottle recycling; use of these was not included in this estimate. Based on these successes, it is recommended that the city expand the program to all remaining city facilities.

Implementation Scenario—Environmental Resources staff should work with Sanitary Services Corporation and with each department and in each municipally owned building to identify one or more Green Team members and provide recycling facilities, including convenient, clearly identified receptacles.

Comprehensive Plan Support for Action—FLU-8

Emissions Reductions—If City Hall employee recycling rates can be achieved by all municipal employees, an additional 52 tons of eCO_2 can be saved each year through the expansion of this program.

Co-Benefits—In addition to saving energy and reducing greenhouse pollutants, recycling extends the life of our landfills and uses our natural resources more judiciously. Moreover, recycling is one of the most widely recognized environmentally beneficial behaviors. The presence of an effective recycling program sends an important signal about the city's priorities to employees and the public.

Costs—The cost of providing recycling facilities for City Hall was $3600. Monthly operation costs are included in our existing service. Expanding the program to other facilities could cost approximatly $10,000. The ongoing cost for recycling service at the other city facilities is about $78 per month plus staff time for maintaining the program. It is expected that, in combination with monitoring from the Resource Conservation Management Program and implementation of FoodPlus! Recycling, the city would save money on garbage hauling by reducing bin size or frequency of pick up. This is expected to offset some of the cost.

Available Assistance/ Support —RE Sources for Sustainable Communities has applied for a grant from the Department of Ecology to study the effectiveness of different messages to encourage recycling. These data may be useful in promoting recycling among city employees.

Stakeholders—Sanitary Services Corporation

Table 20: Internal Responsibility for Implementation

Environmental Resources	Develop program, recruit Green Team, educate staff
Green Team	Help educate staff, provide feedback, monitor program
Facility Staff/Green Team Members	Collect recyclables for routine disposal

9. Provide for Organics Recycling at All City Facilities  (25 tons of eCO_2)

Importance/Context—In 2006 Environmental Resources staff initiated an expansion of City Hall's recycling program. A "Green Team" was created with one or two representatives from each department to help facilitate the implementation of the recycling program and to help disseminate information among City Hall employees. The effort has been quite successful and it is estimated that each year it will prevent emissions of about 13 tons of eCO_2. Based on this success, it is recommended that the city expand the program to other city facilities (see Measure #8) and, in addition, that the program be expanded to include organics recycling through Sanitary Services Corporation's FoodPlus! Program.

Implementation Scenario—In addition to the existing recycling infrastructure, facilities for organics recycling should be provided in break rooms and kitchen areas. Environmental Resources would be responsible for educating employees about use of the FoodPlus! program, and Green Teams would be used to help collect the recyclables and monitor facilities for any problems.

Comprehensive Plan Support for Action—FLU-8

Emissions Reductions—It is estimated that in 2005, 25.5% of solid waste originating from municipal facilities was organic/food waste, or just under 100 tons/year. If 50% of this waste could be collected and recycled through the SSC program, it would eliminate 25 tons of eCO_2 pollution per year.

Co-Benefits—In addition to saving energy and reducing greenhouse pollutants, recycling extends the life of our landfills and uses our natural resources more judiciously. Recycling organic matter produces nutrient-rich compost, which can help offset the need for more energy-intensive fertilizers. Moreover, recycling is one of the most widely recognized environmentally beneficial behaviors. The presence of an effective recycling program sends an important signal about the city's priorities to employees and the public.

Costs—The estimated cost for FoodPlus! service at most city facilities is about $185 per month. There would be some additional cost to acquire containers, organize the program and educate employees. It is also expected that, in combination with monitoring from the Resource Conservation Management Program and in conjunction with expanded recycling efforts, the city would save money on garbage hauling by reducing bin size or frequency of pick up. This is expected to offset some of the cost.

Available Assistance/Support—RE Sources for Sustainable Communities has applied for a grant from the Department of Ecology to study the effectiveness of different messages to encourage recycling. These data may be useful in promoting recycling among city Employees.

Potential Barriers—Employees may be resistant to using organic waste collection receptacles.

Stakeholders—Sanitary Services Corporation

Table 21: Internal Responsibility for Implementation

Environmental Resources	Develop program, recruit Green Team, educate staff, site food waste collection facilities
Green Team	Help educate staff, provide feedback, monitor program
Facility Staff/Green Team Members	Collect recyclables for routine disposal

Proposed Community Measures

Table 22: Proposed Community Greenhouse Gas Emissions Reduction Measures

Policy	Rating	Year to be Initiated	Tons eCO_2 Reduction by 2012	% of 2012 Goal	Tons eCO_2 Reduction by 2020	% of 2020 Goal	Project Lead/Contact and Department
Residential							
10. Energy Conservation Challenge		*2008*	*1,200*	*<1%*	*1,200*	*<1%*	*Environmental Resources*
11. Climate Protection Public Education		*2007*	*740*	*<1%*	*740*	*<1%*	*Environmental Resources*
12. Further Promotion of LEED Standards		*2008*	*915*	*<1%*	*3,111*	*<1%*	*Environmental Resources*
13. Further Promotion of Built Green and Energy Star Standards		*2008*	*126*	*<1%*	*479*	*<1%*	*Environmental Resources*
Commercial				<1%		<1%	
10. Energy Conservation Challenge		*2007*	*1,292*	*<1%*	*1,292*	*<1%*	*Environmental Resources*
12. Further Promotion of LEED Standards		*2008*	*1,207*	*<1%*	*4,103*	*<1%*	*Environmental Resources*
All Municipal Measures[iv]		*2007*	*15,473*	*7.7%*	*15,519*	*3.1%*	*Environmental Resources*
Industrial							
10. Energy Conservation Challenge		*2007*	*478*	*<1%*	*478*	*<1%*	*Environmental Resources*
Transportation							
14. Achieve Alternative Transportation Mode Shift Goal		*2006*	*8,826*	*4%*	*20,655*	*4%*	*Public Works Engineering*
15. Limit Idling		*2007*	*5,295*	*2.6%*	*5,295*	*1%*	*Environmental Resources*
16. Promote Biofuels		*2006*	*41,897*	*21%*	*55,320*	*10.8%*	*Environmental Resources*
17. Promote Hybrids		*2007*	*9,243*	*4.6%*	*20,738*	*4%*	*Environmental Resources*
Waste							
18.Increase Residential Curbside Recycling Rate		*2007*	*19,316*	*9.6%*	*19,316*	*3.8%*	*Environmental Resources*
TOTAL			*106,008*	*53%*	*148,246*	*29.2%*	

Source CACP Model Output

[iv] Municipal Measures were included here because the city's efforts are a significant portion of the proposed measures. The numbers used represent the effects of both Phase I and Phase II of the Municipal Action Plan.

10. Energy Conservation Community Challenge (2,970 tons of eCO_2)

Importance/Context—Energy conservation is one of the most cost-effective ways to reduce greenhouse gas pollution. A number of communities around the region have expressed interest in having a community energy conservation challenge. Such a challenge would include a concerted effort at public education much like the Green Power Community Challenge, but potentially including an intra-community component.

Implementation Scenario—This measure envisions following up on the Green Power Community Challenge with a one-year energy conservation challenge. Bellingham's efforts should be coordinated with the NWCAA, Puget Sound Energy, Sustainable Connections, RE Sources for Sustainable Communities, the Building Performance Center, Whatcom County and other cities and counties in the area. Effort should be made to engage residents, businesses and the building industry. The Challenge would promote local businesses that provide services or products that support energy efficiency and "do-it-yourself" solutions. The Challenge would highlight existing programs such as Energy Star and promote awareness of available tax benefits.

Comprehensive Plan Support for Action—FLU-8, LU-33, Lu-105, HG-2, HP-31, CDG-1, CDG-12, CDP-58, PUG-4

Resource Savings—Every kWh of electricity saved will save between 6-8 cents. Every therm of natural gas saved will save $1.00-1.20.

Emissions Reductions—Every kWh of electricity conserved will prevent the emission of approximately one pound of CO_2. Every therm of natural gas conserved will prevent the emission of approximately twelve pounds of CO_2. The US EPA estimates that use of Energy Star standards can reduce up to 30% of a home's energy use. If 200 households in Bellingham achieved that level of savings and another 2000 households achieved just a 5% savings, the community's emissions would decrease by 1200 tons each year in the residential sector. Conservation savings potential in the business sector is more variable. If 100 businesses are able to save 15% of their energy use and another 200 are able to achieve a 5% savings, community emissions would decrease by approximately 1770 tons of eCO_2 per year.

Co-Benefits—By decreasing the ongoing operating costs, energy conservation can increase the affordability of existing housing stock and increase the profitability of local businesses. There may also be improvements in local air quality.

Costs—The Green Power Community Challenge cost approximately $50,000 plus staff time, paid predominantly by Puget Sound Energy. The main costs to the city have been videography and staff time. As the actual implementation of a conservation challenge is likely to be somewhat more complex, the cost of the conservation challenge may be somewhat higher. Budgeting can be based on available resources, but a preliminary estimate suggests $75,000 would be appropriate for education and outreach within Bellingham. (Cost would expand if including other jurisdictions.) The capital cost of the conservation measures and resulting savings would be the responsibility of the residents or businesses.

Available Funding—Puget Sound Energy, the Puget Sound Energy Foundation, the NWCAA and Whatcom County have all expressed interest in partnering on such an effort and may be able to provide funding. Including other communities from around the region would allow for the realization of some economies of scale with elements such as printing

and production costs. Staff is currently working with partners to pursue grant funding through the U.S. EPA's Regional Geographic Initiative.

Available Assistance/Support—Puget Sound Energy, NWCAA, EPA Energy Star Program, U.S Green Building Council, Sustainable Connections, RE Sources for Sustainable Communities, Whatcom County, City of Ferndale, City of Lynden, City of Anacortes, City of Oak Harbor, City of Coupeville, City of Langley.

Stakeholders—Additional stakeholders include the Building Industry Association of Whatcom County, the businesses that sell products or services related to energy conservation and Cascade Natural Gas.

Table 23: Projected Implementation Timeline

Step Toward Implementation	*Time Commitment**	*Lead Department/Staff*
Complete Green Power Community Challenge	*6 months*	*Environmental Resources*
Identify Partners, Develop Scope of Work, Identify Funding Sources	*3 months*	*Environmental Resources*
Announce Conservation Challenge	*1week*	*Mayor/Council*
Work with partners to develop campaign strategy, materials etc. Begin to engage community.	*6 months*	*Environmental Resources*
Work with partners to implement the campaign: produce education and outreach materials; prepare for kick-off event	*3 months*	*Environmental Resources*
Implement Conservation Challenge Campaign Plan	*1 year*	*Environmental Resources*
Complete Campaign. Announce overall success and individual winners. Develop materials to make lessons learned available to other communities.	*1 month*	*Environmental Resources*

**assumes a staff time commitment of a few hours per week*

11. Climate Protection Public Education and Outreach (740 tons of eCO_2)

Importance/Context—Global warming is a complex topic, around which there is a significant amount of misunderstanding. Solutions are abundant, but are often not considered important without a clear understanding of the problem. In other cases, there is an understanding of the problem, but individuals lack a sense of empowerment with regard to solutions. The city's substantial leadership in this issue positions us as a strong messenger. The Environmental Resources Division currently engages in a number of education and outreach programs. Climate protection can be incorporated into these existing efforts and/or developed as a stand-alone educational program. Public education and outreach would have a synergistic effect, enhancing the effectiveness on nearly all other community action plan components. Ideally the process should begin with research into existing attitudes, understandings and receptiveness, which will maximize the effectiveness of future efforts.

Implementation Scenario—Implementation could involve a wide range of efforts: from a single brochure included in the utility bill mailing, to messages incorporated into existing education curricula, to a full, stand-alone program. The message should include a discussion of the problem as well as a number of easy steps individuals can take to reduce their own impacts. Focus should be on empowering individuals to make a difference. The current proposal is for Environmental Resources staff to contract for focus group and/or survey research to identify effective messages and receptive audiences given local conditions in Bellingham. Based on the outcome of that research, a more detailed program based on proven marketing strategies will be proposed and developed.

Comprehensive Plan Support for Action—FLU-8, TG-4, TP-22, CDG-16, PUG-4

Emissions Reductions—If educational efforts result in 1000 city residents reducing emissions by 5%, then total emissions would decline by more than 740 tons per year.

Co-Benefits—Residents would likely save money in energy costs. Reduced traffic and improved air quality could be expected.

Costs—The primary expenses would be staff time, curriculum development and printing. As the scope of the project is flexible, so are the budget needs.

Available Funding—Grant funding may be available from a variety of sources dependent on scope and curriculum. Environmental Resource staff is currently pursuing grant funding for a community survey through the U.S. EPA's Regional Geographic Initiative.

Available Assistance/Support—RE Sources for Sustainable Communities currently provides a global-warming education program for 5th- to 7th-grade students in fifty schools in the region. The ICLEI is in the process of developing a global-warming education and outreach toolkit for local governments. Whatcom County and/or the Northwest Clean Air Agency may collaborate to fund the survey research.

Stakeholders—Local media, Bellingham Public School District, Western Washington University, Bellingham Technical College, Whatcom Community College, and not-for-profit organizations with a mission to provide environmental education.

Table 24: Projected Implementation Timeline

Step Toward Implementation	*Time Commitment**	*Lead Department/Staff*
Conduct focus group survey research to identify locally effective messages	*2 months*	*Environmental Resources*
Develop climate protection education program based on research results	*2 months*	*Environmental Resources*
Identify available funding and get approval for education program	*Concurrent w/ previous steps*	*Environmental Resources*
Begin implementing program	*1 month*	*Environmental Resources*
**assumes a staff time commitment of a few hours per week*		

12. Further Promotion of LEED Standards  (7,214 tons of eCO_2)

Importance/Context—Leadership in Environmental and Energy Design (LEED) is a building rating system developed and promoted by the U.S. Green Building Council. Along with other benefits of LEED certification, new buildings constructed to LEED standards can save anywhere from 5 to 40% of the energy that would have been required if they were merely built "to code." There are already several significant efforts in the community to promote the use of this standard. Through a variety of training and education efforts, the number of LEED Accredited Professionals has increased in recent years from only three to over thirty. The number of new buildings pursuing certification in Bellingham has increased every year, and there is increasing interest in using some of the techniques and ideas even in projects that do not pursue full certification. The City of Bellingham, Whatcom County and the State of Washington have all committed to implementing LEED for future capital projects.

Implementation Scenario—This measure assumes the city will continue to support the ongoing efforts by Sustainable Connections and RE Sources for Sustainable Communities to encourage private developers to use the LEED rating system and employ sustainable building techniques.

The Planning and Community Development Department has recently identified core staff for a new Green Team. The team will be responsible for creating a mission statement, recruiting members from other departments and developing a work program that will promote environmental stewardship and sustainability through building and land use practices.

The Green Team members will identify alternatives and possible incentives to promote sustainable development with a streamlined regulatory review and permitting process. One such alternative could be an "expert" permit review team for Green projects. Review times could be reduced by this expert permit review team by including all reviewable components (land use enablement, infrastructure installation and building permit review) of the development concurrently instead of sequentially. If successful, this expert permit review team model could be utilized for all types of development so as to provide fair, consistent and efficient permit review for all development proposals.

It has also been proposed that Bellingham should attempt to house a pilot project for the LEED for Neighborhood Development (LEED ND) standards. These standards are still under development by the U.S. Green Building Council, but will expand the program from its focus on individual buildings to a wider focus on buildings, neighborhoods, transportation and infrastructure. Such a pilot project might eventually prove to be appropriate for the former GP mill site, Old Town or other areas. Pilot project status might provide significant advantages including planning assistance and grant funding. Such a decision would necessarily hinge upon a number of considerations beyond the scope of this Action Plan, but would certainly complement climate protection efforts by increasing the scope and profile of sustainable building techniques.

Comprehensive Plan Support for Action—FLU-8, VB-17, LU-33, LU-105, LU-106, LU-143, HV-1, HG-2, HP-5, HP-24, HP-31, HP-32, CFG-5, CFG-6, CFG-13, CFP-41, CDG-1, CDG-12, CDG-16, CDG-19, CDP-58, PUG-4, PUP-18, PUP-19, PUP-20, PUP-21

Emissions Reductions—Research by the Cascadia Green Building Council has shown actual performance of existing LEED buildings to save 10.2 kBTU per year over benchmarks for conventional construction.[42] The Bellingham Comprehensive Plan assumes approximately 800 new dwelling units will be constructed each year, and 67% of these will be multi-family units that could be certified through the LEED program. In addition, the 2002 EcoNorthwest Study indicates an expected growth in industrial jobs of 246 jobs each year requiring 159,900 square feet of new industrial space each year; 326 retail jobs requiring 195,600 square feet of retail space each year; and 785 other commercial jobs requiring 314,000 square feet per year. If, through a combination of education and incentives, 33% of this demand over the next five years can be filled with LEED -certified buildings, it would mean a reduction of 915 tons of eCO_2. If 50% of the demand from 2012 to 2020 were met by LEED-certified buildings, it would mean an additional savings of 2196 tons of eCO_2 in the residential sector. If the same market penetration can be achieved in the commercial and industrial sectors, it would reduce 1207 tons of eCO_2 by 2012 and 2896 tons more by 2020.

Co-Benefits—In addition to energy savings, LEED buildings typically integrate water-saving techniques that will lessen the burden on city infrastructure. They also integrate recycled and reused building components (resulting in upstream eCO_2 savings not included in the above calculations), improve employee and resident health and performance, integrate low-impact development techniques to protect water quality, incorporate a variety of traffic-calming effects and save the building operators money due to reduced energy use.

Costs—Although LEED methods can certainly be made more expensive than standard building practices, a recent study comparing 600 facilities built to both LEED and non-LEED standards showed no significant difference in construction cost.[43] There is some cost associated with the additional step of documentation to achieve LEED certification, but that

cost is generally nominal compared to the increased market value of certified buildings and the savings achievable through decreased operating costs.

Cost for the city would be predominantly staff time.

Available Assistance/Support—Sustainable Connections Green Building Program and RE Sources Sustainable Living Center and many community members in the building industry.

Stakeholders—Puget Sound Energy, Realtors and the Building Industry Association

13. Promote Built Green and Energy Star Standards (126 tons of eCO_2)

Importance/Context—The U.S. Environmental Protection Agency and the Department of Energy have collaborated to develop the Energy Star program, which creates a national standard for energy efficiency in a variety of categories including newly constructed homes. Energy Star homes must be 15% more efficient than required by code. The Building Industry of Whatcom County, following the example of other building industry associations, has developed an environmental practices rating system for homes called Built Green. This program encourages builders to use a variety of environmentally preferable practices, including energy-efficiency measures, by making the information easily available to consumers. While Energy Star certification is not a required step for Built Green certification, thus far all Built Green homes in Whatcom County have also achieved Energy Star standards. The U.S. Green Building Council will soon approve LEED for homes standards.

Implementation Scenario—It is proposed that the city continue to support efforts of the Building Industry Association, Puget Sound Energy, Sustainable Connections and RE Sources for Sustainable Communities to encourage and facilitate private developments to use the Energy Star Standards and the Built Green rating system and LEED for Homes when it becomes available.

The Planning and Community Development Department has recently identified core staff for a new Green Team. The team will be responsible for creating a mission statement, recruiting members from other departments and developing a work program that will promote environmental stewardship and sustainability through building and land use practices.

The Green Team members will identify alternatives and possible incentives to promote sustainable development with a streamlined regulatory review and permitting process. One such alternative could be an "expert" permit review team for Green projects. Review times could be reduced by this expert permit review team by including all reviewable components (land use enablement, infrastructure installation and building permit review) of the development concurrently instead of sequentially. If successful, this expert permit review team model could be utilized for all types of development so as to provide fair, consistent and efficient permit review for all development proposals.

Comprehensive Plan Support for Action—FLU-8, VB-17, LU-33, LU-105, LU-106, LU-143, HV-1, HG-2, HP-5, HP-24, HP-31, HP-32, CFG-5, CFG-6, CFG-13, CFP-41, CDG-1, CDG-12, CDG-16, CDG-19, CDP-58, PUG-4, PUP-18, PUP-19, PUP-20, PUP-21

Emissions Reductions—The Bellingham Comprehensive Plan assumes that approximately 800 new dwelling units will be constructed each year and 33% of these will be single-family units, which could be certified through the Built Green program. LEED for homes or achieve Energy Star rating. In King County extensive promotion of the program has rapidly increased public awareness and consumer demand and as of 2005 15% of all new single-family homes being built were using the Built Green system. Nationwide, about 10% of all new homes constructed are built to meet Energy Star standards. If Bellingham could achieve the goal of 15%, then it would mean the development of about forty new Built Green or Energy Star homes per year; by 2012 there would be over 200 and by 2020 there could be 560 or more. If each achieved the Energy Star standard of 15% more efficient than required by code, it would yield an annual savings of 126 tons of eCO_2 in 2012 and 479 tons of eCO_2 in 2020.

Co-Benefits—In addition to energy savings, Built Green Homes often integrate water-saving techniques that lessen the burden on city infrastructure, integrate recycled and reused building components (resulting in upstream eCO_2 savings not included in the above calculations), incorporate low-impact development techniques protecting our water quality, improve resident health, and save homeowners money on energy costs.

Costs—The marginal cost of achieving Energy Star requirements is estimated at between $900 and $2000 per home. There is an additional fee of $500 for certification. These costs typically pay for themselves in the first few years of operating the home. Cost for the city will likely be limited to staff time.

Available Assistance/Support—Sustainable Connections Green Building Program and RE Sources Sustainable Living Center, many community members in the building industry, Puget Sound Energy and Ecos Consulting

Stakeholders—Realtors, Puget Sound Energy and the Building Industry Association.

14. Achieve Comprehensive Plan Alternative Transportation Mode Shift Goal (20,655 tons of eCO_2)

Importance/Context—The Bellingham Comprehensive Plan outlines a mode shift goal to reduce total trips by automobile from the current rate of 87% of all trips to 75% of all trips by 2022. The goal outlines a steady increase in other modes and a concurrent decrease in the use of automobiles.

Achieving this goal is expected to depend on the success of a number of factors including the Whatcom Smart Trips program, the Social Data Individualized Marketing program, land use decisions, a steady increase in availability and convenience of mass transit (Whatcom Transit Authority's Go Lines in particular) as well as a widespread effort to make the city more pedestrian- and bicycle-friendly. Achieving this goal will require a wide range of actions local government can take to encourage the development of a city that is not so dependent on cars.

Table 25: Mode Shift Goal

Mode	2004	2010	2015	2022
Automobile	87%	84%	80%	75%
Transit Bus	2%	3%	4%	6%
Bicycle	3%	4%	5%	6%
Pedestrian	8%	9%	11%	13%

Source: Bellingham Comprehensive Plan, Transportation Element

Implementation Scenario - Implementation will include a variety of specific actions, many of which are outlined in the Transportation Element of the Comprehensive Plan. The Whatcom Council of Governments' Smart Trips Program and the Social Data Individualized Marketing are key components, as are efforts to optimize Whatcom Transit Authority (WTA) ridership, continued expansion and interconnection of city sidewalks, trails and bicycle lane networks, increased availability of bike racks and bicycle facilities, city-wide implementation of the Safe Routes to School program, and the continued maturation of urban villages and encouragement of infill development.

Comprehensive Plan Support for Action—FLU-8, LU-47, LU-82, LU-103, LU-143, LU-150, TG-2, TG-4, TG-6, TG-7, TG-10, TG-16, TG-19, TG-20, TG-22, TG-23, TG-28, TG-29, TG-30, TG-32, TG-33, TG-35, TG-36, TG-37, TP-1, TP-2, TP-4, TP-9, TP-20, TP-22, TP-23, TP-31, TP-32, TP-37, TP-38, TP-41, TP-42, TP-44, TP-45, TP-46, TP-50, TP61, TP-63, TP-64, TP-65, TP-66, TP-78, TP-81, TP-88, TP-92, CFG-19, CFG-23, CFP59, CFP-64, CFP-67, CFP 70

Emissions Reductions—Achieving the goal by 2020 would mean emissions reductions of approximately 20,655 tons of eCO_2 per year.

Co-Benefits—-Achieving this target will also save approximately 2.65 million gallons of gasoline, dramatically reducing our area's dependence on fossil fuels. It will significantly improve local air quality by eliminating considerable amounts of common air pollutants including over 800 tons of carbon monoxide. It will mean increased exercise for many of the city's residents and corresponding health benefits. It will also result in a more pedestrian-oriented city that feels safer and is more attractive.

Costs—Bellingham, along with the Whatcom Council of Governments, WTA and Whatcom County, is presently supporting the implementation of the Smart Trips program. Ultimately, the Social Data Individualized Marketing Program will cost approximately $1,500,000. Funding for the first phase has been identified. Additional sources of funding will need to be secured to implement the rest of the program, it is not expected that the city fund this component.

Costs for the other components have not been estimated.

Available Funding—The Council of Governments is working to secure funding to implement the Individualized Marketing Program. The U.S. Department of Transportation has grant funding available to help implement the Safe Routes to School program, and the Washington State Department of Transportation periodically makes funding available to assist with bike and pedestrian safety through engineering, education and enforcement and provides funding to support the implementation of the CTR program.

Potential Barriers—Transportation is a complex issue with a huge number of stakeholders and often strong personal feelings. Programs that encourage voluntary changes at an individual level are not likely to be unpopular, but will tend to be less successful than measures that create disincentives for single-occupant vehicle use; however, such disincentives are likely to be politically unpopular.

Table 26: Projected Implementation Timeline

Step Toward Implementation	*Time Commitment**	*Lead Department/Staff*
Social Data Individualized Marketing In Depth Survey	*6 months*	*Whatcom Council of Governments*
Identify funding and complete individualized marketing	*unknown*	*Whatcom Council of Governments*
Develop plan to meet the requirements of the Commute Trip Reduction Efficiency Act	*10 months*	*Public Works Engineering and Whatcom Council of Governments*
Include transportation component in Climate Protection Public Education	*ongoing*	*Environmental Resources*
Continue to provide walking and bicycling facilities where possible on all reconstructed and retrofitted arterials	*Ongoing*	*Public Works Engineering*
Make Safe Routes to School a comprehensive city-wide program	*2 years*	*Kim Brown, Public Works Engineering*
**assumes a staff time commitment of a few hours per week*		

15. Limit Idling (5,295 tons of eCO_2)

Importance/Context—Studies have shown people generally leave their vehicles idling for an average of five to ten minutes per day, and idling vehicles waste ½-1 gallon of fuel per hour.[44] There are over 65,000 vehicles in Bellingham, and it is estimated they waste approximately 988,000 gallons of fuel per year by idling.

Whatcom Transportation Authority recently established a policy that buses staging for more than two minutes should not be idled except in extremely cold weather. It is expected this practice will save more than $25,000 a year and 15,000 gallons of fuel, or about 5% of WTA's total fuel use.

Implementation Scenario—Bellingham city government can help to reduce fuel wasted in idling by implementing a no-idling program. This effort would primarily be educational. Presently a pilot program, developed by a coalition of clean air agencies and funded by the NWCAA, is being implemented by RE Sources for Sustainable Communities. The proposal is to work with these and other regional partners to expand and improve on the pilot program following its completion. This measure assumes that, over time, such a policy could cut the fuel wasted on idling in Bellingham by 50%. This effort could be coordinated with the NWCAA, and Whatcom County and could stand alone or be integrated into other educational efforts.

Comprehensive Plan Support for Action—FLU-8, VB-44, VB-45, LU-129, TG-6, TP-23, TP-31

Emissions Reductions—Implementation of a no-idling program in Bellingham could eventually prevent the emission of approximately 5,295 tons of eCO_2 annually.. The WTA's decision alone accounts for 2,615 tons of eCO_2.

Co-Benefits—In addition to resource and GHG emissions savings, reducing idling will also reduce the emission of nitrous oxides, carbon monoxide and VOCs that are emitted from a vehicle's tailpipe. According to the American Lung Association, asthma is the most common chronic illness in children and the leading cause of school absences, and children's asthma symptoms increase as a result of exposure to car exhaust.[45]

Costs—The cost will be based on the extent of the program. This will be determined after review of the pilot effort.

Available Funding—Funding is likely to be available through NWCAA.

Available Assistance/Support—A number of other communities in the region have proposed no-idling campaigns as part of their climate protection efforts.

Table 27: Projected Implementation Timeline

Step Toward Implementation	*Time Commitment**	*Lead Department/Staff*
Implement pilot program in 50 elementary schools throughout the region	*9 months*	*RE Sources for Sustainable Communities*
Review effectiveness of pilot and determine next steps for wider implementation	*1 month*	*Environmental Resources and Regional Partners*
Identify funding for wider implementation	*3 months*	*Environmental Resources and regional Partners*
Develop proposal for wider program based on effectiveness and funding	*6 months*	*Environmental Resources and regional Partners*
**assumes a staff time commitment of a few hours per week*		

16. Promote Biofuels  (55,320 tons of eCO_2)

Importance/Context—Switching from fossil fuels to agriculturally based fuels reduces global-warming pollution. Burning petrochemical-based fuels releases carbon previously sequestered underground, thus adding to the amount of CO_2 building up in the atmosphere. By comparison, biofuels emit CO_2 that would have been released naturally as the plant material decomposed, thereby returning to the atmosphere the carbon collected during plant growth. Biodiesel and ethanol emissions are therefore not adding carbon to the atmosphere but are part of the natural carbon cycle.

By 2020, the State of Washington will require the vehicle fuel mix be at least 10% ethanol in gasoline and 5% biodiesel in diesel. Bellingham is capable of achieving these targets and even more ambitious goals ahead of the rest of the state. Whatcom County's extensive farmland makes us a natural beneficiary of this emerging economic sector.

Implementation Scenario—The enactment of S.B.6508 will result in a steady increase in the percentage of biofuels required in the fuel blends sold at gas stations as local production and processing capacity increases. Bellingham could encourage the use of these fuels. Promotion actions could include incentives to gas stations to offer fuels blended with biodiesel and ethanol, consumer education, and outreach to auto dealerships to encourage them to offer more vehicles compatible with greater use of biofuels.

Comprehensive Plan Support for Action—FLU-8, VB-44, TG-2, TG-4, TG-6, TP-31, TP-32, TP-86

Emissions Reductions—Based on estimated growth in demand of gasoline and diesel by the year 2020, a switch to 10% ethanol and 5% biodiesel will eliminate 44,256 tons of CO_2 emissions from Bellingham each year. If Bellingham can encourage voluntary use of these fuels and achieve 25% more than the statewide standard, we will achieve a reduction of 55,320 tons of eCO_2.

Co-Benefits—-Switching to agriculturally produced fuels stimulates Washington and Whatcom County's farming economies. A new commercially viable crop may prove to be a valuable tool in preserving farmland in Whatcom County and throughout the state. This will also reduce the need for drilling petroleum, thereby reducing national dependence on foreign oil. Biofuels also produce less air pollution than petrofuels when burned and so will help protect our air quality.

Costs—Cost will depend upon the extent of the program.

Available Assistance/Support—Washington State Agricultural Extension has done some promotion of biofuels and may be an excellent partner. Whatcom County is considering similar efforts to promote biofuels. Additional funding may be available from the NWCAA.

Potential Barriers—One of the great strengths of the Cities for Climate Protection program is the fact that the city generally leads the way. In the case of biodiesel, issues with manufacturer warranties have arisen that may prevent the city from using biodiesel in greater concentrations than 5% (see page 78).

Stakeholders—Farmers, the farmland-preservation community, auto dealers, fueling stations and distributors.

Table 28: Projected Implementation Timeline

Step Toward Implementation	*Time Commitment**	*Lead Department/Staff*
Promote the use of biofuels through general climate protection education campaign	*ongoing*	*Environmental Resources*
Explore options for other incentives and encouragement for the use or sale of biofuels or biofuel compatible vehicles.	*3 months*	*Environmental Resources and Climate Protection Committee*
Develop proposals for incentive program	*6 months*	*Environmental Resources and Climate Protection Committee*
**assumes a staff time commitment of a few hours per week*		

17. Promote Hybrid Vehicles  (20,738 tons of eCO_2)

Importance/Context—Hybrid vehicles, especially the Toyota Prius and Honda Insight, can achieve up to double the fuel efficiency of the national average. Driving these vehicles can therefore have a substantial impact on the global-warming pollution generated by a personal or commercial vehicle.

Implementation Scenario—According to recent automotive research, hybrid vehicles are expected to be at least 5-6% of all passenger vehicle purchases by 2010.[46] This is partly due to the increase in cost of fuel, and the expectation that there will be a large increase in hybrid models available. This measure is therefore likely to be successful without significant stimulus from Bellingham city government; however, public promotion of hybrid vehicles could help the community surpass this level of engagement. Such a public-outreach effort would be a logical component of a broader climate protection education program.

Comprehensive Plan Support for Action—eFLU-8, VB-44, TG-2, TG-4, TG-6, TP-31, TP-86

Emissions Reductions—If 5% of all passenger vehicles in Bellingham are hybrids in the year 2012, it will reduce CO_2 emissions by over 9,243 tons per year. If hybrids comprise 10% of all vehicles in Bellingham by 2020, it will reduce emissions by 20,738 tons of eCO_2.

Co-Benefits—As with all vehicle-related reduction measures, an extensive switch to hybrid vehicles will also lead to a reduction in air pollution such as CO, NOx, and volatile organic compounds (VOC), as well as a reduction of the community's dependence on fossil fuels.

Table 29: Projected Implementation Timeline

Step Toward Implementation	*Time Commitment**	*Lead Department/Staff*
Include promotion of hybrid vehicles in climate change education efforts.	*Ongoing*	*Environmental Resources*
Explore alternative avenues to incentivize hybrid vehicle use in Bellingham	*3 months*	*Environmental Resources and Climate Protection Committee*
Develop proposal for incentive program	*6 months*	*Environmental Resources and Climate Protection Committee*
**assumes a staff time commitment of a few hours per week*		

18. Increase Curbside Recycling Rate  (19,316 tons of eCO_2)

Importance/Context—Residential curbside recycling is one of this city's most effective and longstanding climate protection measures. It is estimated by RE Sources for Sustainable Communities this program collects about 31% of all residential waste. For most households increasing recycling would be a no-cost or a cost-saving measure; curbside recycling is already included in the cost of residential service whether it is used or not.

Implementation Scenario—Presently RE Sources for Sustainable Communities is pursuing grant funding from the State Department of Ecology to study the effectiveness of various recycling techniques with the immediate goal of increasing Bellingham's curbside recycling rate to 35%. It is proposed that the city support RE Sources in this effort, cooperate with them to continue implementing the findings of their research, work with Sustainable Connections and other partners to increase recycling in the business sector and encourage recycling as part of our overall climate protection education program. It is also proposed that the city work with Whatcom County to establish ambitious waste-diversion goals, and, over time, implement joint efforts to achieve those goals. It is hoped that a sustained effort can double the amount of recycling in Bellingham.

Comprehensive Plan Support for Action—FLU-8

Emissions Reductions—Doubling the current amount of recycling will result in a pollution reduction of 19,316 tons of eCO_2.

Costs—Current proposed actions would require modest dedication of staff time, but would not increase costs of the education and outreach efforts or require additional expenditures.

Co-Benefits—Recycling is an easy step for many people to take, it is not particularly time-consuming, and there is no extra cost. Engaging more of Bellingham's population in recycling is an excellent way to introduce more people to simple actions that they can take to

that benefit the environment. If recycling can be increased, encouraging other behavior changes may become easier.

Recycling is also a growing part of the economy, and should be viewed as an excellent source of jobs in our community.

Available Funding—The Washington State Department of Ecology regularly provides grant funding for waste diversion efforts.

Available Assistance/Support—RE Sources for Sustainable Communities, Department of Ecology, Sustainable Connections, Whatcom County, Sanitary Services Corporation

Table 30: Projected Implementation Timeline

	*Time Commitment**	*Lead Department/Staff*
Provide city comment on Whatcom County Solid Waste Management Plan	*1 month*	*Mayor's Office and Environmental Resources.*
Study effectiveness of various messages.	*1 year*	*RE Sources*
Coordinate educational efforts with RE Sources, Whatcom County, Sustainable Connections and Sanitary Services Corporation	*ongoing*	*Environmental Resources*
**assumes a staff time commitment of a few hours per week*		

Proposed Additional Measures

In addition to the above measures, which have the effect of reducing emissions at the community and government levels, there are several other recommended measures, which will not independently help to reduce emissions, but will further the program goals and create a structural framework for the program.

1. Become a member of ICLEI - Local Governments for Sustainability

ICLEI - Local Governments for Sustainability has been a valuable partner in the creation of this inventory and action plan. They have provided the CACP software, technical support and facilitated the grant program, which paid much of the staff time required to develop this plan. The ICLEI recently announced the opening of the Northwest Regional Capacity Center in Seattle that will support climate protection efforts in cities throughout the Northwest. Joining ICLEI is an important step for Bellingham for several reasons:

1. Continuing our partnership with ICLEI will enable them to continue to support our efforts with technical assistance, training and networking opportunities for staff.
2. Joining ICLEI will signal our dedication to climate protection to other communities and potential partners.
3. Working with ICLEI is an important part of sharing the lessons Bellingham learns with other communities that may want to adopt similar measures in the future.

Joining ICLEI will cost the city $1,200 per year. Joining ICLEI is a priority recommendation of this Action Plan.

2. Become a Member of Climate Solutions

Climate Solutions is a not-for-profit organization based in Olympia that organizes the Northwest Climate Connections Network. This is an affiliation of about 75 communities, organizations and businesses that affirm the importance of a healthy stable climate, work to engage members and constituents in solutions, and help promote a healthy climate policy at the state, national and international levels. Participating in this regional organization is recommended for several reasons:

1. Coordinating Bellingham's reduction measures with other communities, businesses and organizations in the region will increase our efficiency and effectiveness.
2. Participating in Climate Solutions is a significant way for Bellingham to lend its support for climate protection policy made at other levels of government. Bellingham's leadership should be an inspiration to the state and federal government.
3. Joining Climate Solutions is an important way for Bellingham to signal its dedication to climate protection to our potential partners and to other communities.
4. Working with Climate Solutions will be an important part of the way Bellingham shares its experience with other communities.

Climate Solutions has a flexible dues structure; membership for the city would cost approximately $2500 per year.

3. Provide Stakeholder Comment to State and Federal Government

While global warming will most dramatically impact local governments, many of the most effective preventative steps are only available to state and federal governments. Moreover, any regulations that have a dramatic influence on climate pollution will also have a range of other impacts; it would be wise to try to ensure that state and federal policy treats local governments fairly. In the future it will likely make sense to assign the city's Government Relations Director to track particular legislation and to advocate for the city's interest. In particular, changes to the Corporate Average Fuel Economy (CAFE) standards and the possible establishment of a national cap-and-trade system are of interest at the national level. In Washington State, we should remain apprised of a number of efforts including the potential establishment of a mandatory statewide reduction target.

3. Explore Future Carbon-trading Options

It is considered likely that the eventual regulation of carbon emissions will take the form of a cap-and-trade system. Under such a regulatory structure, organizations and communities that are less carbon dependent will have significant economic advantages. Moreover, dependent upon the details of the regulatory program, those who have already reduced their emissions could potentially be able to sell the value of that reduction to others. The city should take steps to ensure our efforts are sufficiently documented so as to be able to be credited with them under any possible carbon-trading system.

In the meantime, there are already voluntary carbon offset markets in which Bellingham could participate. It may be possible for the city to use these voluntary markets as a way to fund existing programs.

4. Climate Protection Advisory Committee

Phase III of the Climate Protection Action Plan will require a number of policy-setting decisions, selecting of priorities, and development of new initiatives. It would lend credibility and meaning to the outcome of this planning effort if staff efforts were supported and informed by a group of community stakeholders. This role could be filled by City Council or a committee thereof. Alternatively, it could be filled by an existing city advisory board or require the formation of a new committee.

5. Develop Adaptation Strategies

The Cities for Climate Protection Program is intended as a way for local governments to do their part to help reduce the problem of global warming. Despite any success we might have, the climate is changing and will likely continue to change into the future. We have a big impact on the severity of the consequences, but some of the damage has already been done. It is important that consideration of the likely impacts be incorporated into the city's long-term planning. At present Environmental Resources Staff is considering two primary impacts, the changes in the municipal water supply that may result from the melting of the Deming Glacier and other effects, and the ramifications of sea-level rise on Bellingham's coastal areas including the former Georgia Pacific mill site. Environmental Resources will continue to track these potential problems and keep city staff and elected officials aware of these issues.

Future Measures: Action Plan Phase III

Phase III of the city's Action Plan will include longer term measures, which have not yet been initiated. While it would be possible for Environmental Resources staff to develop these next steps, it was considered important to incorporate a wider cross-section of the community in the development of this next phase. Action Plan Phase III will need to be developed over time in order to eventually meet our city's goals. Table 11 shows Bellingham's emissions, targets and the impacts of Phases I and II.

Table 31: Bellingham Emissions Summary – Phase III

	Community Analysis	Municipal Operations Analysis
Base Year	2000	2000
eCO_2 emissions in the base year (tons)	950,793	19,970
Target Year	Community - 2012	Municipal Government-2012
Business-as-usual projection of eCO_2 emissions in 2012 (tons)	1,083,474	22,583
2012 Targeted emissions reduction level (% of 2000)	7%	64%
2012 Targeted emissions level (tons)	883,474	7,189
Difference from forecast level (tons)	200,000	15,394
Total eCO_2 emissions reduction achieved to date (Action Plan Phase I)	45,945	12,998
% eCO_2 emission reduction target achieved to date (Action Plan Phase I)	23%	84%
Total eCO_2 emissions reduction from proposed measures (Action Plan Phase II)	106,008	2,475
% eCO_2 emission reduction from proposed measures (Action Plan Phase II)	53%	16%
Quantity of eCO_2 emission reduction pending to reach the goal (Phase III) (tons)	48,047	0
% eCO_2 emission reduction pending to reach the goal (Phase III)	24%	0%
Target Year	Community - 2020	Municipal Government - 2020
Business-as-usual projection of eCO_2 emissions in 2012 (tons)	1,192,794	24,794
2020 targeted emissions level (% of 2000)	28%	70%
2020 targeted emissions level (tons)	684,474	5,991
Difference from forecast level (tons)	508,227	18,804
Total eCO_2 emissions reduction achieved to date (Action Plan Phase I)	45,945	12,998
Total eCO_2 emissions reduction from proposed measures (Action Plan Phase II)	148,246	2,521
% eCO_2 emission reduction from proposed measures (Action Plan Phase II)	29.2%	13.4%
Quantity of eCO_2 emission reduction pending to reach the goal (Phase III) (tons)	314,754	3,285
% eCO_2 emission reduction pending to reach the goal (Phase III)	61.9%	17.5%

Source CACP Model Output

Figures 30 and 31 show the municipal government and Community emissions and targets over time with the impacts of each phase of the Action Plan towards achieving those targets.

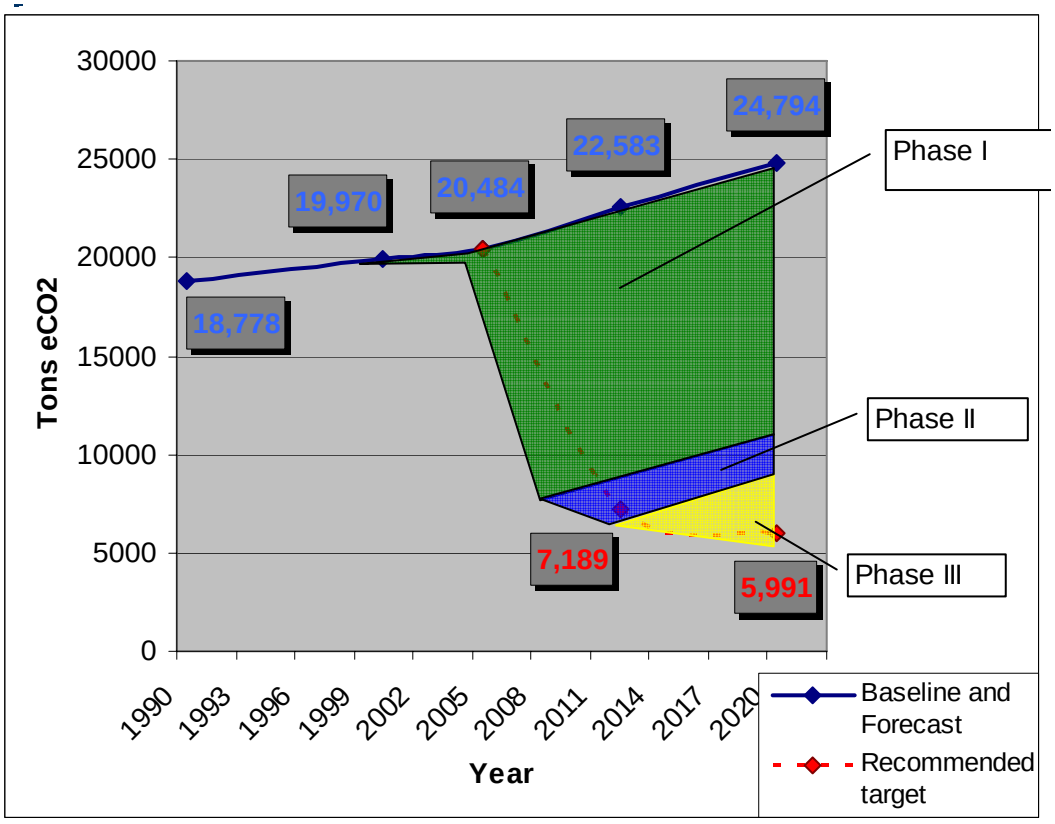

Figure 30: Municipal government emissions and targets over time

Source CACP Model Output

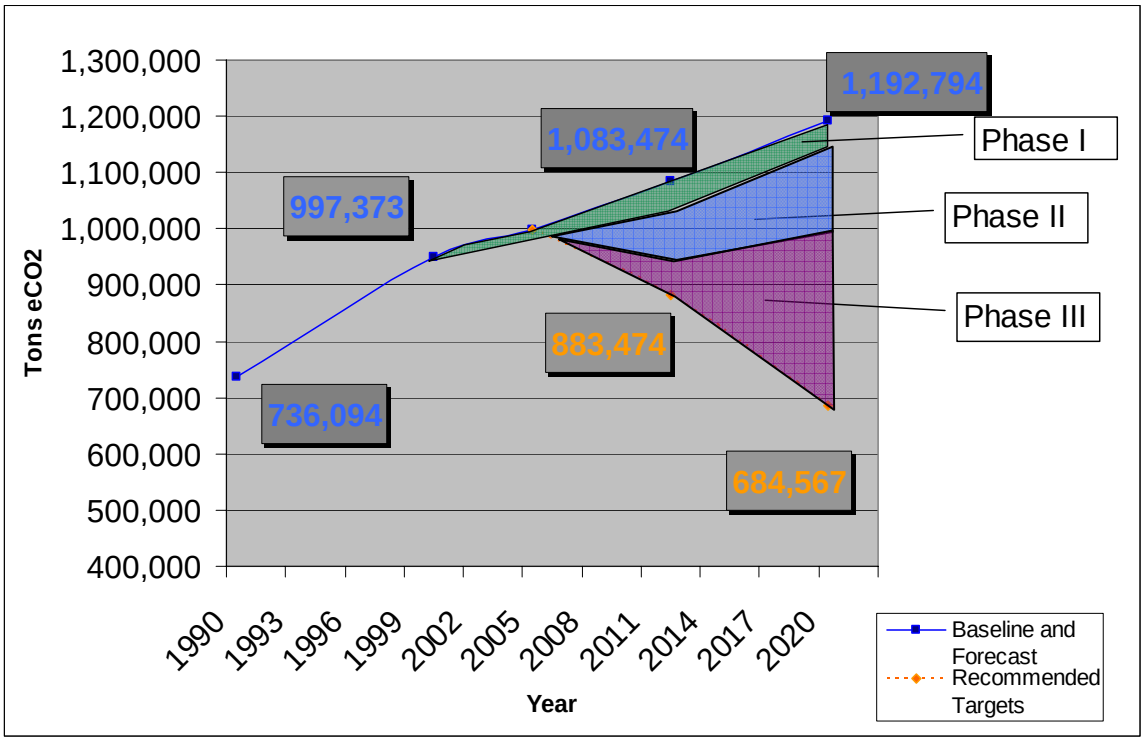

Figure 31: Bellingham community emissions and targets over time
Source CACP Model Output

What follows is a preliminary list of ideas that arose during the development of this report, but were not considered appropriate steps in Phase II. This list is best considered as a starting point for discussion and should be amended and added to by the Climate Protection Advisory Committee.

Potential Actions Impacting Municipal Operations

1. Join Puget Sound Clean Cities Coalition
2. Incorporate climate protection into Sister Cities Program—best-practices sharing
3. Bus-pass reimbursement for city employees
4. Expand city employee telecommuting opportunities
5. Increase compressed-schedule opportunities
6. Make the best parking spaces available for carpoolers, not managers and department heads
7. Allow city employees to cash in their unused municipal parking lot permit
8. Participate in the Department of Energy's Clean Cities Program
9. Establish a city fleet fuel efficiency average
10. Participate in EPA's Waste Wise Program
11. Use photovoltaic electricity to power streetlights and park lights
12. Purchase carbon offsets
13. Use electric or other alternative vehicles in municipal fleet
14. Employ limited idling policy for municipal fleet

Actions Impacting Bellingham Community as a Whole

1. Offer incentives for photovoltaic and/or solar water-heating installations
2. Create a Bellingham-specific carbon-offset fund
3. Launch a bicycle boulevard pilot project
4. Set VMT goal—absolute reduction/relative to population growth
5. Set 10% challenge—businesses and individuals
    i. Web-based tracking
    ii. Encourage individuals and businesses to develop their own action plan
    iii. Recognition for success
6. Smart-shopping seminars—reduce consumerism/waste
7. Create and distribute a comprehensive, Bellingham-specific citizens' environmental guidebook
8. Enact a more progressive energy code
9. Require subdivision maps to provide for passive solar heating/cooling opportunities including solar site orientation.
10. Employ a building inspector who focuses on energy efficiency
11. Make bicycle facilities (storage and showers) mandatory in building code
12. Require weatherization of older homes—must be brought up to code at time of sale
13. Require Energy Star appliances in projects funded with city money.
14. Establish a business outreach program—work with large businesses to adopt goals, make resources available to small- and medium-sized businesses
15. Support large building re-commissioning through partial funding, loans or education
16. Set an ambitious community-wide waste diversion goal—90% by 2020?
17. Encourage increased commercial organics recycling in restaurants
18. Encourage recyclables processing industry in Bellingham—mixed plastics facility?
19. Increase carpooling incentives— provide carpool-only spaces downtown, work with large shopping centers
20. Base parking fees on vehicle size
21. Enact a plastic bag tax
22. Discourage halogen lighting (building code, public education, buy-back program)
23. Establish a steam district using steam from the Ecogen facility in the waterfront redevelopment
24. Generate hydroelectric power from the old Georgia Pacific pipe from Lake Whatcom
25. Support methane waste power generation at Columbia Ridge Landfill
26. Require recycling at all construction sites
27. Work with businesses to support individual "zero waste" business goals
28. Fund a wind power feasibility mapping study for Bellingham area
29. Make downtown multifamily tax credit dependent upon achieving LEED Certification

Appendix A – Inventory Data Collection Process, Assumptions and Notes

Community Inventory

Electricity, Natural Gas and Propane: Overall community electricity and natural gas usage data were gathered through requests to Puget Sound Energy and Cascade Natural Gas. PSE was able to provide a total number of kWhs used in the County, divided into Residential, Commercial, and Industrial sectors. These data included all electricity users. For Cascade Natural Gas, data was only available as far back as 2003. Usage for 2000 was therefore estimated based on the projected relationship between therm usage and utility tax collection. In addition, there are several large users of natural gas in Bellingham who do not purchase their fuel directly through CNGC. For most of these, throughput data were available from Gail King at the Northwest Clean Air Agency, others were contacted directly.

Estimates of Propane use were determined by establishing a relationship between number of households using propane as the primary fuel for heating (provided by the 2000 US Census) and the average propane use per household in the Pacific Region (provided by the US Energy Information Administration).

Data on Georgia Pacific's historical natural gas and electricity use was provided by John Andersen.

Transportation data: The City-wide vehicle mileage data were taken from the Highway Performance Monitoring System (HPMS) annual survey. The total miles traveled were entered into the CACP software, which generated an estimate of emissions based on national vehicle use and mile-per-gallon averages.

Waste: The numbers for total waste in Bellingham were based on reports prepared for the Washington State Utilities and Transportation Commission and provided by Sanitary Services Inc.. The breakdown of waste components was assumed to be the same as what is listed in the Whatcom County Recycling Potential Assessment. To determine the methane recovery factors for each landfill, the facilities were contacted directly. Because CACP software only allows for one value for methane recovery, a weighted average of these numbers was generated based on how much waste went to each land fill.

Municipal Inventory

Electricity, Natural Gas, and Propane: As with the Community inventory, data for electricity and natural gas were generated through a request from PSE and Cascade Natural Gas. PSE was able to forward monthly usage data beginning between January and June of 2000. For this report, the 12-month period starting whenever the data were first available was used as the estimate for 2000 electricity use.

The same methods were used to determine electricity usage by the street lights and signals that are owned by the County.

As with the Community data, for natural gas the usage information was only available back to 2003. Therefore, a comparison was made of heating-degree days from 2000 and 2003, and this was used to generate an estimate of therm usage per facility in 2000.

Vehicle Fleet: Rich Coffman was able to provide records for fueling. These were used to determine the fleet vehicle usage by department.

Employee Commute –Data regarding employee commute was available through Kim Brown who supplied Commute Trip Reduction Surveys from 1999 to 2005 for both the Civic Center and Public Works Operations Facility, which together represent the majority of the City's employees. These surveys provided data on the number of employees per worksite and the daily average vehicle miles traveled (VMT) per employee.

An assumption was made that the 2001 data would have been the same for 2000. The average daily VMT for all City employees was assumed to be similar to the weighted average of the commutes for these two facilities.

Solid Waste Emissions: The total waste generated by City operations was difficult to measure, because Sanitary Service Company does not weigh individual trash bins as they are collected. Calculations were based on the 1999 California Statewide Waste Composition Study, which found that employees of municipal facilities generate an average of 0.356 tons/employee/year including recyclables. This value is very similar to per employee results arrived at independently by an analysis of the Whatcom County Courthouse.

The methane recovery factor used for municipal waste was the same as that for community waste.

Forecasting and Backcasting

Community forecasting and backcasting was based on energy demand projections for the Pacific Region provided by the Energy Information Administration. This data was "scaled" to Bellingham's expected population growth based on the projections in the ECONorthwest study that is cited in the Bellingham Comprehensive Plan.

Forecasts and backcasts methodology for municipal operations varied dependent upon the sector. An estimate of full time equivalent (FTE) employee growth was developed with the help of the Human Resources Department. For municipal buildings and waste the average of the FTE growth rate and the growth rate observed between 2000 and 2005 was used. Vehicle fleet and employee commute were assumed to grow at the same rate as FTE's. Emissions from the water/wastewater and streetlighting were assumed to grow at a rate equal to the average of the observed growth rate between 2000-2005 and the city's population growth rate from the ECONorthwest study.

Details on the estimates used to calculate the impacts of existing and recommended measures and greater detail regarding the methodology used in the development of the inventory is available by contacting: Alex Ramel, Environmental Resources Program Assistant, aramel@cob.org.

Appendix B: Various Nations' Vulnerability and Historical Contributions to Global Warming

Vulnerability Scores

Includes top 25 emitters
50 = most vulnerable, 10 = least vulnerable

Country	Score	Country	Score
Ethiopia	41	*Philippines*	20
Burkina Faso	40	South Africa	19
Pakistan	37	Argentina	18
Haiti	37	Brazil	18
Nepal	35	Korea (South)	18
Bangladesh	32	*Trinidad and Tobago*	16
India	30	Japan	15
China	29	Poland	14
Saudi Arabia	29	*Costa Rica*	14
Indonesia	26	Italy	13
Iran	26	France	12
Guatemala	26	Spain	12
Turkey	23	Canada	11
Russia	22	Germany	11
Ukraine	22	United Kingdom	11
Fiji	22	Australia	10
Mexico	20	United States	10

These vulnerability scores are based on a combination of 11 proxy variables (including sanitation, literacy, maternal mortality, caloric intake, government effectiveness, and life expectancy). For each variable, the full set of countries were divided into quintiles and scored from 1 to 5, based on where the country fell in the range. These individual quintile scores were averaged, and the total multiplied by 10, giving a score of 10 to 50. Not all proxy data were available for all countries.

Source: Adger et al.
Note: An aggregate EU value is not shown. Italicized countries are those not among the top 25 emitters.

Historical Contribution Indicators, 1850-2000

Top 25 emitters

	Percent of World (Rank)		
	Cumulative Emissions	Concentration Increase	Temperature Increase
United States	29.8 (1)	28.2 (1)	29.5 (1)
European Union (25)	27.2 (2)	24.5 (2)	26.7 (2)
Russia	8.3 (3)	8.5 (4)	8.7 (3)
Germany	7.5 (4)	6.6 (5)	7.4 (4)
China	7.3 (5)	8.7 (3)	7.2 (5)
United Kingdom	6.5 (6)	5.2 (6)	6.1 (6)
Japan	4.1 (7)	4.4 (7)	4.2 (7)
France	3.0 (8)	2.6 (8)	2.9 (8)
Ukraine	2.3 (9)	2.3 (10)	2.4 (9)
Canada	2.1 (10)	2.2 (11)	2.2 (10)
Poland	2.1 (11)	2.0 (12)	2.1 (11)
India	2.0 (12)	2.4 (9)	2.0 (12)
Italy	1.6 (13)	1.7 (13)	1.7 (13)
South Africa	1.2 (14)	1.2 (14)	1.2 (14)
Australia	1.1 (15)	1.1 (15)	1.1 (15)
Mexico	1.0 (17)	1.1 (16)	1.0 (17)
Spain	0.9 (20)	0.9 (17)	0.9 (20)
Brazil	0.8 (22)	0.9 (20)	0.8 (22)
Korea (South)	0.7 (23)	0.9 (19)	0.7 (24)
Iran	0.6 (25)	0.7 (24)	0.5 (26)
Argentina	0.5 (28)	0.5 (31)	0.5 (28)
Indonesia	0.4 (29)	0.6 (28)	0.4 (30)
Turkey	0.4 (31)	0.5 (30)	0.4 (31)
Saudi Arabia	0.4 (32)	0.5 (29)	0.4 (33)
Pakistan	0.2 (47)	0.2 (45)	0.2 (49)
Developed	**77**	**74**	**77**
Developing	**22**	**26**	**22**

This table lists each country's estimated contribution to total world cumulative emissions, to increased atmospheric GHG concentrations, and to the observed increase in average global temperature.

Note: Cumulative emissions include CO_2 from fossil fuels and cement only.

Source: Pew Center on Global Climate Change, 2004[47]

Appendix C: Bellingham Comprehensive Plan Visions, Goals and Policies Related to the Climate Protection Action Plan

Visions for Bellingham

VB 17 – Development patterns that encourage walking, biking and transit use are fostered through incentives and zoning regulations, including provisions for developments that allow people to live within walking distance of shopping and employment. These provisions may encourage small scale neighborhood centers as well as cottage industry or home occupations.

VB 45 – Bellingham reduces noise pollution and increases air quality by reducing its reliance on the automobile and promoting walking, bicycling and other modes of transportation.

Framework Land Use Policies

FLU-2 Bellingham's land use pattern should accommodate carefully planned levels of development that promotes efficient use of land, reduces sprawl, encourages alternative modes of transportation, safeguards the environment, promotes healthy neighborhoods, protects existing neighborhood character, and maintains Bellingham's sense of community.

FLU-8 Emphasize Bellingham's role as an environmental steward by conducting City business in a manner that: 1) increases community understanding of the natural environment and participation in protecting it through education and programs, 2) promotes sustainable land use patterns and low-impact development practices, and 3) leads by example in the conservation of natural resources such as energy, water and trees, and avoidance of adverse environmental impacts.

Land Use Policies

LU - 33 Encourage energy-efficient site and building designs to increase efficiency and preserve natural resources.

LU - 47 Auto oriented strip or linear commercial development shall be avoided. Commercial areas of all types should be compact, allow for walking between businesses and easy access by transit and transit riders.

LU - 82 Encourage city center employees to use transit, car pools, bicycles and other forms of transportation that free up parking spaces for customer parking.

LU - 103 All new housing developments should be arranged in a pattern of connecting streets and blocks with sidewalks and trails to allow people to get around easily by foot, bicycle, bus or car.

LU - 105 Encourage the use of long-lived, low maintenance building materials and high efficiency energy systems to reduce building life cycle costs.

LU - 106 Promote and encourage the use of "Built Green" and/or "LEEDS" principles in all new housing developments.

LU - 108 To encourage redevelopment and infill, development fees should be structured to recognize the reuse of existing infrastructure.

LU - 129 Water and air quality should be maintained and/or enhanced through the development and/or enforcement of environmental regulations.

LU - 143 Establish land uses, development densities, impervious surface coverages and stormwater standards that minimizes flooding, streambank erosion, and loss of aquatic and other habitat.

LU - 150 Consider reductions in required parking standards for purposes of:

- Achieving a compact urban form that is attractive, inviting and walkable.
- Furthering City infill and affordable housing goals and policies.

- Encouraging use of transit and other transportation alternatives.
- Reducing impacts on the environment.
- Encouraging the redesign of existing auto oriented strip commercial development.

Transportation Goals

TG-2 Encourage and provide for energy efficient means of transportation in Bellingham.

TG-4 Raise the public's level of awareness about regional transportation issues, laws and regulations, and alternative transportation modes such as transit, rideshare, bicycling and walking to better achieve the goals of the comprehensive plan.

TG-6 Provide a transportation system which minimizes environmental and social impacts and reduces reliance on fossil fuels.

TG-7 Focus on improving traffic circulation and reduce demand for constructing costly system improvements designed to accommodate additional single occupancy vehicle trips.

TG-10 Emphasize, accommodate, and provide facilities for multiple transportation modes on Bellingham streets wherever possible.

TG-16 Identify and commit to connecting 'missing links' within the land-based transportation network for all modes of transportation, including pedestrian, bicycle, transit, and motor vehicles.

TG-19 Increase mode share of bicycle and pedestrian trips by providing a safe, well-connected, and convenient bicycle and pedestrian circulation network throughout the city.

TG-20 Prioritize pedestrian and bicycle facility improvements over auto-oriented improvements within Urban Villages and areas targeted for infill development.

TG-22 Support WTA high-frequency transit service by allowing higher density development in designated Urban Villages in Bellingham and the Bellingham UGA.

TG-23 When new development takes place, support WTA high-frequency transit service by encouraging transit-oriented development along and within ¼ mile of WTA's Primary Transit Network within Bellingham and the Bellingham UGA.

TG-28 Set target goals to increase the mode share of pedestrian, bicycle, and transit trips and reduce automobile trips as a percentage of total trips, as listed below.

Mode	2004	2010	2015	2022
Automobile	**87%**	**84%**	**80%**	**75%**
Transit Bus	**2%**	**3%**	**4%**	**6%**
Bicycle	**3%**	**4%**	**5%**	**6%**
Pedestrian	**8%**	**9%**	**11%**	**13%**

(Note: 2004 data from FTA/Social Data Study)

TG-29 Secure multi-jurisdiction (City, County, WTA, Port, WCOG, WWU, WSDOT, FTA) funding to conduct Social Data and "Individualized Marketing" surveys, including follow-up travel behavior intervention in 2010, or one-year prior to the next Bellingham Comprehensive Plan update, to track and monitor progress towards mode shift targets.

TG-30 Bellingham reduces automobile trips on roadways and increases the efficiency of transportation facilities by developing and encouraging Transportation Demand Management (TDM) strategies to help achieve target goals for transportation mode shift, wherever possible.

TG-32 Emphasize and commit to the implementation of infill and Urban Village land use strategies to create residential densities that will support safe, viable, and convenient opportunities to use transportation modes other than the private automobile.

TG-33 Review parking requirements for major commercial and industrial uses for the purpose of reducing the supply of parking thereby providing a disincentive to automobile use.

TG-35 Encourage the "unbundling" (separate pricing) of parking spaces associated with residential development in Urban Villages to promote reduction in ownership of multiple automobiles.

TG-36 Encourage the provision of car-sharing with new residential development within Urban Villages to reduce the residential parking demand.

TG-37 Establish parking reduction allowances for residential units in Urban Villages and within ¼ mile of the WTA Primary Transit Network that require each unit to receive WTA bus passes in perpetuity.

Transportation Policies

TP-1 Consider revision of land use plans to allow densities and mixes of uses that reduce the number and length of vehicle trips and increase the opportunity to use public transportation and non-motorized modes of travel.

TP-2 Reinforce the link between land use and public transportation by encouraging transit-oriented development along and within ¼ mile of WTA Primary Transit Network corridors and near urban villages, town centers, and neighborhood centers.

TP-4 Provide development incentives (such as increased density, increased square footage, and parking requirement reductions) for new development located within Urban Villages and along and within ¼ mile of WTA Primary Transit Network corridors when amenities for transit users, bicyclists and pedestrians are included, while minimizing impacts to surrounding residential neighborhoods

TP-9 Ensure that alternative transportation modes are included in comprehensive plans, subdivisions, and other land developments.

TP-20 Support efforts by WTA, City and County Bicycle and Pedestrian Advisory Committees, and the WCOG to develop an ongoing public education program for all transportation users in the urban area to learn about the rights of pedestrians and other forms of non-motorized transportation.

TP-22 Support pro-active marketing, advertising, and public education efforts by the WTA, WCOG, and City and County Bicycle Pedestrian Advisory Committees to encourage major employers and businesses to provide incentives for their employees to use transit, non-motorized transportation, or car-pooling/ridesharing to get to work rather than single-occupant private automobiles.

TP-23 Work with the Bellingham School District to implement Transportation Education programs, designed to promote transit and non-motorized transportation modes as part of a regional demand management program.

TP-31 Improve air quality by reducing vehicle exhaust emissions by promoting: alternatives to the single occupant vehicle; use of cleaner fuels; and, improving the operating efficiency of the transportation system.

TP-32 Promote energy conservation by implementing transportation demand management policies and through the use of alternative fuels.

TP-37 Develop programs to reduce single-occupancy vehicle use, vehicle miles traveled, trip length, and travel during peak periods. Encourage more major employers and developments to implement transportation management plans (including flexible work schedules) that reduce single occupancy vehicle use and travel during the peak periods.

TP-38 Support efforts by the Whatcom Council of Governments in developing a Regional Transportation Demand Management program to encourage high occupancy vehicle and alternative transportation use, including incentives developed through coordinated efforts of WTA, City of Bellingham, Whatcom County, Port of Bellingham and major employers.

TP-39 Encourage use of non-automotive travel modes by developing parking management plans. Mechanisms to be considered include:

- An emphasis on short-term parking in retail areas;
- Market-based pricing of on-street parking meters to encourage short-term day time parking;
- Incentive-based pricing in garages to encourage long-term day time parking;
- Reduction of free or subsidized employee long-term parking availability;
- Re-evaluation of appropriate minimum and maximum parking ratios for development proposals; and
- Elimination of "free" public parking in Urban Villages.

TP-41 Consider imposing a maximum number of parking spaces allowed within Urban Villages and along the WTA Primary Transit Network where high frequency transit service exists prior to or concurrent with development.

TP-42 Support the location of safe new or expanded park-and-ride and car pool lots and support increased safety measures in existing park-and-ride and car pool lots.

TP-44 Provide preferential space and lower costs for car pool and van pool parking within the public right-of-way, and public facilities, where feasible.

TP-45 Encourage major employers to provide dressing room, showers, and lockers to facilitate walking, jogging, and bicycling to work.

TP-46 The City should develop and promote Transportation Demand Management strategies and programs for the purpose of reducing automobile trips generated rather than increasing roadway capacity.

TP-50 Walking and bicycling facilities should be provided on all new, reconstructed, or retro-fitted arterial streets, where right-of-way allows.

TP-61 Give high priority to developing and maintaining non-motorized transportation facilities that lessen impacts on the environment and reduce energy consumption, such as the bicycle and pedestrian trails network.

TP-63 Include adequate (e.g., to or exceeding WSDOT standards) facilities for safe and convenient bicycle and pedestrian travel in all roadway improvement projects where warranted and/or feasible.

TP-64 Utilize appropriate urban design elements to promote a pedestrian environment in areas of heavy pedestrian usage (e.g., commercial, governmental, business and medical centers, and transit centers).

TP-65 Provide safe, convenient and protected bicycle parking at activity centers such as commercial areas, institutions, parking garages, park-and-ride facilities and transit terminals.

TP-66 Develop appropriate bicycle treatments on those arterial streets designated as bicycle routes.

TP-78 Where appropriate, improve pedestrian crossing safety where trails, footpaths, or pedestrian routes must traverse busy streets.

TP-81 Support the public transportation system providing viable options for persons preferring public transportation as an alternative to the private automobile.

TP-86 Explore and utilize, where feasible and cost effective, existing and emerging technologies for alternative fuels and fuel efficiency measures for transit vehicles.

TP-88 Integrate the public transit system with other modes of transportation including auto, bicycle, and pedestrian travel with intercity bus, rail, ferries and airline facilities.

TP-92 Encourage employers to establish employee benefits for ridesharing and transit.

Housing Visions and Goals

HV-1 Bellingham's regulations encourage and provide incentives for innovative housing and mixtures of housing types that preserve natural resources and consolidate open space.

HG-2 Consider long-term lifecycle cost affordability through the use of cost-saving materials and low-impact development techniques.

Housing Policies

HP-5 Promote the use of innovative development patterns to better utilize land, promote design flexibility, and preserve open space and natural features.

HP-24 Encourage flexible residential street standards that are appropriate to the density of the development and the expected use of the street, with the intent of lowering the cost of infrastructure, and have the effect of calming traffic speed and increasing public safety.

HP-31 Encourage the use of long-lived, low-maintenance building materials and high-efficiency energy systems to reduce housing life cycle costs.

HP-32 Promote the incorporation "Built Green" principles in all housing developments.

Capital Facilities Goals

CFG-5 Encourage education, resources, and incentives for individual homeowners to retrofit and/or utilize innovative on-site storm drainage and retention approaches and low-impact development techniques.

CFG-6 Minimize conventional storm drainage design and where possible, rely upon those alternative approaches and low-impact development techniques that recognize the improvement of natural watercourses and wetlands in maintaining a viable drainage system.

CFG-13 Encourage continuous improvement of regulatory practices and policies regarding drainage-related control.

Capital Facilities Policies

CFP-41 The City shall promote, encourage, and support low-impact development techniques for stormwater collection, detention, and treatment that comply with the most current Washington State Department of Ecology stormwater regulations. The use of low-impact development techniques can reduce the need for larger conventional stormwater detention facilities.

Community Design Goals

CDG-1 Promote improvement in the quality of public, residential, commercial and industrial development and maintain a high quality environment by ensuring that new construction and site development meets high standards.

CDG-12 Improve the living environment and design characteristics of Bellingham's multi-family housing.

CDG-16 Builders, developers and architects are provided with a set of clear objectives and performance goals which promote the highest attainable standard of quality consistent with economic feasibility for multifamily housing.

CDG-19 Neighborhood and pocket urban villages are designed to promote reduced dependency on automobiles and provide opportunities for increased pedestrian, bicycle, and public transit access.

CDG-23 City streets encourage pedestrian activity. Livelier street edges that include traditional landscaping, bike lanes, rain gardens and setback sidewalks are inviting places for people and make for safer streets.

Community Design Policies

CDP-58 Energy efficient designs should be encouraged in all residential structures.

CDP-59 Pedestrian and bicycle transportation should be given proper consideration in the design of neighborhood streets.

CDP-64 Encourage the inclusion of street-side parking, bicycle lanes, setback sidewalks and planting strips on all new and retrofitted secondary arterials.

CFP-67 Consider programs that provide incentives to use transportation alternatives to reduce downtown and urban village parking demand and make the most efficient use of available parking and ensure these programs are coordinated with other affected agencies/businesses.

CDP-70 A safe school route program should be defined and promoted. The designated routes to schools (especially elementary schools) should be improved where necessary to assure safe passage.

Private Utilities and Service Goals

PUG-4 Reduce demand for new energy generation and resources through support of conservation policies and strategies.

Private Utilities and Service Policies

PUP-18 Support energy efficient construction codes.

PUP-19 Encourage siting of residences to increase solar access. Minimize blockage of access to sunlight for adjoining residences to the extent feasible.

PUP-20 Encourage tree planting to save heating and cooling energy and to provide wind breaks. Balance tree planting efforts with the need for solar access and the desire to protect views in certain areas.

PUP-21 Seek ways to promote energy conservation in City of Bellingham facilities and operations.

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