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October 14, 2008

Ms. Erica M. Hamilton
Commission Secretary
British Columbia Utilities Commission
Sixth Floor – 900 Howe Street
Vancouver, BC V6Z 2N3

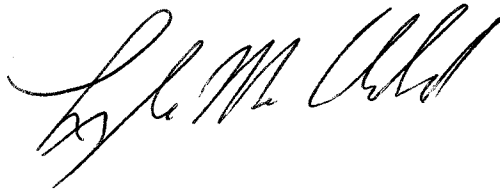
Dear Ms. Hamilton:

RE: Project No. 3698512
British Columbia Utilities Commission (BCUC)
British Columbia Hydro and Power Authority (BC Hydro)
Terasen Gas Inc. and Terasen Gas (Vancouver Island) Inc. (Terasen Utilities)
Application for Energy Efficiency and Conservation Programs

Further to BCUC Order No. G-130-08 (Exhibit A-7), attached is BC Hydro's Evidence in the above-noted proceeding.

For further information, please contact Lyle McClelland at 604-623-4306.

Yours sincerely,



for

Joanna Sofield
Chief Regulatory Officer

Enclosures (2)

c. Terasen Gas Inc.
Attention: Tom Loski
Director, Regulatory Affairs

BCUC Project No. 3698512 Registered Intervenor Distribution List

DIRECT TESTIMONY OF RANDY REIMANN

1 **Q1. Please introduce yourself to the British Columbia Utilities Commission (BCUC).**

2 A. My name is Randy Reimann. My present position with British Columbia Hydro and
3 Power Authority (BC Hydro) is Manager of Resource Planning.

4 **Q2. What are the subjects of your evidence?**

5 A. My evidence will address the following issues:

6 First, my qualifications and experience.

7 Second, I will address Terasen Gas Inc.'s and Terasen Gas (Vancouver Island) Inc.'s
8 (collectively, Terasen Utilities) contention that as a result of encouraging fuel switching
9 from electricity to natural gas, overall greenhouse emissions associated with electricity
10 demand in B.C. would be reduced through the reduction of importing electricity
11 generated using coal-fired or natural gas-fired generation.

12 **Qualifications and Experience**

13 **Q3. How long have you held your current position?**

14 A. I have held the position of Manager of Resource Planning with BC Hydro since
15 July 2004.

16 **Q4. What positions did you hold prior to your present position?**

17 A. I was responsible for transmission issues as they relate to BC Hydro including Network
18 Integration Transmission Services applications from April 2004 to June 2005. Prior to
19 that I was in the BC Hydro Strategic Planning Group for six years and was responsible
20 for market and transmission issues for the Corporate Strategy Group. I began in
21 BC Hydro working for five years managing transmission voltage customer
22 interconnection and tariff issues.

23 Prior to working at BC Hydro, I worked for four years as a Consulting Engineer for
24 University Dynamics Limited and Fransen Engineering electrical engineering firms where
25 I specialized in power systems design and analysis for large industrial plants. I also
26 worked for seven years with Alberta Power Limited as a Load Research Engineer and
27 Generation Planning Engineer and Customer Representative.

28 **Q5. What are your professional qualifications?**

29 A. I am a Professional Engineer registered with the Association of Professional Engineers
30 and Geoscientists of British Columbia. I have a Bachelor of Applied Science in Electrical
31 Engineering from the University of British Columbia and Masters of Business
32 Administration from the University of Alberta.

1 **Q6. Have you ever testified before the BCUC or its predecessors?**

2 A. Yes, I testified in the following cases:

- 3 • 2004 British Columbia Transmission Corporation's Open Access Transmission
4 Tariff; and
- 5 • 2006 BC Hydro's Integrated Electricity Plan/Long-Term Acquisition Plan (LTAP).

6 **Fuel Switching**

7 **Q7. In its response to BCSEA-SCBC IR 1.18.4 (Exhibit B-7, page 29), Terasen Utilities**
8 **assert that fuel switching from electricity to natural gas will "[reduce] our need to**
9 **import to import electricity from other jurisdictions that generate it using**
10 **inefficient coal or natural gas as inputs. Further, this would make more of British**
11 **Columbia's clean electricity available for export..." How do you respond?**

12 A. I do not agree with Terasen Utilities' assertion. There is no medium to long term linkage
13 between fuel switching from electricity to natural gas and a change in BC Hydro's need
14 for importing electric energy or ability to export such energy. BC Hydro plans
15 acquisitions to meet its load requirements as driven by its reliability criteria within the
16 parameters of Government legislation and regulations. To the extent that there was a
17 fuel switching program from electricity to natural gas that resulted in BC Hydro
18 forecasting a reduction in demand from certain customers, it would reflect that impact in
19 its load forecast, its LTAPs and its power acquisition processes. Therefore, over the
20 medium to long term, BC Hydro's net supply/demand balance and the amount of electric
21 energy it would need to purchase or have available for export would be unchanged.

22 **Q8. Does that complete your testimony?**

23 A. Yes.

DIRECT TESTIMONY OF PATRICE ROTHER

1 **Q1. Please introduce yourself to the British Columbia Utilities Commission (BCUC).**

2 My name is Patrice Rother. My present position with British Columbia Hydro and Power
3 Authority (BC Hydro) is Manager of Environmental Strategy in the Safety, Health and
4 Environment group.

5 **Q2. What are the subjects of your evidence?**

6 A. My evidence will address the following issues:

7 First, my qualifications and experience.

8 Second, I will discuss the recent British Columbia (B.C.) Government and regional
9 greenhouse gas (GHG) legislative and policy developments, and their potential
10 implications for Terasen Gas Inc.'s and Terasen Gas (Vancouver Island) Inc.'s
11 (collectively, Terasen Utilities) Energy Efficiency and Conservation Programs Application
12 (EEC Application).

13 **Qualifications and Experience**

14 **Q3. How long have you held your current position?**

15 A. I have held the position of Manager of Environmental Strategy with BC Hydro since
16 May 2007. In my position I share responsibility for, among other things, development
17 and implementation of BC Hydro's GHG policy and climate change strategy, and GHG
18 regulatory compliance. I also conduct research on national, regional and B.C.
19 environmental policy and regulatory developments.

20 **Q4. What positions did you hold prior to your present position?**

21 A. Between 2005 and 2006 I was the Innovation and Technology Project Manager and the
22 Executive Assistant to BC Hydro's Vice President of Engineering. Prior to working at
23 BC Hydro, in 2005 I was Project Director at RWDI AIR Inc., a consulting firm specializing
24 in air quality projects. My specific responsibilities included development of air quality
25 management studies for various clients and projects, and market development.

26 I worked for eight years at Metro Vancouver, formerly known as the Greater Vancouver
27 Regional District. From 2002 until 2004 I was the team lead of the Permitting and
28 Enforcement Division of Metro Vancouver's Policy and Planning Department, and
29 appointed as the Assistant District Director (Air Quality), Deputy Sewage Control
30 Manager and Deputy Solid Waste Manager. Between 1996 and 2002 I was an air quality
31 planner with Metro Vancouver.

32 **Q5. What are your professional qualifications?**

33 A. I have a Masters of Science from the University of Saskatchewan and a Masters of
34 Business Administration from Simon Fraser University.

1 **Q6. Have you ever testified before the BCUC or its predecessors?**

2 A. No.

3 **Q7. Have you ever testified before any regulatory bodies?**

4 A. No

5 **GHG Legislative and Policy Developments**

6 **Q8. Please describe the B.C. Government's GHG-related legislative and policy**
7 **developments.**

8 A. On January 1, 2008 the B.C. *Greenhouse Gas Reduction Targets Act (GGRTA)* was
9 brought into force. *GGRTA* sets into law B.C.'s GHG emissions target of at least
10 33 per cent below 2007 levels by 2020, and at least 80 per cent below 2007 levels by
11 2050. Interim GHG targets for 2012 and 2016 are to be set by the end of 2008. In 2008
12 the Government of B.C. also introduced the B.C. Climate Action Plan (the Plan), and
13 passed additional legislation to enable the further development of GHG regulations,
14 including the detailed design and implementation of a cap-and-trade system and GHG
15 reduction and offset requirements for fossil fuel-fired electricity generation sources. A
16 copy of the Plan is attached and marked Exhibit A hereto.

17 B.C. has joined the Western Climate Initiative (WCI), a partnership of seven U.S. states
18 (California, Oregon, Washington State, Montana, Arizona, New Mexico and Utah) and
19 the provinces of B.C., Manitoba, Quebec and Ontario. This commitment includes
20 participation in the design and implementation of a GHG emission trading system. The
21 WCI GHG emission trading system is to be launched on January 1, 2012. The WCI's
22 regional aggregate GHG reduction target is to be 15 per cent below 2005 levels by 2020.

23 The uncertainties regarding how the Province's GHG emission reduction targets will be
24 met include:

- 25 • The emission baseline used to set the initial 2012 cap;
- 26 • The apportionment of B.C.'s allowance budget within the WCI cap. The WCI's
27 regional aggregate GHG reduction target is less stringent than the
28 B.C. Government's legislated GHG targets, and does not override the
29 B.C. Government's *GGRTA* GHG targets;
- 30 • The method by which allowances will be allocated and distributed to regulated
31 entities within B.C. and other Partner jurisdictions (e.g., the level of auctioning
32 and grandfathering of allowances, whether allowances will be distributed at the
33 level of the facility or the firm);
- 34 • Mandatory GHG accounting and reporting requirements for various sectors
35 covered under the cap;
- 36 • Rules and regulations governing the use, creation, validation, and verification of
37 offset projects within B.C. and WCI regulatory schemes; and
- 38 • The implications of market-based GHG regulation on fuel price and renewable or
39 "green" energy markets.

Q9. What does the recently released B.C. Government Climate Action Plan have to say on GHG targets and electrification?

A. At pages 34 and 35 of the Plan, the B.C. Government proposes two electrification initiatives. The first, truck stop electrification, would involve development of plug-ins at key truck stops within B.C., and would reduce GHG emissions by encouraging fuel switching from diesel to electricity during truck idling. The second, port electrification, would involve the electrification of the East Berth at Canada Place in Vancouver. Fossil fuel powered ships would be able to plug in to the electric system while they are in port instead of self-generating.

Q10. Have there been any other electrification proposals?

A. Yes. On August 6, 2008, the Climate Action Team (CAT) presented its recommendations for strategies and interim GHG targets for 2012 and 2016 in a report entitled "Meeting British Columbia's Targets: A Report from the B.C. Climate Action Team". CAT was established in November 2007 to help the B.C. Government reduce GHG emissions by 33 per cent by 2020.

As part of 31 recommendations to the B.C. Government, CAT considers electricity use as a key option for reducing GHG emissions and identifies the following new applications:

- Electric vehicles; and
- Electrification of oil and gas facilities, thereby eliminating the need for natural gas-driven compressors, pumps and equipment.

A copy of the CAT report is attached and marked Exhibit B hereto.

Q11. Are there any implications for the EEC Application?

A. As part of the EEC Application, Terasen Utilities propose expenditures to encourage fuel switching from electricity to natural gas. In response to BC Hydro Information Request 10.1 (Exhibit B-5), Terasen Utilities acknowledge that GHG emissions would be increased at the point of use (i.e., the appliance) as a result of fuel switching from electricity to natural gas. At this time it is unclear if such a GHG increase runs counter to the *GGRTA* targets and Plan initiatives.

Terasen Utilities take the position that GHG emissions are a regional issue. However, as discussed above, the B.C. Government legislated its own, more stringent targets, and there continues to be uncertainty as to how the WCI GHG trading scheme will align with the *GGRTA* legislated targets and other Plan action items.

Terasen Utilities also assert that overall GHG emissions associated with electricity demand in B.C. would still be reduced through the reduction in the need to import electricity generated using coal-fired or natural gas-fired generation. The Direct Testimony of Mr. Randy Reimann addresses the Terasen Utilities assertion with respect to such need to import electricity.

Q12. Does that complete your testimony?

A. Yes.

CLIMATE ACTION PLAN



**BRITISH
COLUMBIA**

The Best Place on Earth

Climate action cuts across all sectors of our economy and is being addressed in multiple ways. Information on government actions related to climate action are also found in the following:

- LiveSmart BC
[**http://www.livesmartbc.ca/**](http://www.livesmartbc.ca/)
- The BC Energy Plan: A Vision for Clean Energy Leadership
[**http://www.energyplan.gov.bc.ca/**](http://www.energyplan.gov.bc.ca/)
- The BC Bioenergy Strategy
[**http://www.energyplan.gov.bc.ca/bioenergy/**](http://www.energyplan.gov.bc.ca/bioenergy/)
- The Agriculture Plan: Growing a Healthy Future for BC Farmers
[**http://www.al.gov.bc.ca/Agriculture_Plan/**](http://www.al.gov.bc.ca/Agriculture_Plan/)
- The Mountain Pine Beetle Action Plan
[**http://www.for.gov.bc.ca/hfp/mountain_pine_beetle/**](http://www.for.gov.bc.ca/hfp/mountain_pine_beetle/)
- Living Water Smart: British Columbia's Water Plan
[**http://www.livingwatersmart.ca/**](http://www.livingwatersmart.ca/)
- The BC Air Action Plan
[**http://www.bcairsmart.ca/**](http://www.bcairsmart.ca/)
- The BC Transit Plan
[**http://www.th.gov.bc.ca/Transit_Plan/index.html**](http://www.th.gov.bc.ca/Transit_Plan/index.html)
- Energy Efficient Building Strategy
[**http://www.energyplan.gov.bc.ca/efficiency/**](http://www.energyplan.gov.bc.ca/efficiency/)
- BC Green Building Code
[**http://www.housing.gov.bc.ca/building/green/**](http://www.housing.gov.bc.ca/building/green/)
- Pacific Institute for Climate Solutions
[**http://www.pics.uvic.ca/**](http://www.pics.uvic.ca/)
- Towns for Tomorrow
[**http://www.townsfortomorrow.gov.bc.ca/**](http://www.townsfortomorrow.gov.bc.ca/)
- Climate Action Secretariat
[**http://www.climateactionsecretariat.gov.bc.ca/**](http://www.climateactionsecretariat.gov.bc.ca/)

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*A study by the University of California Berkeley estimated the state could gain as many as 89,000 new jobs and realize an annual economic benefit of up to \$74 billion by pursuing its climate action goals.**

We can expect to see similar benefits here in B.C., as people seek efficiencies to help reduce costs, and businesses emerge to capture new opportunities in fields such as clean energy and energy-efficient technology.

* David Roland-Host, "Economic Growth and Greenhouse Gas Mitigation in California," University of California at Berkeley, 2006.

Global warming is the challenge of our generation. How we respond will shape the future of not just our environment, but also our economy, our society, our communities, and our way of life. British Columbia is taking decisive action to ensure these changes are positive. Since 2007 we have built a solid framework that addresses climate action in four key ways:

- We have entrenched greenhouse gas reduction targets in law, including a commitment to reduce B.C.'s emissions by one-third by 2020.
- We are taking targeted action in all sectors of the B.C. economy to help reduce emissions and set the course for the new low-carbon economy of the future.
- We are taking steps to help British Columbians adapt to the realities of climate change and its impact on our province.
- We are beginning a process to educate and engage British Columbians. This includes holding public forums and developing our LiveSmart BC initiative to support individuals, families, communities, business and industry to make cleaner choices and help build a new low-carbon society.

And we are making good progress. In fact, independent economic modelling estimates that the climate action initiatives we have already announced will take us approximately **73 per cent of the way to our 33 per cent 2020 reduction target.**

This ***Climate Action Plan – Phase One*** describes how the government will build on the framework established since 2007 and identify choices we can all make to save money and reduce our carbon footprint. We will develop subsequent phases of the plan with the continued guidance of the very best scientific, economic and engineering minds in British Columbia and throughout the world.

The challenge we face is enormous but, with decisive action, it can be met. It must be met if we want to sustain the quality of life we enjoy today for our children and our grandchildren. So let's work together, and let's make them proud.



Honourable Gordon Campbell
Premier of British Columbia

Honourable Barry Penner
Minister of Environment

Reaching Our Target

Independent economic modelling estimates that the climate action initiatives announced since 2007 will take us approximately 73 per cent of the way to our 2020 33 per cent greenhouse gas reduction target.

The Climate Action Team will make recommendations at the end of July, 2008, for how to fill the remaining gap needed to reach our target. The Team will also recommend interim 2012 and 2016 targets, which must be set by law by the end of 2008.

The government has recently passed a number of significant pieces of climate-action legislation that define the British Columbia approach to reducing greenhouse gas emissions and preparing for the new low-carbon realities of the future. This legislation includes:

- **The Greenhouse Gas Reductions Targets Act, to set GHG reduction targets for the Province.**
- **The Greenhouse Gas Reduction (Cap and Trade) Act, to enable the implementation of a cap and trade system in conjunction with regional partners.**
- **The Greenhouse Gas Reduction (Vehicle Emissions Standards) Act, to enable the adoption of vehicle emissions standards that will increase automobile fuel efficiency.**
- **The Greenhouse Gas Reduction (Emissions Standards) Statutes Amendment Act, to regulate landfill gas.**
- **The 2008 Utilities Commission Amendment Act, to encourage more low-carbon energy generation projects.**
- **The Greenhouse Gas Reduction (Renewable and Low Carbon Fuel Requirements) Act, to encourage the development of renewable forms of energy and decrease the carbon content of fuels.**
- **The Local Government (Green Communities) Statutes Amendment Act, 2008, to encourage the development of more sustainable, healthy communities.**
- **The Carbon Tax Act, to encourage low-carbon economic development while reinvesting every penny of carbon tax revenue into targeted tax cuts for individuals and businesses.**



Stimulating Low-Carbon Economic Development

British Columbia's decisive action on climate change provides us with a huge competitive productivity advantage as we move to the new, low-carbon economy of the future. B.C. is harnessing market forces to help make cleaner choices more attractive and provide new incentives for developing clean energy and technologies with:

- **Tax cuts, funded by a revenue-neutral carbon tax on fossil fuels, phased in over five years.**
- **A study commissioned by the BC government to identify the scope of new economic development opportunities associated with a new low carbon economy for British Columbia.**
- **A new Pacific Carbon Trust and partnerships with other jurisdictions to support B.C.'s participation in the fast-growing field of carbon trading.**

Creating Green Communities

Smart planning, with compact communities, energy-efficient buildings and more clean transportation alternatives, is the way of the future. This plan supports greener B.C. communities with:

- **A new Green Building Code with some of the highest energy efficiency standards in Canada.**
- **A \$14-billion Provincial Transit Plan to build infrastructure and double ridership across B.C. by 2020.**
- **Support for all communities to have anti-idling policies in place by 2012 to reduce GHG emissions and local air pollution.**

Championing Innovation

With the worldwide market for clean energy technologies valued at an estimated \$1 trillion by 2030, this Climate Action Plan positions B.C. to support new innovation with:

- **A \$25 million Innovative Clean Energy (ICE) Fund, designed to help make B.C. a leader in global alternative energy technologies.**
- **A \$25 million Bioenergy Network to encourage research and development in areas such as wood-waste cogeneration, biofuel production and wood pellet production.**
- **A \$94.5 million endowment to create the Pacific Institute for Climate Solutions that brings together universities, government and the private sector to facilitate cutting-edge solutions.**

Building on the Value of our Forests

Forestry has been the backbone of our economy for generations. Now, as we move to address climate change, we have a whole new range of opportunities to leverage our forests with initiatives such as:

- **A new net-zero deforestation policy to help ensure B.C. can realize the full value of our forests' carbon storage potential and manage the forests for future generations.**
- **Forests for Tomorrow, a \$161 million 4-year investment in reforestation program aimed at improving the future timber supply and addressing risks to other forest values.**
- **Trees for Tomorrow, a program that will see millions of trees planted in backyards, schoolyards, hospital grounds, civic parks, campuses, parking lots and other public spaces around B.C. to foster the many benefits of urban forests.**
- **A new B.C. Bioenergy Strategy that will convert wood waste and trees that have been killed by the mountain pine beetle into clean, renewable energy, create new opportunities for rural communities, spur new investment and innovation, and help B.C. become energy self-sufficient.**
- **The goal of maximizing the enormous potential and capacity of our forests beyond timber-use, for energy production as well as carbon storage.**



LiveSmart BC

A new initiative called LiveSmart BC was launched in early 2008 to provide new incentives to reward smart choices that save energy, water, fuel, time and money. These programs will also help to contain urban sprawl and reward development that creates affordable housing, new green spaces and more people-friendly neighbourhoods. As part of this initiative:

- **All British Columbians will be able to choose their own ways to reduce their greenhouse gas emissions, increase efficiency, and save money related to transportation, home energy use, and other aspects of daily life.**
-
- **Some examples of the savings that are possible by making LiveSmart choices are:**
 - up to \$1630 cash back for a gas furnace
 - up to \$560 cash back for a gas water heater
 - up to \$910 cash back for increasing attic insulation
 - provincial sales tax exemptions on energy efficient products
 - up to \$6000 to purchase a fuel efficient car – including up to \$2000 in provincial incentives, \$2000 in federal Eco-Auto Rebate (until December 31, 2008) and up to \$2250 in Scrap-It program incentives.
-

(See page 60 for details on the many other LiveSmart BC related incentives currently available.)





Flames from the Okanagan Mountain Park fire in 2003 are visible above the city of Kelowna.

We've all seen signs that our climate is changing – from devastating storms, to longer summer droughts, to the warmer winters linked to the mountain pine beetle epidemic threatening Interior forests. Some people argue that these changes are natural; that the earth's climactic patterns have always varied from year to year and decade to decade. However, in November 2007, the Intergovernmental Panel on Climate Change (IPCC) - representing the most respected climate experts worldwide - issued a report with the most decisive evidence yet to support three key conclusions:

- ***the earth's climate is changing***
- ***the change is being caused by human activities, and***
- ***its effects will worsen if no action is taken.***

The Problem Is Real

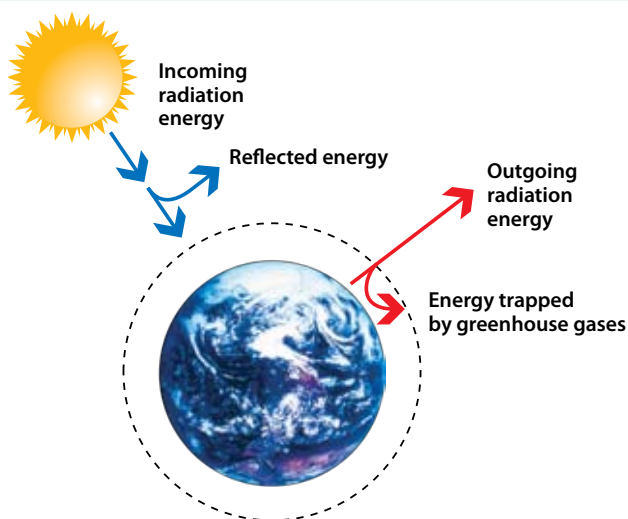
The Intergovernmental Panel on Climate Change is the world's foremost authority on the subject, drawing on the expertise of more than 2,500 scientists from 130 countries. Established by the World Meteorological Organization and the United Nations Environment Programme, the IPCC has coordinated four major assessments of global climate change, dating back to 1990. In its 2007 report, the panel concluded that global warming is now unequivocal and is "now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level."

Globally, 11 of the last 12 years (1995 to 2006) rank among the warmest since 1850. The IPCC has also concluded that atmospheric carbon dioxide equivalents (the standard measurement for greenhouse gas emissions) increased from a relatively stable 280 parts per million to over 380 parts per million over the past 150 years. According to analysis of ice cores, current concentrations are the highest on

The Greenhouse Effect

When the sun's energy reaches earth most of the energy warms the atmosphere and the earth's surface. The earth then radiates some of this energy back into space as infrared rays. Greenhouse gases in the atmosphere trap some of the infrared rays before they escape resulting in additional warming of the earth.

Burning fossil fuels, and other human activities, have increased levels of greenhouse gases in the atmosphere. This has increased the atmosphere's capacity to trap energy by accentuating the greenhouse effect and raising global temperatures.



record for the last 650,000 years. The IPCC also noted that “anthropogenic warming could lead to some impacts that are abrupt or irreversible, depending upon the rate and magnitude of the climate change... Climate change is likely to have some irreversible impacts.”

The temperature increases described by the IPCC are primarily due to fossil fuel combustion and land use changes which release increased levels of carbon dioxide, methane and nitrous oxide (greenhouse gases). These gases trap solar heat within the atmosphere, in the same way a greenhouse does, resulting in an overall rise in global temperatures.

But climate change means much more than warming. It has the potential to permanently alter life as we know it.

The IPCC says we can expect to see:

- rising sea levels, decreased snowpacks and increased glacial melting
- increased heat waves and drought occurrences, and
- increased extreme precipitation events, leading to increased flood risks.

It also concludes that, because of global warming, we face increased risks of:

- extinction for up to 30 per cent of plant and animal species, and
- decreases in global food production.

All of these impacts have the potential to devastate our quality of life. And - because of our position in the northern hemisphere - British Columbia is one of the places feeling the greatest effects from global warming.

The Problem Is Here

Many parts of British Columbia have been warming at a rate that, in some cases, is more than twice the global average. Over the last 50 - 100 years, B.C. has lost up to 50 per cent of its snow pack, and total annual precipitation has increased by about 20 per cent. At the same time, our communities have been experiencing longer summer droughts as weather patterns grow increasingly erratic. This is consistent with IPCC findings that note that global warming is greatest over land and at the highest northern latitudes.

According to the latest report on climate change prepared by Natural Resources Canada, British Columbia is already facing:

- increasingly frequent and severe water shortages, which will affect everything from agriculture to hydroelectric power generation, and will require complex trade-offs, especially in densely populated areas
- risks of land loss, resource changes and shifts in related economic, social and cultural values in coastal communities as sea levels continue to rise

“Taking refuge in the status quo...is avoiding responsibility and being generationally selfish. Every molecule of carbon dioxide released into our atmosphere by human activities matters. It hangs there for decades or even centuries, and adds to the accumulated burden of global warming on our planet.”

B.C. Speech from the Throne,
February 2008



Winter storm damage in Beacon Hill Park, Victoria.

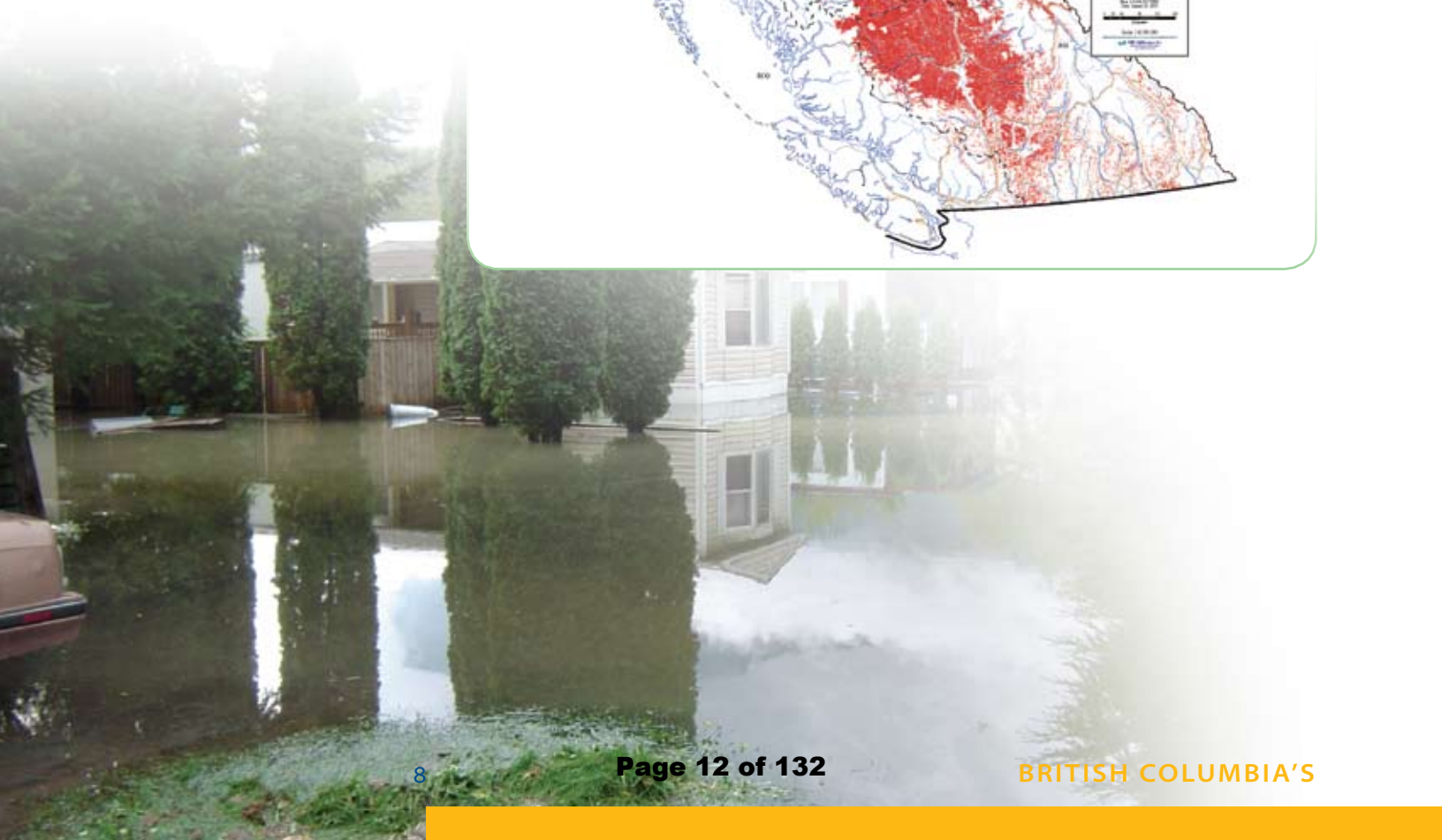
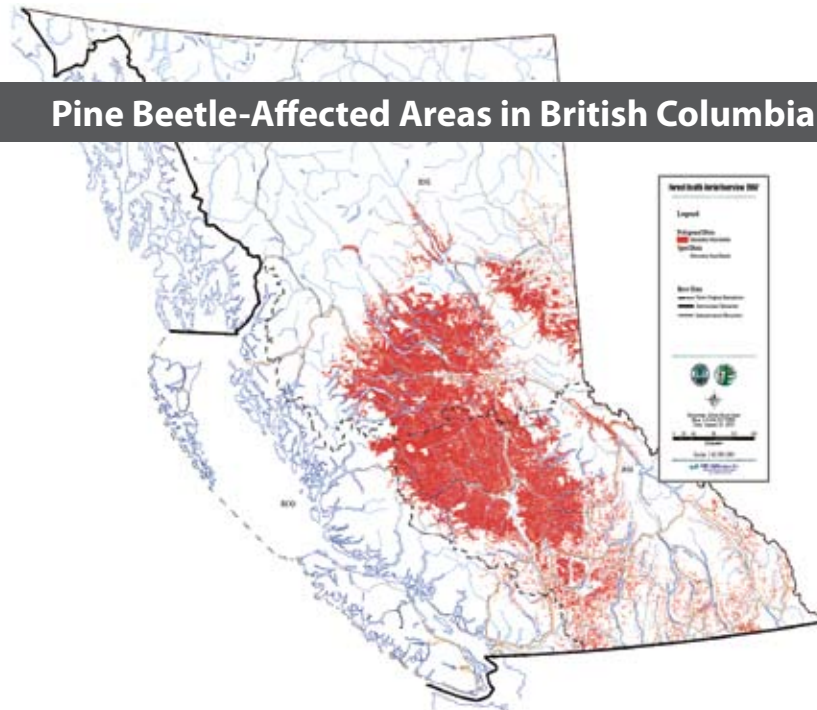


An aerial view of a British Columbia forest affected by the pine beetle epidemic.

- challenges to critical infrastructure, including pipelines and transportation networks, many of which are located in narrow valleys and vulnerable to flooding, slides, etc.
- increased stress on our forests and fisheries, and
- higher costs, including costs for insurance and post-event clean-up and restoration, associated with more extreme weather events.

Warmer winters have also contributed to the mountain pine beetle epidemic, which has destroyed more than 13 million hectares of pine forest - an area equivalent to four times the size of Vancouver Island. The beetle's numbers have historically been controlled by cold winters and warmer weather is directly linked to their devastating spread.

Pine Beetle-Affected Areas in British Columbia



Doing Nothing Is Not An Option

The scientific evidence is now overwhelming, and so is the urgent need for action. The changes already set in motion in the earth's atmosphere will affect every one of us, and the longer we wait before taking action, the higher the economic, environmental and social costs will be. In addition, as noted by the IPCC, "There is high agreement and much evidence that mitigation actions can result in near-term co-benefits (e.g. improved health due to reduced air pollution) that may offset a substantial fraction of mitigation costs."

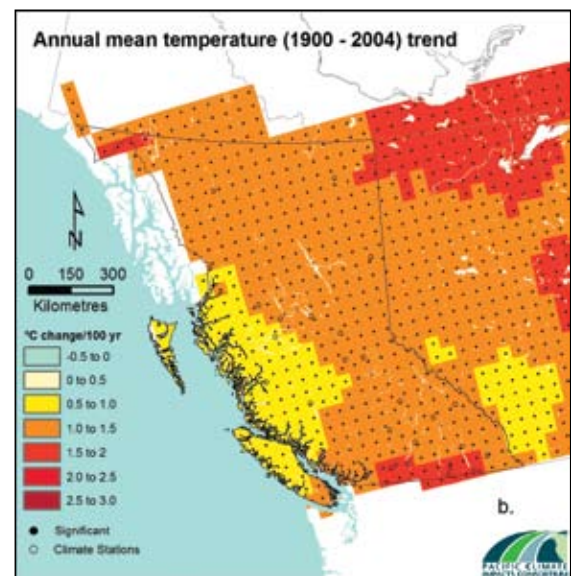
The UK government recently commissioned an independent review on the economics of climate change. The Stern Review concluded that "the benefits of strong, early action considerably outweigh the costs." The report estimated the costs of mitigating climate change at one per cent of global gross domestic product - compared to a loss of up to 20 per cent of global GDP if we do nothing.

Average Annual Temperature Increase in B.C. in the 20th Century

Global warming has its greatest impact on jurisdictions in the Northern Hemisphere, including British Columbia. The illustration above shows the change in average temperatures in B.C.'s regions in the 20th century.

The numbers may appear small, but what they show is that parts of B.C. are warming at a rate more than twice the global average of 0.6 degrees during the same period.

For more on the impacts of climate change in B.C. – including interactive maps that let you make your own projections – go to <http://www.pacificclimate.org/resources/climateimpacts/rbcmuseum/>



Key Climate Action Opportunities

- *Economic Growth*
- *Investment*
- *Innovation*
- *Job Creation*
- *Leading Edge Technologies*
- *Healthier Living*
- *Sustainable Communities*
- *Rural and Northern Development*
- *Cleaner Air*
- *Cleaner Water*
- *Clean Energy*
- *Less Waste*
- *Personal Savings*

As people everywhere start facing up to this reality, British Columbia is perfectly positioned to seize the opportunities that come along with it. We have a strong diverse economy, talented well-educated people, a thriving clean technology sector, and a growing list of eco-friendly businesses in every sector.

We have some of the world's leading climate change scientists and innovators turning their minds to new solutions. And we have incredible natural attributes that work to our advantage. If any place in the world is a natural home for low-carbon economic development, it is British Columbia.

We are ideally positioned to capture a share of the clean energy technology market. We are leaders in fuel cell technology, we generate clean hydropower, and we have world-class biomass resources from which a range of bio-products can be developed.

We also have exciting opportunities to leverage the carbon storage potential of our forests. They have always been among our greatest natural resources. Now we have incentives to explore new ways to maximize their value. For example, they could play a key role in carbon trading – a fast-growing sector of the global economy, worth an estimated \$30 billion in 2006.

If we fail to act on climate change, we will miss these opportunities. We will also see our greenhouse gas emissions continue to soar, with potentially devastating impacts on our environment and our communities. That is why B.C. has developed this Climate Action Plan. It sets the course for a prosperous, successful and sustainable future in which B.C. can compete and win in the new low-carbon economy.

"What [the B.C. government has] done here is they recognize this is the right thing to do, it's the only thing to do to address this problem and we're not going to wait for the feds or someone to do it. We're going to show leadership in North America and you watch, it's going to start to have a ripple down effect and others are going to start to join up as the years go by."

- Andrew Weaver

School of Earth and Ocean Sciences, University of Victoria

"The benefits of strong and early action far outweigh the economic costs of not acting"

The Stern Review
United Kingdom

B.C. is Ready

Imagine what it might have been like to get in on the ground floor of the home computer revolution 30 or 40 years ago. That's the kind of opportunity we have today as we witness the beginnings of a new, global low-carbon economy. Some people can't even imagine it – just as, a generation ago, most of us could never have imagined such a thing as the Internet. But low-carbon options are the way of the future, and those who pioneer them will have enormous opportunities to prosper.

That's what happened in Japan during the energy crisis of the 1970s. The country regulated the highest-ever fuel-efficiency standards for its domestic auto market. Manufacturers responded and today, they continue to own the world market for fuel-efficient vehicles.

The greenhouse gas reduction targets legislated in B.C. will help to drive similar advances here at home. In fact, B.C. is already out ahead of almost every other jurisdiction in North America in moving to a new low-carbon economy.

To accurately identify the size of the opportunity for British Columbia, the province will commission an independent academic economic impacts analysis. Such an analysis will provide our province – its government, businesses, and citizens – with the tools we need to take full advantage of all the many benefits that will be brought by this new economic opportunity.

The world market for renewable energy technology was worth more than \$50 billion in 2006 – up 33 per cent in just one year. The world carbon trading market is seeing even more dramatic growth: between 2005 and 2006, its estimated value tripled. With our people, our natural resources, and our commitment to climate action, B.C. is in an excellent position to tap into both of these markets of the future.



The B.C. Climate Action Plan **Exhibit A**

Phase One

This **Climate Action Plan – Phase One** represents the next step forward. It summarizes B.C.'s actions to date, highlights new initiatives and points the way to longer term, future initiatives. It demonstrates how our province is responding to both the challenge and the opportunities presented by global warming.

■ **British Columbia is moving to address global warming in the following four ways:**

1. The government has established firm targets for greenhouse gas reduction in our province, and enshrined these in law through the Greenhouse Gas Reduction Targets Act.
2. Specific policy measures have been applied to reduce emissions in each of our major economic sectors. This includes key legislation to introduce a revenue-neutral carbon tax, as well as to enable our province to join a regional cap and trade system, impose emissions standards on vehicles, regulate landfill gas emissions, impose a low-carbon fuel standard, and encourage green community development.
3. Strategies to assist British Columbia to adapt to the effects of climate change have been initiated.
4. A process to educate and engage the public about the effects of climate change and what we can all do to contribute to climate action has begun.

This section of the **Climate Action Plan – Phase One** focuses on the key pillars of the B.C. Climate Action Plan as they relate to the Province as a whole.

For details on sector-by-sector emission reduction strategies, see Section Two: Acting in Every Sector.

Legislated Targets

The November 2007 Greenhouse Gas Reduction Targets Act entrenched the following commitments in law:

- By 2020, B.C. will reduce its greenhouse gas emissions by 33 per cent, compared to 2007 levels. In addition, legally binding targets will be set this year for 2012 and 2016.
- By 2050, GHG emissions in the Province will be reduced by at least 80 per cent below 2007 levels.
- By 2010, the B.C. public sector will be carbon neutral. In other words, the government is setting an example and keeping its own carbon footprint as small as possible.

Key Partnerships

- An important part of British Columbia's approach to climate action is working with other governments – whether they be municipal or local, provincial, regional, or international - as partners to forward climate action goals.
- B.C. was among the first in Canada to join The Climate Registry, an international partnership working to create a common approach to measuring and reporting GHG emissions. For details, see Appendix E.
- B.C. has partnered with the states of Washington, Oregon and California in the Pacific Coast Collaborative, which includes a focus on ocean conservation. For details see Appendix D.
- B.C. is a member of the Western Climate Initiative, which is developing regional cap and trade system to help reduce emissions from industrial polluters. For details, see Appendix C.
- B.C. is also a member of the International Carbon Action Partnership, which is working to establish a global carbon market. For details see Appendix F.
- Closer to home, the Province is working with local and regional governments through a wide range of programs and partnership initiatives encouraging healthier choices and cleaner communities. For details see Appendix G.

Experts Agree

Leading economists and scientists agree that a revenue-neutral carbon tax is a critical and necessary tool in the move to reduce greenhouse gas emissions. The tax makes high-carbon choices less attractive and provides an additional incentive for people and businesses to reduce their carbon footprints.

Tax Cuts, Funded by a Revenue-Neutral Carbon Tax

- The government recently introduced legislation to implement a revenue-neutral carbon tax based on greenhouse gas emissions from fossil fuel combustion, effective July 1, 2008. This is an important tax shift. Revenue collected from the carbon tax must, by law, be recycled into the economy in the form of tax cuts. To ensure this occurs, the government is legally compelled to table an annual public plan that clearly outlines how every cent of carbon tax revenue will be balanced by a corresponding tax reduction.
- **What is a Carbon Tax?**
 - A carbon tax is usually defined as a tax based on GHG emissions generated from burning fossil fuels. It puts a price on each tonne of GHG emitted, sending a price signal that will, over time, elicit a powerful market response across the entire economy, resulting in reduced emissions. It has the advantage of providing an incentive without favouring any one way of reducing emissions over another. By reducing fuel consumption, increasing fuel efficiency, using cleaner fuels and adopting new technology, businesses and individuals can reduce the amount they pay in carbon tax, or even offset it altogether.
 - The British Columbia revenue-neutral carbon tax is based on the following principles:
 - All carbon tax revenue is recycled through tax reductions – As noted above, the government has a legal requirement to present an annual plan to the legislature demonstrating how all of the carbon tax revenue will be returned to taxpayers through tax reductions. The money is not to be used to fund government programs.
 - The tax rate starts low and increases gradually – Starting low gives individuals and businesses time to make adjustments and respects decisions made prior to the announcement of the tax. There is also certainty about the rates for the first five years.
 - Low-income individuals and families are protected – A refundable Low-Income Climate Action Tax Credit will ensure that those with lower incomes are compensated for the tax, and that most will be better off. In addition, a Climate Action Dividend cheque of \$100 will be distributed to all British Columbians starting at the end of June 2008.
 - The tax has the broadest possible base – All emissions from fossil fuel combustion in B.C. captured in Environment Canada's National Inventory Report will be taxed, with no exemptions except those required for integration with other climate action policies in the future and for efficient administration.
 - The tax will be integrated with other measures – The carbon tax will not, on its own, meet B.C.'s emission-reduction targets, but it is a key element in the strategy. To avoid unfairness and what might effectively be double

taxation, the carbon tax and complementary measures such as the “cap and trade” system will be integrated as these other measures are designed and implemented.

■ How does the tax work?

The carbon tax applies to the purchase or use of fossil fuels within the Province. The amount of GHGs emitted when a unit of fossil fuel is burned depends fundamentally on the chemical make-up of the fuel, particularly on the amount of carbon in the fuel. That fact allows for a relatively simple administrative process for applying the carbon tax.

Administratively, the carbon tax is applied and collected at the wholesale level in essentially the same way that motor fuel taxes are currently applied and collected, except marketable natural gas and propane which is collected at the retail level the same as provincial sales tax. This minimizes the cost of administration to government and the compliance cost to those collecting the tax on government's behalf.

The tax rates starting on July 1, 2008 are based on \$10 per tonne of CO₂ equivalent emissions, increasing by \$5 per tonne each year for the next four years to \$30 per tonne in 2012. Allowing this relatively long phase-in period up to the \$30 per tonne level is intended to give people and businesses time to adjust their habits and purchasing patterns, and to respect decisions taken before the tax was announced, such as vehicle purchases.

■ Revenue-Neutral Carbon Tax Plan

(\$millions)	2008/09	2009/10	2010/11
Carbon tax revenue (amount to be returned to taxpayers)	(338)	(631)	(880)
Personal Tax Cuts			
– Low income refundable tax credit *	104	145	146
– Reduce bottom two tax bracket rates by 2 per cent for 2008 and by 5 per cent for 2009 and subsequent years *	113	230	244
– Additional personal income tax rate cuts	-	40	157
Total tax cuts for individuals	217	415	547
Business Tax Cuts			
– Reduce general corporate rate to 11 per cent July 1, 2008 *	75	128	133
– Reduce general corporate rate to 10.5 per cent January 1, 2010 and to 10 per cent January 1, 2011	-	6	73
– Reduce small business corporate income tax rate to 3.5 per cent July 1, 2008 *	46	79	82
– Reduce small business corporate income tax rate to 3 per cent January 1, 2010 and to 2.5 per cent January 1, 2011	-	3	45
Total tax cuts for businesses	121	216	333
Total tax cuts	338	631	880

* Legislation introduced with Budget 2008.

With the tax cuts in Budget 2008, in 2009 British Columbia will have the lowest provincial personal income taxes for individuals up to \$111,000 in income of the provinces. Further “recycling” carbon tax revenues into income tax reductions will add to this competitive advantage in personal income tax.

Budget 2008 includes \$60 million for the first stage of LiveSmart BC – the LiveSmart Efficiency Incentive Program, which provides support to households for energy audits and building retrofits. For more on LiveSmart, see page 60.

Since different fuels generate different amounts of GHG when burned, \$10 per tonne of CO₂ equivalent must be translated into tax rates for each specific type of fuel. Table 1.2 shows the per unit rates for selected fossil fuels in 2008. For example, in 2008 the rate for gasoline will be 2.34 cents per litre. The tax rate for diesel used for road transportation will be slightly higher at 2.69 cents per litre due to the higher carbon content of the fuel while the tax on propane will be lower on a per litre basis.

Table 1.2 Selected Carbon Tax Rates by Fuel Type

	UNITS FOR TAX	TAX RATE JULY 1, 2008
Gasoline	¢/litre	2.34
Diesel	¢/litre	2.69
Jet Fuel	¢/litre	2.61
Natural gas	¢/gigajoule	49.66
Propane	¢/litre	1.54
Coal – high heat value	\$/tonne	20.77
Coal – low heat value	\$/tonne	17.77

After being phased in, further tax rate changes will depend on a number of factors including:

- Whether B.C. is meeting its emissions targets
- The expected future impact on emissions of other policies such as cap and trade and low-carbon fuel standards
- The actions taken by other governments to reduce their GHG emissions and to set a price on carbon, and
- The advice of the Climate Action Team.

What effect will the carbon tax have on British Columbians?

The main impacts of the carbon tax for individuals are related to transportation and heating costs. However, it is important to note that for individuals and businesses the tax is revenue-neutral. Additional costs paid in the form of the carbon tax will be offset on aggregate by reductions in income tax. A one-time \$100 Climate Action Dividend will be paid to all British Columbians as well.

For those who use private vehicles for transportation, the impact will depend on four factors; distance driven, fuel efficiency of the vehicles, the type of fuel used, and driving habits. All of these can be adjusted over time to reduce the impact of the tax. For example, in the near term, trips can be combined to reduce kilometres driven. In the first two years, most people driving a typical car or truck 20- or 30,000 kilometres a year can offset the cost of the carbon tax altogether by saving the equivalent of one tank of gas.

The amount of carbon tax associated with heating and cooling of residential buildings and domestic hot water depend on the type of energy used, the energy

efficiency of the equipment, the outside temperature, the level at which the thermostat is set and the energy efficiency of the building.

The table below shows the impact of the carbon tax and associated tax cuts in 2008 and 2009 on a variety of family types. It demonstrates how tax cuts will typically exceed the costs of the carbon tax.

Table 1.3 Carbon Tax and Tax Cuts*

NET SAVINGS		
1. Family of four: \$90,000 income (one spouse earning \$50,000 the other \$40,000)	2008	2009
One-time Climate Action Dividend	400	-
Personal income tax cut	85	224
Van: 10 l/100km fuel efficiency driving 20,000 km/year	-24	-59
Sedan: 9 l/100km driving 15,000 km/year	-16	-40
Natural gas for heat and hot water (102.6 GJ in Lower Mainland)	-26	-64
Annual Savings (\$)	419	61
2. Family of four with boat: \$120,000 income (both spouses earning \$60,000)	2008	2009
One-time Climate Action Dividend	400	-
Personal income tax cut	136	358
Sedan: 9 l/100km driving 20,000 km/year	-21	-53
SUV: 12 l/100km fuel efficiency driving 30,000 km/year	-42	-105
Runabout (water skiing 3 hours per week for 8 weeks @ 30 litres per hour)	-9	-21
Natural gas for heat and hot water (80.3 GJ in Inland interior)	-20	-50
Annual Savings (\$)	444	129
3. Family of four: \$70,000 income (one earner)	2008	2009
One-time Climate Action Dividend	400	-
Personal income tax cut	85	201
Pickup truck: 12 l/100km fuel efficiency driving 20,000 km/year	-28	-70
Sedan: 9 l/100km driving 21,000 km/year	-22	-55
Propane for heat and hot water (58 GJ in Revelstoke)	-18	-44
Annual Savings (\$)	417	32
4. Single income family of four: \$80,000 income	2008	2009
One-time Climate Action Dividend	400	-
Personal income tax cut	85	224
Pickup truck: 14 l/100km fuel efficiency driving 20,000 km/year	-33	-82
Sedan: 9 l/100km driving 20,000 km/year	-21	-53
Natural gas for heat and hot water (142 GJ in Fort Nelson)	-35	-88
Annual Savings (\$)	396	1

Climate Action Dividend

A one time, tax-free Climate Action Dividend cheque of \$400/family of four (or \$100 per British Columbian) will be distributed starting at the end of June 2008. As part of Budget 2008, this money will make it easier for British Columbians to choose a low carbon lifestyle.

For example, British Columbians could choose to use their Climate Action Dividend to purchase energy efficient products (like CFC lightbulbs), conduct a home energy audit, or assist with public transit or alternative transit needs (cycling, walking etc.).

NET SAVINGS		
5. Two earner family of four: \$60,000 income	2008	2009
One-time Climate Action Dividend	400	-
Personal income tax cut	45	118
Van: 10 l/100km driving 20,000 km/year	-24	-59
Natural gas for heat and hot water (84 GJ East Kootenays)	-21	-53
Annual Savings (\$)	400	6
6. Single parent with one child: \$30,000 income	2008	2009
One-time Climate Action Dividend	200	-
Personal income tax cut	13	33
Low income climate action credit	100	205
Older vehicle: 12 l/100km fuel efficiency driving 20,000 km/year	-28	-42
Electric heat and hot water	0	0
Annual Savings (\$)	285	196
7. Senior couple: \$30,000 income (equal pension incomes)	2008	2009
One-time Climate Action Dividend	200	-
Personal income tax cut	0	0
Low income climate action credit	100	205
Older vehicle: 12 l/100km fuel efficiency driving 7,000 km/year	-10	-25
Oil furnace (2,000 litres) and electric hot water tank	-27	-68
Annual Savings (\$)	263	112
8. Single Senior: \$30,000 income	2008	2009
One-time Climate Action Dividend	100	-
Personal income tax cut	16	43
Low income climate action credit	50	103
Older vehicle: 12 l/100km fuel efficiency driving 7,000 km/year	-21	-53
Oil furnace (2,000 litres) and electric hot water tank	-27	-68
Annual Savings (\$)	118	25
9. Single Individual under age 65: \$40,000 income	2008	2009
One-time Climate Action Dividend	100	-
Personal income tax cut	34	90
Sedan: 9 l/100km driving 20,000 km/year	-21	-53
Electric heat and hot water	0	0
Annual Savings (\$)	113	37

NET SAVINGS		
10. Single Individual under age 65: \$80,000 income	2008	2009
One-time Climate Action Dividend	100	-
Personal income tax cut	85	224
Sedan: 9 l/100km driving 12,000 km/year	-13	-32
Electric heat and hot water	0	0
Annual Savings (\$)	172	192

* Carbon tax is \$10 per tonne of CO₂e emissions effective July 1, 2008 and increases to \$15 per tonne effective July 1, 2009.

Carbon tax rates have been adjusted slightly from those used in the Budget 2008 announcement to reflect revised Statistic Canada CO₂e emission factors released in May 2008.

Natural gas and propane consumption are 2007 estimates of actual use from Terasen Gas and Pacific Northern Gas except in the case of the two-earner family of four with \$60,000 which is based on typical heating use examples from Terasen's website.

The relative impact the carbon tax has on British Columbians living in different regions of the Province is subject to many variables, depending on circumstances. However, it is important to note that on average, residents in the lower mainland commute further than residents in all other areas of the Province. Commuting in traffic is also less efficient, so more fuel is used per kilometre in the Lower Mainland than elsewhere in the province because of idling and traffic congestion. Finally, homes that are heated with natural gas will be subject to the carbon tax, while those using electricity will not. Residents of the Lower Mainland use more natural gas per household than most other regions of the province.

▣ What effect will the carbon tax have on business?

Every business or other organization that purchases or uses fossil fuel for combustion in British Columbia will be subject to the carbon tax. The main uses of the fuel are for transportation, heating of buildings and providing heat for industrial processes.

As with individuals, businesses will have choices to make about their fuel usage that will affect the amount of tax that they will pay. The low initial tax rate is not expected to significantly affect the business community and the five year phase-in will allow time for business to adjust. The Province hopes that other jurisdictions will also put effective mechanisms in place that put a reasonable price on GHG emissions. In any case, carbon tax revenue will be recycled to business, initially through significant corporation income tax reductions mitigating the net impact on the business community.

▣ What effect will the carbon tax have on GHG emissions?

According to the *IPCC 4th Assessment - Synthesis Report*, "an effective carbon-price signal could realize significant mitigation potential in all sectors." A preliminary estimate by an independent consulting company (MK Jaccard and Associates) suggests that in absence of all other GHG reduction strategies, the carbon tax

alone could cause a reduction in B.C.'s emissions in 2020 by up to three million tonnes of CO₂ equivalent annually. This is roughly the equivalent to the greenhouse gas emissions created by 787,000 cars per year. See Charting our Progress for more information on GHG reduction estimates.

Carbon Trading

The development of carbon (or emissions) trading is an excellent example of the kinds of opportunities currently emerging as governments, industries and businesses worldwide move to reduce their greenhouse gas emissions. The sector was valued at approximately \$10 billion in 2005. That increased to \$30 billion in 2006, and this explosive rate of growth is expected to continue.

British Columbia is working with partners in the Western Climate Initiative (WCI) to develop a regional cap and trade system that will help reduce emissions in B.C. and ensure that the Province can compete in this new carbon trading marketplace. British Columbia is working hard with its WCI partners to ensure that this system has a high degree of environmental integrity and helps develop opportunities for British Columbia in emissions trading. The Province is engaging regularly with all stakeholders in the development of this system, and the work of all WCI subcommittees is available for public review on the WCI website at www.westernclimateinitiative.org.

■ How does a Cap and Trade System Work?

A cap and trade system (also called a carbon trading or emission trading system) is an administrative approach that uses the market principles of supply and demand to reduce greenhouse gas emissions.

The goal of implementing a cap and trade system is to reduce emissions by setting a cap on the total amount of emissions for emitters and lowering the cap over time with the aim of achieving an overall reduction target. Emitters that are required to participate in the system, be they large industrial emitters or other groups, are issued emission allowances (also called credits) that are equivalent to the amount of emissions permitted by the cap.

The total number of emission allowances distributed must not exceed the cap, thus keeping the amount of emissions to that level. If an emitter exceeds the amount of emissions represented by their allowances, they must purchase additional allowances from other emitters (this transaction is referred to as a trade). Conversely, if an emitter is able to reduce its emissions and does not need all of its allowances, it will be able to sell the excess allowances for a profit. As an alternative way of complying with the cap, emitters may also be permitted to offset a portion of their emissions by investing in emissions-reducing projects (more on offsets below).

Essentially, emitters that reduce their emissions are rewarded and emitters that continue to emit beyond permitted levels must pay. In this way, a cap and trade system achieves an overall emissions reduction at the lowest possible cost to society by providing an incentive for those emitters that can most cost-effectively reduce their emissions to take action.

Cap and trade systems are market-based mechanisms that use free market principles to achieve an emissions reduction. Because emitters will likely choose the cheapest way to reduce their emissions, the cost of reductions will be reduced as incentives are created. British Columbia will ensure that any cap and trade system introduced in our province will be integrated with the carbon tax and avoid any form of “double taxation.”

A proven track record

Emissions trading systems have a proven track record in the European Union. They form a key element of climate action strategies for the Western Climate Initiative and the Regional Greenhouse Gas Initiative in the northeastern United States.

■ What are carbon offsets?

A carbon (or emission) offset is a greenhouse gas emissions reduction tool an emitter can use to compensate for its own emissions. Offsets are measured in terms of carbon dioxide equivalency and so can represent a reduction in greenhouse gases other than just carbon dioxide.

Offsets represent the net reduction in emissions that occurs when a company or other organization invests money in emissions-reducing (offset) projects. In a cap and trade system, emitters invest in the offset projects by purchasing offset credits in an effort to comply with the cap. In effect, the emitter is compensating for its own emissions by funding another organization’s efforts to reduce emissions. Outside of a cap and trade system or other compliance system, individuals, companies or other organizations can voluntarily purchase offsets to compensate for their own emissions from activities such as those related to transportation or electricity use.

Common offset projects include renewable energy, such as biomass or wind energy. Other common focuses include energy efficiency, afforestation, or the destruction of industrial or agricultural pollutants. One of the key determinants of credible offsets is whether or not the activity is incremental; that is, would not have occurred without the offset investment. Offsets can also be assessed based on whether or not their estimated greenhouse gas reductions are monitored and independently verified to have actually occurred.

Although existing offset systems differ, there are some internationally recognized criteria common to offsets.

Recognized offsets are generally:

- 1) Real - they must result in an absolute net reduction in greenhouse gases.*
- 2) Quantifiable - they must be measured in a way that documents the difference between the emissions that would have occurred in the absence of the offset project and those achieved with the project.*
- 3) Additional - they must result in more greenhouse gas reduction than would have occurred in the absence of an offset system.*

The B.C. Climate Action Team is providing expert guidance as the government moves forward to address climate change. The team is made up of 22 expert advisors, including nine world leaders in the climate sciences. For more on the team, see Appendix B.

As carbon trading develops in North America, new opportunities will be created for British Columbians to develop offset projects in our province. Our abundant natural resources, including the enormous carbon sequestration possibilities presented by our forests and alternative energy potential, will stand us in good stead in this new low-carbon economy.

A Carbon-Neutral Public Sector

The B.C. government is setting an example and working to ensure that all its operations are carbon neutral by 2010. This commitment - enshrined in legislation - is the first of its kind in North America. It applies to all provincial public sector operations, including government ministries and agencies, schools, colleges, universities, health authorities and crown corporations.

As part of this commitment, everyone who works for the Province will be required to:

- **Report** their baseline greenhouse gas emissions – the amount they produce in a “business as usual” scenario;
- **Reduce** these emissions as much as possible; for example, government travel will be replaced with teleconferencing wherever feasible; and
- **Offset** the remaining emissions. Offsetting means investing in projects that reduce greenhouse gas emissions, so the net effect of our activities is carbon neutral.

All public sector organizations will also be required to publicly report on their emissions levels, actions they have taken to reduce these levels, and their plans for continuing to minimize emissions. No other government in North America has made this commitment.

The new requirements apply to provincial ministries and agencies, members of the legislative assembly, schools, colleges, universities, health authorities, Crown corporations and other public sector organizations. All must be carbon neutral by 2010. Core government business travel has also been carbon neutral since October 2007.

Budget 2008 includes more than \$100 million to support this work. Most of the funding will support energy efficiency upgrades to public buildings. In addition, \$15 million has been allotted for developing advanced communication tools that reduce the need for government travel.

The government also has a range of programs and initiatives in place to help public sector employees to make cleaner choices. These include a requirement that all new provincially-owned or leased buildings will be built to a minimum of LEED Gold or equivalent criteria. LEED is the recognized standard in environmentally friendly building design.

PACIFIC CARBON TRUST

The Pacific Carbon Trust is a new provincial Crown corporation that will offer carbon offsets meeting high standards of environmental integrity. Budget 2008 provides \$24 million to invest in GHG-reduction projects in B.C.

The initial mandate of the trust is to offer credible, low-cost offsets to meet public sector demand for offsets necessary to meet its targets for a carbon-neutral public sector. Once up and running, the trust may also sell offsets to individuals and many B.C. businesses.

Concern about climate change and the environment has given rise to new ways of gauging the costs of products and services. For example:

- *Life-cycle costing assesses the full range of costs to the environment – from the production of raw materials through manufacturing, distribution, use and disposal. This allows for meaningful comparisons and supports improvements in business practices. For example, some wineries have begun using Tetra Paks instead of bottles to reduce both their packaging waste and transportation impacts.*
- *"Cradle-to-cradle" costing assesses the total cost of owning a product or asset over its lifecycle. This includes the costs of maintenance, operation and disposal in addition to the up-front capital cost. Costing products in this way ensures decisions are not made on the basis of short-term costs and benefits.*

GREEN PURCHASING POLICY

Government is a major purchaser of goods and services throughout B.C. That means it has the potential to significantly influence local economies and stimulate demand for lower-emission and energy-saving technologies, products and services. Budget 2008 includes \$2 million to develop a new low-carbon purchasing policy with, for example, a new emphasis on products that are designed to avoid waste as much as possible.

THE PUBLIC SECTOR ENERGY CONSERVATION AGREEMENT

The government and BC Hydro have also entered a comprehensive agreement to significantly increase energy conservation and expand the use of alternative-energy options across the 6,500 public sector buildings in British Columbia, including Crown corporations, education and health-care facilities, office buildings, social housing and other government operations. The agreement is based on three pillars:

1. Aggressive conservation targets
2. Enhanced energy assessment, portfolio audits and employee engagement, and
3. Accelerated alternative energy innovation

See Appendix K for text of the entire agreement.

B.C.'s Greenhouse Gas Reduction Targets Act commits all provincial ministries, health authorities, school districts, colleges, universities, Crown corporations and other government agencies to be carbon neutral by 2010. B.C. is the first jurisdiction in North America to make this commitment.



Site of the Whistler Sliding Centre – part of British Columbia's sustainable Olympic Games.

The 2010 Winter Olympic and Paralympic Games A Showcase for Sustainability

All eyes will be on B.C. in 2010 when we host the Winter Olympic and Paralympic Games. For the Vancouver Organizing Committee (VANOC), sustainability means managing the social, economic and environmental impacts and opportunities of our games to produce lasting benefits, locally and globally.

New buildings have been specially designed to conserve energy, water and materials, minimize waste, maximize air quality, and protect surrounding areas.

Existing venues are being upgraded to showcase energy conservation and efficiency and demonstrate alternative heating and cooling technologies. For example, the refrigeration plant at the Whistler Sliding Centre will capture waste heat from the cooling process and transfer it to other buildings on site – reducing overall energy demand.

Overall, the games will be carbon neutral, using carbon trading to offset any emissions produced during construction or staging.



Legislated targets, the revenue-neutral carbon tax, an emissions trading system, a carbon-neutral public sector, and partnerships with other jurisdictions will all play a key role in helping to reduce B.C.'s greenhouse gas emissions. At the same time, the government is taking focused action to support reductions in each of the Province's major economic sectors.

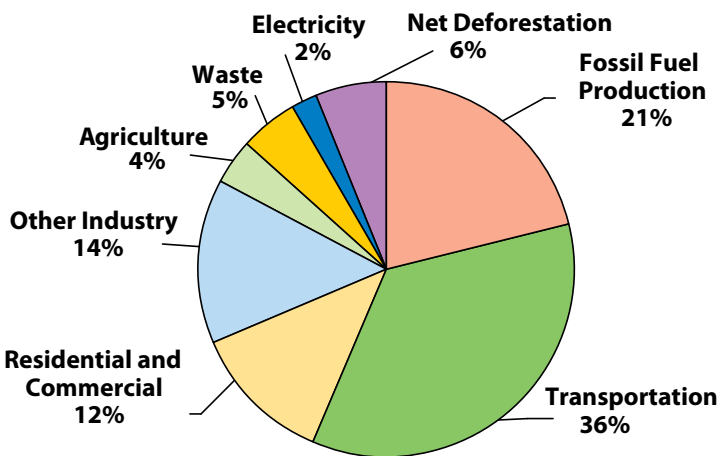
This is important for two reasons. First, it allows us to focus attention on the needs and particular realities of various industries, businesses and contributors to our economy. Second, it prevents overlap and duplication and is consistent with the categories used by Environment Canada to collect and report information on greenhouse gas emissions.

As shown in the pie chart below, transportation is the leading contributor to GHG emissions, followed by fossil fuel production, other industry, and residential and commercial use of energy for such things as space heating, water heating and operating equipment and appliances.

The measures included in this **Climate Action Plan – Phase One** are expected to achieve about three-quarters of the greenhouse gas reductions B.C. intends to make by 2020. The expert Climate Action Team will recommend additional strategies and measures to make up the difference.

For details on GHG measurements and estimates, see Section Three. For a list of members of the Climate Action Team, see Appendix B.

B.C. Greenhouse Gas Emissions (2006)



Acting in Every Sector: Transportation

Did you know? Letting an engine idle for just 10 minutes a day creates a quarter of a tonne of GHG emissions a year, as well as wasting approximately \$70 in fuel.

– Climate Action Network
Canada, 2007

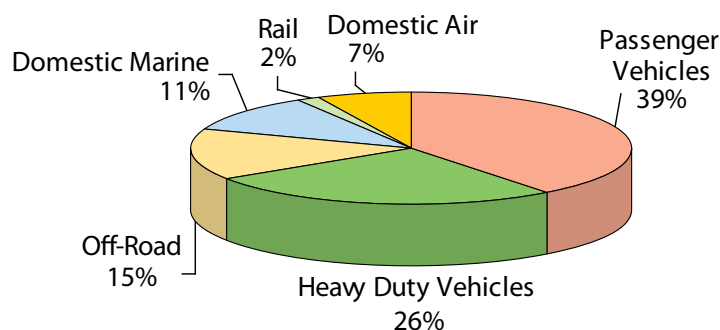
Transportation is the leading contributor to B.C.'s greenhouse gas emissions, accounting for approximately 36 per cent of the total in 2006. Transportation is also the single largest source of personal GHG emissions, accounting for about 58 per cent of average household emissions.

Clearly, we cannot just give up our cars and the other transportation systems we rely on. But there are three basic types of action we can take to reduce emissions from transportation:

- Improve the efficiency of the vehicles we drive
- Reduce the carbon content in the fuels we use
- Decrease the number of kilometres driven

This Climate Action Plan uses all three of these approaches to set us on the road to cleaner transportation.

B.C. Transportation Greenhouse Gas Emissions (2006)



The introduction of tailpipe standards in B.C. is expected to reduce personal vehicle GHG emissions by 30 per cent compared to most 2005 models. That will eliminate nearly a million tonnes of greenhouse gas emissions annually – an equivalent to taking approximately 233,000 passenger vehicles off the road by 2016.

Transportation: Key Actions

Strategies to improve the efficiency of the vehicles we drive

TAILPIPE EMISSION STANDARDS

The Greenhouse Gas Reduction (Vehicle Emissions Standards) Act puts into law the 2008 throne speech commitment to set vehicle greenhouse gas (GHG) emission standards equivalent to those laid out in California's 2004 regulation. These standards will assist British Columbia to achieve important emission reductions related to personal vehicles.

Seventeen U.S. states have adopted or are in the process of adopting the California model, while six others are actively considering it. Twelve out of Canada's 13 provinces and territories support California tailpipe greenhouse gas

standards, with Quebec now in the process of making final revisions to its draft regulations. Together, these states and provinces have a combined population of 176 million and represent nearly half of all new car sales in the U.S. and Canada.

Under the Act, automakers' fleets of family vehicles will not be allowed to exceed predetermined fleet-average GHG emission standards. The "fleet-average" approach will allow manufacturers to keep selling vehicles that exceed the allowed emissions – provided they sell enough low-emission vehicles for their fleets to meet the new average standards. This approach ensures that consumers will continue to have the choice of the full range of vehicles available today.

The Act also provides B.C. with authority to require larger vehicle manufacturers to include a percentage (or set number) of zero-emission vehicles in their fleets per year. This requirement will be based on California's approach, and will target both GHG emissions and air pollutants. The Greenhouse Gas Reduction (Vehicle Emissions Standards) Act provides authority to establish additional elements of the California regime by regulation. The tailpipe GHG emission standards under this Act will come into effect when California starts to implement its regulations.

Air Care and CO2

Since 1992, the AirCare program has been successful at reducing smog-forming emissions produced by the cars and trucks we drive. AirCare has recently begun providing Lower Fraser Valley motorists and residents with important CO2 information on inspection reports and through AirCare's website.

AirCare Vehicle Inspection Reports will now provide a section that calculates vehicles' annual CO2 production. CO2, or carbon dioxide, is a normal result of the combustion of transportation fuels and the main greenhouse gas (GHG) produced by human activity. In addition, AirCare's website has been updated with a CO2 calculator that allows motorists to compare the fuel consumption and GHG emissions produced by their vehicle against a cross section of other vehicles, as well as practical tips on how to reduce vehicle emissions. See www.aircare.ca

What are the key benefits of tailpipe emission standards?

- Tailpipe emission standards are an effective way of reducing greenhouse gas emissions associated with personal vehicles by encouraging manufacturers to sell a more fuel-efficient fleet of vehicles in British Columbia. This in turn will lead to less money being spent on fuel in our province.
- These standards also preserve consumer choice by imposing emissions standards on the manufacturers to apply to the overall fleet; as a result, consumers are still able to purchase any type of vehicle they want, regardless of fuel efficiency.



Budget 2008 includes more than \$1 billion for a broad range of climate action programs and tax incentives to encourage cleaner choices. This includes the first phase of funding for the \$14-billion Provincial Transit Plan.

The average BC motorist can expect to save \$485.00/year on fuel costs in vehicles meeting the 2016 California standard compared to meeting the current standards. This will result in over \$100,000,000 in total fuel savings across B.C. by 2016 – money that will be re-invested back in to the economy.

- Although the proposed standards for 2016 could be met using existing technologies already in use, the standards also have the effect of providing additional incentives to car manufacturers to develop ever-increasingly fuel-efficient vehicles and bringing them to market. This will result in a more competitive, efficient vehicle fleet that produced lower greenhouse gas emissions in our province.

■ Expansion of the Vehicle Scrapping Program – “Scrap-It”

The Province is investing \$15 million to enhance and expand the successful Scrap-It program across British Columbia, giving people real incentives to take old automobiles with higher greenhouse gas emissions off the road. This will help improve air quality and reduce greenhouse gas emissions across the Province by getting some of the most polluting vehicles off the road. Scrap-It is a voluntary program that provides incentives to help British Columbians to trade in pre-1995, high-polluting vehicles for cleaner kinds of transportation with lower emissions.

The Scrap-It program was previously available only in the Lower Mainland. This new investment means the program will be expanded across the Province and redesigned to put a greater emphasis on reducing CO₂ from older vehicles.

The \$15 million in additional funding will go towards increasing the largest incentives up to \$2,250, which would apply to the choices with the largest GHG reduction, such as a hybrid car or transit passes. A base incentive of \$750 would apply to choices with low GHG-reduction benefits, and a new middle level incentive of \$1,250 will be created. To qualify for the program, the vehicle to be “scrapped” must be a 1995 or older model, have been insured for the past year, and be driven to the collection point under its own power.

Why Scrap-It?

The Scrap-It Program gives the owners of older (pre 1995) vehicles more reasons to switch to cleaner transportation alternatives. Along with the knowledge that you’ve done something good for the environment, the program offers a range of incentives, including:

- *\$750 to purchase a 1998 or newer vehicle with medium GHG emissions*
- *\$1250 to purchase a 1998 or newer vehicle with low GHG emissions*
- *up to \$2250 to purchase a zero or very low GHG emissions vehicle or vehicle alternative (such as transit passes)*

Funding provided in Budget 2008 will allow the program, which currently operates only in the Lower Mainland, to expand provincewide.

It's expected the program will "scrap" between 10,000-20,000 older vehicles over the next three years. If an average of three tonnes a year of CO₂ is secured from 15,000 "scrapped" vehicles for a three-year remaining life, it would reduce CO₂ emissions in B.C. by an estimated 135,000 tonnes.

Since its inception, the Scrap-It program has taken 6,510 vehicles off the road, and 5,951 incentives have been claimed. Of the incentives chosen, 2,920 have been transit passes, 2,060 have been claimed for the new vehicle incentive, and 641 have been claims for the used vehicle incentive. The remaining 330 claims split the bicycle, West Coast Express, car sharing and van pooling incentives.

Vehicles taken off the road through Scrap-It will be recycled with minimal environmental impact by recognized auto recyclers.

Program partners include the New Car Dealers Association of BC, the Ministry of Environment, Environment Canada, and participating new car dealers.

▣ **Hybrid vehicles in government**

- Since 2006, the Province has worked to ensure that new vehicles purchased or leased by government use hybrid technology.
- The government currently has 584 hybrid vehicles in its fleet – the largest such fleet in Canada. By helping to support the market for hybrids, the B.C. government is encouraging this highly-efficient technology and setting an example for business and individuals.

▣ **PST exemption for hybrid and fuel-efficient vehicles**

Encouraging alternatives to inefficient forms of transportation that contribute substantially to provincial greenhouse gas emissions is a key component of any climate action plan.

- The Province has waived the Provincial Sales Tax on hybrid vehicles since 2002, saving buyers up to \$2,000.
- A similar sales tax exemption is now also in place for alternative-fuel vehicles, saving buyers up to \$2,000. All vehicles that qualify for the federal government's Eco-Auto Rebate will also be GST exempt until the end of 2008. With the two programs combined, British Columbians could save up to \$4,000 on the purchase of a fuel-efficient vehicle.

The PST exemption has also been extended to include other environmentally friendly forms of transportation, including electric-assisted bicycles, scooters and electric motorcycles.

The B.C. government operates the largest hybrid vehicle fleet in North America. Setting an example in this area is part of the Province's commitment to a carbon-neutral public sector by 2010.



■ Cleaner buses and trucks

- In 2007, the Province announced \$50 million for the purchase of new, cleaner transit buses provincially.
- A further \$10.6 million has been provided to school districts to invest in clean-energy school buses.
- Regulations introduced in 2007 require retrofits of all heavy-duty diesel trucks made between 1989 and 1993. Diesel oxidation catalyst filters must be installed on these trucks by 2009. B.C. has also invested \$500,000 in Green Fleets BC, a partnership initiative led by the Fraser Basin Council to help reduce emissions from vehicle fleets of all kinds.

■ Low-carbon fuel standard

British Columbia passed enabling legislation to adopt a low-carbon fuel standard in 2008 through The Greenhouse Gas Reduction (Renewable and Low Carbon Fuel Requirements) Act. Fuel distributors will be required to measure the average global warming intensity of their products and reduce it over time.

Intensity is measured on a lifecycle or well-to-wheels approach. It takes into account all emission-creating activities related to the use and production of the fuel, including land-use changes that result from biofuel production.

B.C. is targeting at least a 10 per cent reduction in the average carbon intensity of transportation fuels by 2020.

Industry will determine how best to meet the standard. There are many possible paths for compliance, including biofuels, electricity, hybrid vehicles, flex-fuel vehicles and fuel cells. Carbon intensity can also be reduced at refineries, through actions that improve efficiency and reduce on site greenhouse gas emissions.

The lifecycle approach will encourage the development of biofuels with lower upstream emissions. These include ethanol from agricultural wastes, forest residues and perennial grasses. This initiative is also supported by the Province's new Bioenergy Strategy.



Harnessing Market Forces to Combat Climate Change

A low-carbon fuel standard is a good example of a market-based approach to climate action. It provides choice for consumers and promotes competition on the basis of greenhouse gas emissions.

The policy is fuel- and technology-neutral, allowing market forces to encourage innovation. Because market prices, production and demand will adjust in response, the new standard will also largely eliminate the need for subsidies to industry or consumers.

■ Support for hydrogen and fuel cell technology development

- B.C. has invested over \$3 million in this area since 2002.
- In total, more than \$110 million for hydrogen and fuel cell technology has been announced in British Columbia.
- The Province is a recognized world centre for hydrogen and fuel cell technology.
- The Hydrogen Highway, from B.C. to Baja California, announced in 2005, is a large-scale, co-ordinated demonstration and deployment program for hydrogen and fuel cell technologies.
- The program is a partnership among industry, government, academic institutions and others in British Columbia, California and hopefully, other Pacific coast states.
- The initiative will include a fleet of 20 new BC Transit fuel-cell buses based in Whistler by 2009.

■ \$14 Billion Dollar Provincial Transit Plan

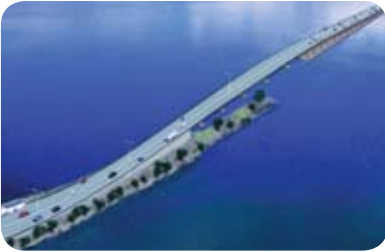
The Government of British Columbia is making substantial investments into innovative transit options for the benefit of all British Columbians now and into the future. By 2020, the plan calls for the provincial government and its federal and local government partners to commit \$14 billion to significantly expand transit in communities across the Province and to double transit ridership.

Successful implementation of the Provincial Transit Plan requires the co-operation and commitment of our partners. Of the \$11.1 billion in new funding, the Province is committing up to \$4.75 billion and is calling on the federal government for \$3.1 billion, TransLink for \$2.75 billion and local governments for \$500 million, along with supportive land use decisions. The plan involves investments by 2020 of:

- \$10.3 billion for four new and updated rapid transit lines serving communities across Metro Vancouver—the Canada Line, the Evergreen Line, the UBC Line and the upgraded and expanded Expo Line
- \$1.2 billion for new RapidBus BC lines—energy-efficient, high-capacity buses on nine major routes in the high-growth urban centres of Kelowna, Victoria and Metro Vancouver. This will provide frequent, fast, reliable service with the look and feel of rapid transit and, in some cases, operating on dedicated laneways
- \$1.6 billion for new, clean-technology buses to bolster the provincial fleet and provide communities with more frequent service to meet the needs of transit users



The Hydrogen Highway project will accelerate the demonstration and commercialization of hydrogen and fuel cell technologies. Hydrogen fuel cell-powered vehicles produce no smog-creating or greenhouse gas emissions, and can be twice as efficient as internal combustion engines.



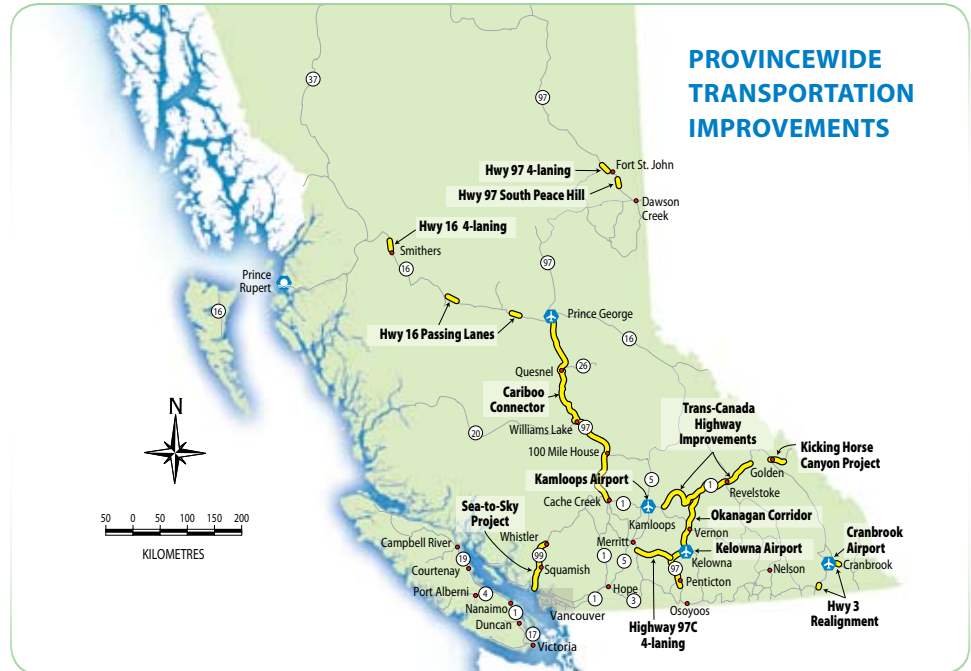
William R. Bennett Bridge, Kelowna



Park Bridge, Kicking Horse Canyon



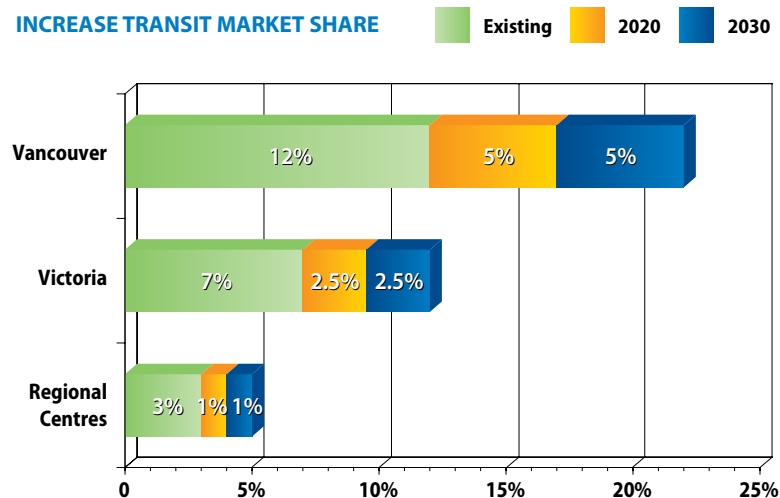
Simon Fraser Bridge, Prince George



The Provincial Transit Plan is designed to:

- Increase transit ridership across the Province to over 400 million trips a year
- Attract to transit a market share of 17 per cent in Metro Vancouver by 2020, laying the foundation to attract 22 per cent by 2030
- Reduce greenhouse gas (GHG) emissions and other air contaminants from cars by 4.7 million tonnes cumulatively by 2020
- Support increased population and employment densities near transit hubs and along transit corridors. This change in urban form will, in turn, increase transit use and further decrease GHG emissions.

INCREASE TRANSIT MARKET SHARE



The Gateway Program

- The Gateway Program was established by the Province of British Columbia in response to the impact of growing regional congestion, and to improve the movement of people, goods and transit throughout Greater Vancouver. Gateway roads and bridge improvements are proposed to complement other regional road and transit improvements already planned or underway. (See www.translink.bc.ca) In addition to helping reduce congestion and associated GHGs from idling vehicles, the program includes \$50 million for cycling and pedestrian paths in the Lower Mainland. This infrastructure will provide low-carbon transportation alternatives for many commuters and encourage active living.

The goals for the Gateway Program are to:

- Reduce congestion;
- Improve the movement of people and goods in and through the region;
- Improve access to key economic gateways through improved links between ports, industrial areas, railways, the airport and border crossings;
- Improve safety and reliability;
- Improve the region's road network;
- Improve quality of life in communities by keeping regional traffic on regional roads instead of local streets;
- Reduce vehicle emissions by reducing congestion-related idling;
- Facilitate better connections to buses and SkyTrain, cycling and pedestrian networks; and
- Reduce travel times along and across the Fraser River during peak periods.

▣ Cycling infrastructure partnerships

- Since 2006, the Province has worked in partnership with communities to support the development of new cycling infrastructure. Every municipality and regional district in the Province is eligible for up to \$250,000 in matching funds to promote transportation cycling – cycling to work, school or errands – to reduce traffic congestion and cut greenhouse gas emissions.
- As a matter of policy, the Province also makes provision for cyclists on all new and upgraded provincial highways. This work is guided in part by the Provincial Advisory Cycling Committee, which brings together groups from both the public and private sectors to address the needs and concerns of cyclists in British Columbia.



The new Provincial Transit Plan is designed to double transit ridership province-wide by 2020.



■ LocalMotion

- In 2006, the Province established a \$40-million LocalMotion fund to accelerate development of capital projects that make communities greener and healthier. The program provides matching funds to local governments investing in projects that encourage active, healthy and environmentally friendly living.
- Specifically, the program supports projects that reduce greenhouse gas emissions by getting people out of their cars, encourage physical activity, and help ensure that communities meet the needs of seniors and people with disabilities.
- LocalMotion has funded dozens of projects around B.C., including the restoration of the historic Kinsol Trestle on Vancouver Island to make it safe for pedestrians and cyclists. Other projects include an indoor running track in Dawson Creek, a “rails to trails” pathway in Kelowna, a destination playground park in Salmon Arm, a hiking and mountain biking trail in North Vancouver, and a pedestrian/cyclist pathway in Nelson.
- In 2007, 26 communities received a total of \$17.3 million from LocalMotion to build bicycle paths, trails and walkways, support community playgrounds and improve accessibility for people with disabilities.

■ Reducing emissions from heavy-duty commercial vehicles and ports

Budget 2008 provides \$30 million over three years for the BC Green Ports initiative, designed to reduce emissions from commercial trucks – and to fund port electrification, allowing ships to turn off their engines while in port.

A further \$3 million will support a new Green Lights Transportation Program. It will use technology to assess commercial vehicles for compliance with trucking regulations while they’re moving – so they don’t have to pull over and idle while they wait for inspections.

■ Truck stop electrification

As part of the plan to reduce emissions from heavy-duty trucks, the Province is supporting the development of plug-ins at key truck stops around B.C. This will help to further reduce GHG emissions from idling diesel engines. Funding for this pilot project is included in Budget 2008.

Building on the pilot project funded in Budget 2008, the Province will work to expand the initiative allowing heavy-duty trucks to plug in to electrical outlets instead of idling their engines.

▣ Port electrification

B.C. is also working on its first port electrification project – a partnership effort that will see the East Berth at Canada Place in Vancouver electrified. That means ships will be able to plug in while they're in port, instead of idling their engines.

Discussions are also underway to determine the feasibility of electrifying a cargo berth at Deltaport. If these initial efforts are successful, the Province will look to further expand port electrification.

▣ Anti-idling regulations

Idling is a significant source of unnecessary greenhouse gas emissions. As a result, wherever possible, the Province will encourage campaigns and regulations designed to reduce this practice as much as possible. Anti-idling regulations will be introduced for the public sector fleet for 2009. Similar measures will be extended provincewide by 2010. Finally, support will be provided to ensure that all communities have anti-idling policies in place by 2012.



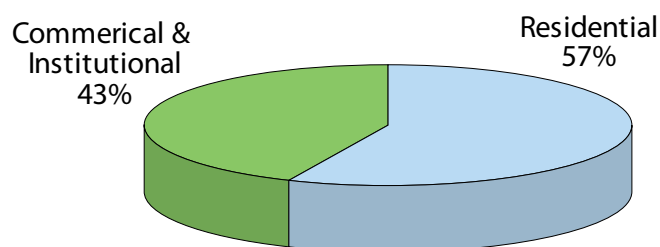
Acting in Every Sector: Buildings

Residential and commercial buildings produced about 12 per cent of B.C.'s total GHG emissions in 2006. More than half is attributable to the use of fossil fuels for space and water heating and gas-fired appliances in our homes.

This Climate Action Plan addresses emissions from buildings in a number of ways:

- Setting standards to ensure that new buildings are as energy efficient as possible
- Providing support and incentives for retro-fitting older buildings, and
- Encouraging the use of more efficient furnaces and other appliances.

B.C. Residential and Commercial Building Greenhouse Gas Emissions (2006)



Buildings: Key Actions

■ B.C. Green Building Code

On April 15, 2008, the government announced new Building Code requirements to increase energy and water efficiency. These first steps in Greening the B.C. Building Code will take effect on September 5, 2008 and will address the following priority areas:

HOUSING

New insulation standards will improve energy efficiency for houses and multi-family residential buildings under five stories. New insulation standards have also been developed for small commercial and industrial buildings.

COMMERCIAL BUILDINGS

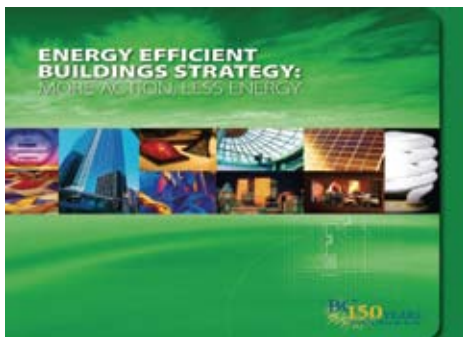
Larger buildings must meet the American Society of Heating, Refrigeration and Air-Conditioning Engineers 90.1(2004) standard. ASHRAE 90.1 is an internationally-recognized standard for energy efficiency in buildings.

WATER EFFICIENCY

Ultra low-flow toilets (6 L) and other water-saving plumbing fixtures and fittings will become mandatory in new construction and renovations.

These first steps will be followed by additional changes to the code to reduce the environmental footprint of buildings throughout their lifespans. Areas under exploration include greywater recycling, the use of lighting sensors and the reuse of existing buildings, and will involve further consultation with local governments, industry and the public.

The new code will also make smart meters mandatory in all new buildings and residential units and will set the highest energy efficiency standards in Canada.



Budget 2008 includes \$3 million to update the Energy Efficient Buildings Plan developed in 2005. The focus will be on increasing participation by homeowners, businesses and communities, encouraging the use of conservation-oriented building technologies and practices.

■ Energy Efficient Buildings Strategy

- The government has developed a new Energy Efficient Buildings Strategy that complements the new Energy Plan and builds on the success of Energy Efficient Buildings: A Plan for B.C. That plan was developed in 2005 to reduce energy consumption and associated greenhouse gas emissions in homes and commercial buildings.
- More than \$100 million was invested in projects to support the plan, with \$11 million provided by the federal and B.C. governments.
- In total, the projects saved enough energy to power 89,000 homes for a year.

■ Green Communities

The Local Government (Green Communities) Statutes Amendment Act, 2008 supports and encourages the development of compact communities that help reduce energy use, reduce the costs of servicing, increase opportunities to walk and cycle to work, and minimize greenhouse gas emissions.

The legislation requires that all official community plans and regional growth strategies include greenhouse gas emission reduction targets, policies and actions. Local governments are also enabled to use development cost charges to encourage more sustainable development and greenhouse gas reductions with new technologies.

Did You Know? *B.C. leads the country in renewable energy production from plant materials, known as biomass. Organic waste from humans, or waste wood from fallen trees or beetle-killed forests, can be converted into clean, carbon neutral energy. As of 2007, the Province had enough capacity to power 640,000 households.*

Units not larger than 29 square metres can now be exempted from Development Cost Charges (DCCs). Small-unit housing and small-lot subdivision will help reduce the growing costs of housing, the costs of servicing, and the environmental costs of urban and suburban sprawl.

Green developments will be rewarded with faster approval processes and strategies that would allow the purchasers of those homes and buildings to avoid costs for municipal services if they create self-sufficient waste systems that render traditional municipal services superfluous.



When completed, Dockside Green in Victoria will be one of the world's largest and most ambitious triple bottom line community, serving as a global model for green development.

■ 100,000 Solar Roofs

The Province is working with the B.C. solar industries to install solar roofs on 100,000 residential and commercial buildings provincewide by 2020.



Solar panels, from Carmanah Technologies, on the roof of Fort Nelson Secondary, one of two schools generating their own clean power as part of the B.C. Solar for Schools program. Since May 2006, the solar installation at Fort Nelson Secondary has generated over 13,000 kilowatt hours of electricity – enough to power a television for almost 95,000 hours.

■ Community Action on Energy Efficiency Program

Fifty-two B.C. communities have received a total of \$1.6 million under this program to assist in developing efficiency projects that meet specific local needs.

■ Towns for Tomorrow

The Towns for Tomorrow Program was developed to address the unique challenges faced by smaller communities in British Columbia with respect to sustainability and meeting their infrastructure needs. Recognizing that resources are often limited in smaller communities, the program is designed to meet these challenges, from ease and simplification of applications to efficient and effective administration processes.

Towns for Tomorrow is investing \$21 million over three years for capital projects that will help achieve the Province's vision of vibrant, integrated, creative and prosperous communities. Projects will be cost shared 80/20 (provincial/ municipal) with a maximum provincial contribution of \$400,000.

Eligible applicants are incorporated municipalities with populations of 5,000 persons or less and the Central Coast Regional District.

■ Smart Development Partnership Program

Through this program, the Province has been providing local governments with up to \$50,000 to support sustainable land-use planning.

Smart Planning and Development

Smart planning is a process to help ensure the long-term well-being of communities. It provides a framework that helps communities plan for their own needs, while ensuring that the needs of future generations can be met. Smart planning emphasizes partnerships and encompasses the social, economic, environmental and cultural aspects of communities.

■ BC Local Government Grants Program

Local governments can receive up to \$10,000 for projects supporting community energy planning and reducing greenhouse gas emissions.

Winners of B.C.'s first Green City Awards



From left to right: North Vancouver Mayor Darrell Mussatto; Capital Regional District Director for Saltspring Island Gary Holman; Dawson Creek Mayor Calvin Krug; Oliver Mayor Ron Hovanes; Whistler Mayor Ken Melamed; Community Services Minister Ida Chong; Vancouver Mayor Sam Sullivan; Nanaimo Regional District Chair Joe Stanhope; and Premier Gordon Campbell.

■ Green City Awards

- Dawson Creek, Oliver, Nanaimo and Saltspring Island were among the winners of the first Green City Awards, established in 2007.
- The awards recognize excellence across three areas – livability, climate action and innovation – and provide up to \$500,000 in total awards each year.

■ Green Government Buildings

Effective immediately, all new provincially owned or leased facilities must be built to a minimum of Leadership in Energy and Environmental Design (LEED) Gold or equivalent criteria. LEED is the recognized standard for measuring building sustainability. Buildings that meet the gold standard are among the most efficient and sustainable in the world.

■ Other Energy Efficiency Programs

The Province is developing a number of new approaches to support improvements to the energy efficiency of existing buildings. These include:

- Developing energy performance labelling
- Expanding the Community Action on Energy and Emissions program
- Updating energy efficiency standards for appliances and equipment (including Energy Star)
- Working towards greater co-ordination of existing energy efficiency programs.
- Setting targets with BC Hydro for energy efficient lighting.

The LiveSmart BC Energy Efficiency program will provide a one-stop hub for information on all government and utility company programs and incentives, access to energy advisors and links to relevant community programs and services, such as transit and recycling.

Acting in Every Sector: Waste

Waste disposal accounts for about 5 per cent of B.C.'s GHG emissions. Most is from municipal landfills. The remainder comes from wood residue landfills, mostly run by forestry companies.

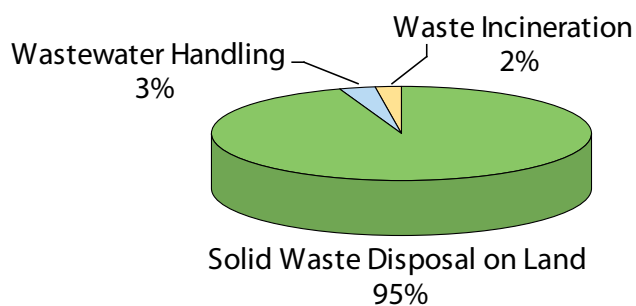
In both cases, decomposition of organic matter produces methane, also known as landfill gas. Proven technologies already exist to capture this gas and use it as a source of cleaner, renewable energy.

This Climate Action Plan represents a key step in transforming our relationship to waste. Instead of seeing it as something to dispose of, the Province is increasingly using waste as a resource – a strategy that has enormous potential to support our move to the new low-carbon economy of the future.

For example, with the new B.C. Bioenergy Strategy, we can turn waste from forestry, agriculture and commercial sectors such as the restaurant industry into clean renewable fuels and, as we develop new expertise, we can leverage our knowledge, expertise and abundant biomass resource to become a global leader in this technology. (For more discussion of British Columbia's bioenergy potential, see the sections on "Energy" and "Forestry.")

Did You Know? *The energy recovered through methane capture at the Burns Bog Landfill every year is enough to power as many as 4,000 homes. At the same time, GHG emissions are reduced by more than 230,000 tonnes.*

B.C. Waste Greenhouse Gas Emissions (2006)



Waste: Key Actions

▣ Keeping organic waste out of landfills

Regional districts are responsible for solid waste management in B.C., and nine out of 27 have policies in place to keep organic material out, diverting it instead to home and community composting. The Province has supported these efforts and the expansion of such initiatives.

■ Turning waste into energy

Two of B.C.'s biggest landfills – Hartland on Vancouver Island and Burns Bog on the mainland – have been capturing methane from their operations for several years. They use it to generate electricity, which they sell to BC Hydro – reducing the need for other forms of generation and, at the same time, directly reducing GHG emissions. These kinds of projects will be encouraged throughout our province wherever possible.

■ Cleaning up our landfills

A new regulation was introduced in 2008 to mandate the collection of landfill gas emissions. The Province will work closely with the Union of British Columbia Municipalities to establish a sensible, rigorous regime for the recovery, sale and use of methane gas from landfills.

■ Composting

New strategies will be introduced to use organic waste to build the strength of soils in our gardens and on our farms.

Exploring opportunities for turning wastes into energy before they reach our landfills will continue to be a key priority, as will reducing the greenhouse gases generated by moving waste from one place to another.

■ Stopping waste at the source

The B.C. government is exploring options that will help make manufacturers more responsible for the packaging and other waste created by their products. British Columbia will encourage alternative, environmentally friendly forms of packaging and help create an environment that recognizes the need to reduce waste wherever possible.



Minimizing E-Waste

"E-waste" (or the waste associated with electronics) finds new life at Genesis Recycling. The Aldergrove company dismantles over 200,000 computers a year, recovers and sells components for recycling and keeps harmful substances out of landfills. Electronic waste is one of the fastest growing waste streams in North America. B.C.'s Extended Producer Responsibility regulation requires the electronics industry to recycle all computers, monitors, desktop printers and TVs, and to offer e-waste collection or drop-off services. Similar stewardship programs are in place across B.C. for paint, aerosols, medicines, pesticides, containers, pharmaceuticals and oil.

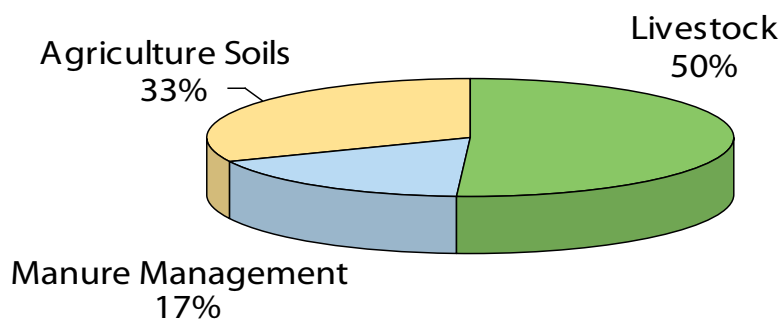
Acting in Every Sector: Agriculture

Climate change has a range of implications for B.C. agriculture. The industry is working to reduce its greenhouse gas emissions, which come from a range of sources, including livestock, manure, fertilizer applications, farm buildings and engine emissions.

The sector also needs to anticipate and plan for any impacts of climate change on its productive capability. Research and innovation will be key to addressing adaptation, and will ensure the agriculture industry can respond to climate change by taking advantage of new opportunities and reducing or mitigating the risk posed by the negative impacts of climate change.

Finally, land use policy will be developed to provide appropriate incentives to ensure agricultural land retains its potential to sequester carbon, participate in bioenergy opportunities while balancing the need for food production and economic activity in rural communities.

B.C. Agriculture Greenhouse Gas Emissions (2006)



In November 2007 the Premier convened an Agriculture Climate Action Forum in Kamloops. In response to the issues identified in the forum, the Investment Agriculture Foundation of B.C. and the British Columbia Agriculture Council have jointly established the Climate Action Initiative project that will include an agricultural climate change action plan. In partnership with the project, the government is currently exploring the following greenhouse gas reduction strategies for the agricultural sector:

- Constructing anaerobic digesters to capture methane from stockpiled manure. The energy could potentially be used to generate electricity or heat, but the biggest emission reduction gains are from the capture and destruction of methane



Agriculture currently contributes four per cent of B.C.'s total greenhouse gas emissions. As we move to a lower-carbon economy, the sector is expected to become an important producer of carbon offsets. This represents a new opportunity for farmers, and could create "new ways of understanding carbon."

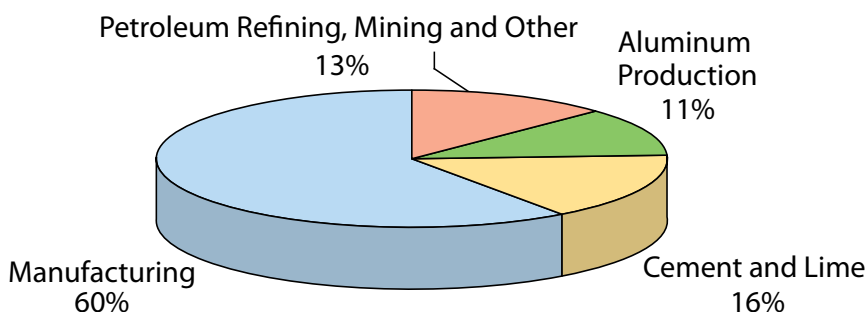
- Improving fertilizer application practices
- Supporting community biogas digestion/electricity generation projects
- Expanding research in biomass fuels
- Developing green city farms to reduce emissions produced by long-distance transportation and refrigeration of food
- Encouraging local purchasing of produce and other agricultural products

The B.C. Climate Action Team has been tasked with developing other possible greenhouse gas reduction strategies for this sector.



Acting in Every Sector: Industry

B.C. Industry Greenhouse Gas Emissions (2006)



Industry: Key Actions

- B.C.'s industrial sector has been on the leading edge of many initiatives to curb the production of greenhouse gases. The sector's share of total emissions has dropped from 19 per cent in 1990 to 14 per cent in 2006, thanks to actions on a number of fronts.
- For example, since 1990, B.C.'s forest industry has significantly reduced its emissions intensity. This has been achieved through measures such as increasing use of wood as a fuel source, substituting natural gas for oil, improving facilities and shifting production to facilities with higher levels of efficiency.
- In the Kootenays, Teck Cominco has reduced its overall emission intensity by 50 per cent by adopting new technology, and reduced its total GHG emissions.
- Likewise, Alcan Aluminum has a proposal to modernize its Kitimat facilities, reducing GHG emissions by 70 per cent while increasing productivity.

Setting up a system for carbon trading

The Greenhouse Gas Reduction (Cap and Trade) Act of 2008 allows the Province to regulate GHG emission levels for various kinds of industry. The government will also establish compliance mechanisms for large emitters (i.e. emissions trading, offsets and credit banking), and mandate GHG emissions reporting.

The new legislation lays the foundation for the Province to participate in carbon trading – an emerging global industry with huge growth potential. The Western Climate Initiative will design a market-based mechanism called a cap and trade system for large emitters of GHGs.



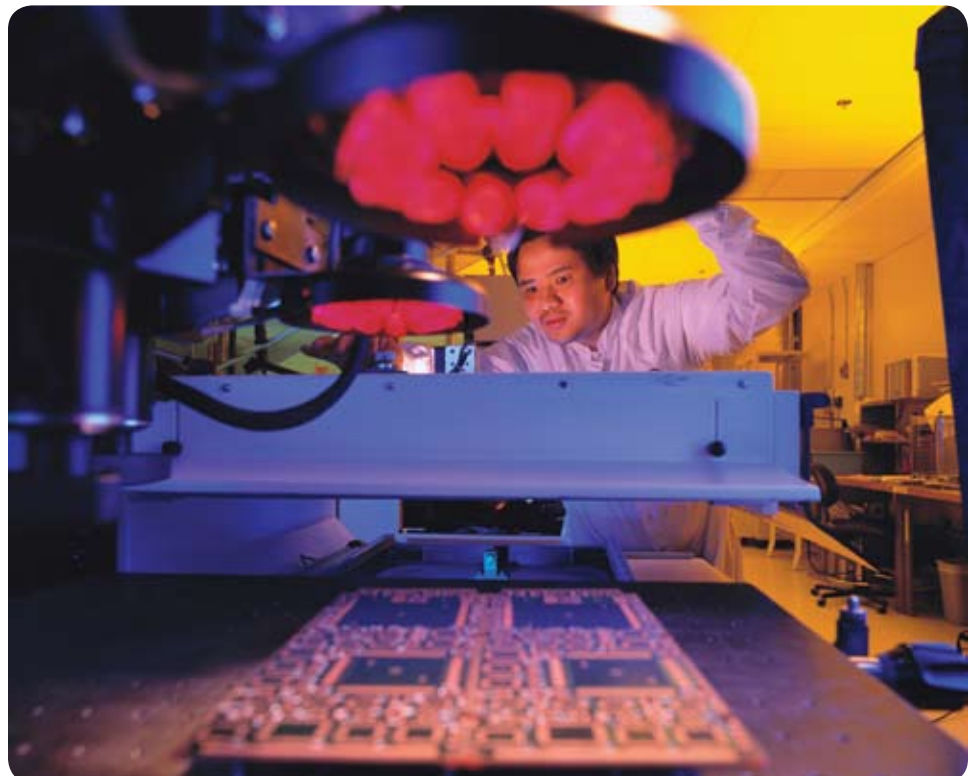
Carbon trading is one of the fastest-growing industries in the world today. Its total value in 2006 was estimated at \$30 billion – a threefold increase over 2005. Establishing a system for carbon trading will allow British Columbia to compete and succeed in this new marketplace.

Key Advantages of Cap and Trade Systems:

- They give companies more flexibility in achieving emission reductions at the lowest possible cost.
- They set clear limits. Traditional approaches often focus on emission rates or require the best available technology, but do not always require that specific environmental goals be met.
- They tend to speed up innovation and accelerate greenhouse gas reductions by putting market mechanisms behind the effort.
- They are a proven way of meeting absolute emission targets at the lowest cost by letting the market decide where the most economically feasible reductions will occur.

■ Encouraging Technological Improvement

Industries that use the best available technology to make their operations cleaner also stand to benefit from lower costs for water, energy and other resource use, and for waste disposal. B.C. will work with industry partners to encourage investments in leading-edge technologies and processes, as part of the Province's broader commitment to environmentally sustainable growth and development.

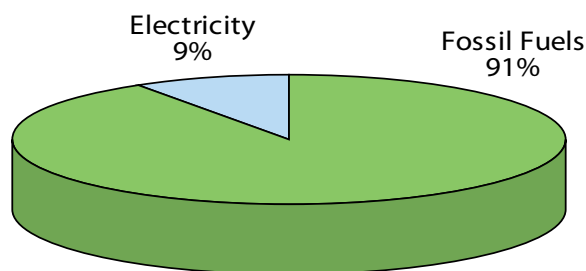


Acting in Every Sector: Energy

Energy production accounts for about 23 per cent of B.C.'s total GHG emissions. Electricity accounts for 2 per cent of total provincial emissions and fossil fuel production accounts for 21 per cent of B.C. emissions.

Energy demand is projected to grow by up to 45 per cent in the next 20 years – underlining the need to use energy wisely, and to support the development of fossil fuel alternatives. This Climate Action Plan encourages both conservation and innovation to help provide more clean energy solutions.

B.C Energy Production Greenhouse Gas Emissions (2006)



Energy: Actions

■ The BC Energy Plan

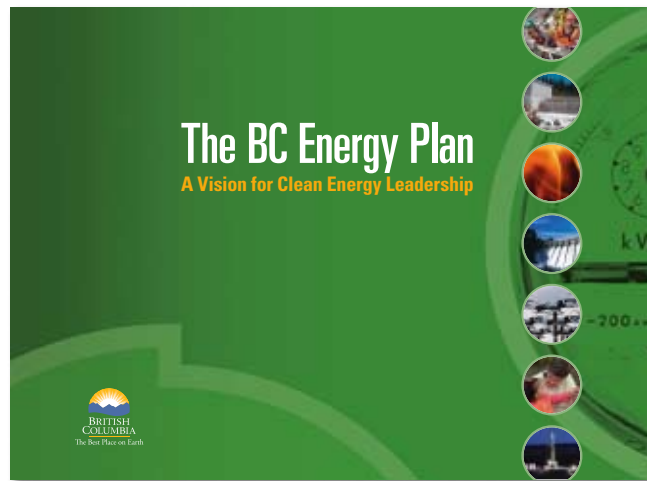
Conservation and enhanced energy efficiency are vital elements of the new **BC Energy Plan: A Vision for Clean Energy Leadership**, introduced in 2007. These strategies will also contribute significantly to British Columbia's greenhouse gas reduction activities. The **Energy Plan** includes the following key climate action elements:

- The Province will be electricity self-sufficient by 2016
- All new electricity generation projects will have zero net greenhouse gas emissions
- Eliminate all routine flaring at oil and gas producing wells and production facilities by 2016 with an interim goal of reducing flaring by half (50 per cent by 2011)
- Clean or renewable energy will continue to account for at least 90 per cent of total generation



The Furry Creek small hydro project near Squamish can power up to 10,000 homes at peak flows. Small projects can make a big difference in remote communities.

- Require Zero greenhouse gas emissions from any coal thermal generation facilities
- BC Hydro will acquire 50 per cent of its incremental electricity needs through conservation by 2020.



■ Enhancing energy conservation

- Since 2001, BC Hydro's PowerSmart Program has invested more than \$300 million in incentives to replace less efficient appliances and building materials, and to increase conservation awareness.
- PowerSmart's Product Incentive Program for businesses has also helped reduce energy consumption.

■ Remote Community Clean Energy Program

- This \$3.9 million pilot project started in 2006, providing financial incentives to communities to help them adopt more clean, efficient power sources and promote energy conservation. Many of B.C.'s remote communities have relied on diesel powered generators to meet their electricity needs. An additional \$20 million in funding will increase remote communities' participation in clean alternative energy and energy efficiency solutions.
- Projects funded to date include more energy efficient housing and an upgrade of the local run-of-river hydro project in Klemtu; a series of housing design workshops in Kitimaat Village; energy efficiency upgrades to residential and commercial buildings throughout Haida Gwaii/Queen Charlotte Islands; and a new energy efficiency program for the Xwemalxkwu Nation.

Through the PowerSmart Program alone, British Columbians now conserve enough energy every year to power more than a quarter of a million homes.

■ Supporting alternative energy development

- Since 2005, the Province has provided incentives to support the development of wind power projects on Crown land. It has also provided funding for a tidal power project at Race Rocks, near Victoria, and BC Hydro has supported a feasibility study for tidal energy on Haida Gwaii.
- In addition, the Province supports the BC Solar for Schools project, which teaches students about the potential of clean solar energy to reduce greenhouse gas emissions. As part of the program, two schools – one in Vernon and one in Fort Nelson – have established solar power systems that supplement their grid-powered energy requirements.

■ Supporting local governments' energy efficiency

- B.C.'s local governments are important partners in the Province's efforts to reduce greenhouse gas emissions and build greener communities. More than 120 towns and cities have already signed the Province's Carbon Neutral Local Governments Charter, making a commitment to reduce emissions from their operations as much as possible and, where emissions cannot be reduced, offset them by equivalent amounts to achieve carbon neutrality. Local governments signing the charter also commit to reporting on their GHG emissions and creating more compact, energy efficient communities. Under amendments to the Local Government Act (Bill 27), local governments will be required to include greenhouse gas emission targets, policies and actions in their Official Community Plans and Regional Growth Strategies. Those who've signed the charter are working to be carbon neutral by 2012.

■ Investments in solar energy

Budget 2008 includes \$5 million to support the expansion of solar thermal energy systems in BC. The funding is largely intended to increase the number of solar installations in B.C., mainly for water heating. It also provides additional support for the Solar for Schools initiative.

■ Smart Meters

By 2012, BC Hydro will replace 1.7 million hydro meters in homes and businesses with smart meters.

Smart meters are digital devices that measure the flow of electricity to each individual customer. It measures at set increments such as every hour or half hour, and transmits information back to the supplier.

Unlike conventional meters, which simply accumulate total power used, smart meters can report on how much is used at specific times of day and provide other information that helps us understand and better manage our energy consumption.

Wind Energy

Wind-energy producers are poised to respond to B.C. Hydro's call for independent power producers to create up to 5,000 gigawatt hours of clean energy.

The Canadian Wind Energy Association has said that its members could produce this power by installing 1,600 megawatts of generating capacity. According to the Association, that much generating capacity would represent some \$4 billion in investment and create 3,000 jobs in B.C.

Smart Meters

BC Hydro is considering a variety of models to determine which has the most potential to benefit British Columbians.

As part of this initiative, BC Hydro will also install a smart electricity grid. This will allow customers who produce more energy than they consume to sell clean power back to BC Hydro. For example, a home with solar or geothermal systems may generate far more electricity than the homeowners use. With the new system, they will be able to put energy back on line to reduce their electricity bill. Green power pricing will also be introduced to reward customers for reducing consumption and shifting power use to off-peak periods.

■ B.C. Bioenergy Strategy

Launched in January 2008, the bioenergy strategy is designed to reduce greenhouse gas emissions and help make the Province electricity self-sufficient.

Budget 2008 includes \$25 million for a Bioenergy Network, which is a key part of the strategy. It will encourage research and development in areas such as wood-waste cogeneration, biofuel production and wood pellet production. The network will also be responsible for directing research and initiating projects that promote the development and use of fuel from organic resources.

B.C. has an abundance of bioenergy opportunities, such as using biomass from the pine beetle outbreak to stimulate investment and economic diversification while generating clean energy. The Province will develop at least 10 community energy projects that convert local biomass into energy by 2020.



Vancouver-based Nexterra Energy develops gasification systems that allow industrial customers to generate their own clean, low-cost heat and power from wood waste. In an era of rising energy costs, this means dramatically lower costs, higher operating margins, and less reliance on natural gas and grid-purchased electricity. It can also mean a dramatically smaller carbon footprint.

Nexterra is one of more than 200 B.C. companies developing clean energy technologies. Together, these companies employ more than 2,500 people and generate over \$650 million in annual revenues. According to the BC Technology Industry Association, the sector has the potential to more than triple revenues and jobs in the next decade.

SHOWN ABOVE, A MODEL OF NEXTERRA'S GASIFICATION TECHNOLOGY.

Acting in Every Sector: Forestry

In standard measures of greenhouse gas emissions, forestry is not considered a stand-alone sector. As a result, it is not included in the national greenhouse gas emissions inventory. Emissions associated with forestry come primarily from areas such as transportation and waste, and are counted as contributors to those sectors.

Nonetheless, forestry is potentially one of the most important sectors in our fight against climate change, and the move to a new low-carbon economy is opening up new opportunities.

For example, as noted previously, wood that was formerly considered waste is increasingly being used as a clean, renewable fuel source. And the fact that growing trees take carbon out of the atmosphere adds a whole new level of potential value to our forests. These two ideas are key to the government's climate action plan for forestry.

As part of this Climate Action Plan, B.C. will have net-zero deforestation. This means that any forest loss associated with development or other land use change will be offset by an equivalent amount of tree planting.

Forests – A Natural Ally

Through photosynthesis, forests take carbon dioxide out of the atmosphere and store it. Absorption is the greatest where trees are young and growing vigorously, and tapers off as they mature.

Once trees die and start to decay, their stored carbon dioxide is released back into the environment. However, if trees are harvested sustainably and manufactured into building products, the carbon dioxide remains stored and the forest regenerates with young trees that absorb even more carbon dioxide. This achieves a net reduction in greenhouse gas emissions. By contrast, events such as wildfires and the pine beetle epidemic reduce our forests' capacity to act as a carbon sink – making effective forest management more important than ever.

In general, attention to climate change has people seeing our forests in a whole new light. Given that a healthy growing forest can sequester an average of 120 tonnes of carbon per hectare annually (or enough CO₂ to fill 120 average homes), B.C.'s 60 million hectares of forest could become a chief ally in advancing the Province's Climate Action Plan.

Forestry: Key Actions

■ Forest Management

FORESTS FOR TOMORROW

- Our forests have been under threat from climate change; not the least of which is the catastrophic effect of the mountain pine beetle epidemic and



A single large, mature tree can absorb more than 20 kilograms of carbon dioxide from the atmosphere every year, and emit enough oxygen to meet the needs of two people. Trees in urban areas also help to reduce global warming by shading our homes and commercial buildings, reducing the need for summer air conditioning by as much as 30 per cent.

intense forest fires. The Ministry of Forests is working to adapt B.C.'s forest and range management framework to reflect and help mitigate the impacts of climate change. This is a long-term initiative that will continue for many years to come.

- Over time, climate change could reduce trees' health and productivity, and make them more vulnerable to disease and insect infestations. It could also result in more wildfires, droughts, floods and storms.
- Forests for Tomorrow is designed to enhance management practices so that forest ecosystems are resilient to stress caused by climate change and other impacts of human activity. For more on the Forests for Tomorrow Initiative, go to www.climateactionsecretariat.gov.bc.ca
- The B.C. government's response to the mountain pine beetle is outlined in full in the Mountain Pine Beetle Action Plan, found at www.climateactionsecretariat.gov.bc.ca. Key objectives of the plan are:
 1. Ensuring long-term economic sustainability for affected communities
 2. Maintaining and protecting public health, safety and infrastructure
 3. Recovering the greatest value from dead timber before it burns or decays, while respecting other forest values
 4. Conserving the long-term forest values identified in land use plans
 5. Preventing or reducing damage to forests in areas that are susceptible but not yet experiencing epidemic infestations
 6. Restoring the forest resources in areas affected by the epidemic
 7. Ensuring co-ordinated and effective planning and implementation of mitigation measures

TREES FOR TOMORROW

When we talk about forests, most of us picture vast rural landscapes, but urban forests also have a crucial role to play in helping to reduce our greenhouse emissions. Under the new provincial Trees for Tomorrow initiative, millions of trees will be planted in back yards, schoolyards, hospital grounds, civic parks, campuses, parking lots and other public spaces around B.C.

The Province is engaging a number of partners in Trees for Tomorrow to make sure the right trees are planted in the right places, and that they provide maximum environmental benefits. The trees will be planted (among others) by members of B.C.'s Youth Climate Leadership Alliance, a group of students and other young people whose mandate includes field research, mitigation work, afforestation and adaptation.

ACCELERATING FOREST GROWTH

Budget 2008 provides \$21 million to increase growth in B.C.'s forests and reduce losses due to forest health problems. This initiative recognizes the key role our forests play in advancing climate action.

By supporting increased forest growth, we can increase the carbon capture and storage potential of our forests. The new funding will also support the development of new seed technologies and help reduce risks from wildfires.



The Benefits of Urban Forests

In addition to taking carbon out of our atmosphere, urban forests have a wide range of other benefits including improving local air quality, reducing topsoil erosion and helping to ensure that groundwater supplies are continually replenished. Urban forests also increase property values and help to enhance communities' economic sustainability. For example, studies have shown that people are more likely to linger and shop in business areas where the streets are lined with mature trees.

NET-ZERO DEFORESTATION

Each year, new developments, urbanization, agricultural conversions, new power lines and their utility corridors contribute to more deforestation. Currently, approximately 10,000 hectares are deforested in British Columbia every year. This releases about 4 million tonnes of greenhouse gases into the atmosphere and removes millions of trees that were absorbing and storing carbon. In recognition of the environmental impact of this land use change, the Province has decided to include greenhouse gas emissions related to net deforestation in its provincial greenhouse gas inventory.

To address the issue of deforestation and maximize the carbon storage potential of our forests, the Province will work to restore our forests over time by restocking areas that have not been sufficiently restocked. The government has also introduced a goal of net-zero deforestation to ensure that our forests are protected for the future. This means that when trees from forest land are permanently removed to facilitate a permanent conversion for a different purpose, they will have to be offset with new trees planted elsewhere. This will ensure no net reduction in forest land.

The government will work with First Nations, industry and communities to put that goal into law by 2010 and establish a viable strategy for realizing the vision by 2015.

■ New Opportunities In Forestry

ENERGY

B.C. leads the country in energy production from plant materials, known as biomass. This includes wood waste, agricultural waste, aquatic plants and vegetation.

Biomass is an important source of energy because, unlike fossil fuels, it is renewable.

Provincewide, we have the capacity to power 640,000 households using biomass

Budget 2008 includes \$25 million for a Bioenergy Network, which is a key part of the Bioenergy Strategy. The network will encourage research and development in areas such as wood-waste cogeneration, biofuel production and wood pellet production – all of which represent new opportunities for growth in B.C.'s forest sector.

Turning wood waste into energy has another key advantage. If that waste is left in the forest, it will decompose and release the carbon that was stored in living trees. So B.C.'s environment benefits twice when we turn this waste into a source of renewable cleaner energy.

The new Bioenergy Network will also be responsible for directing research and initiating projects that promote the development and use of fuel from various organic resources.

CELLULOSIC ETHANOL

B.C.'s balanced approach to the generation and use of biofuels can result in real reductions in greenhouse gas emissions, while improving the sustainability of forestry. In particular, cellulosic ethanol – made from non-digestible plant fibres such as wood waste – holds out enormous potential for growth.

First, cellulosic ethanol is an emerging technology worldwide. B.C. producers have an opportunity to lead in this new area with support from B.C.'s Innovative Clean Energy Fund and the B.C. Bioenergy Network.

The time is right. Jurisdictions around the world are utilizing biofuels, such as ethanol, to help address transportation related GHG emissions. Biofuel markets are growing, and regulations such as B.C.'s low-carbon fuel requirements will help drive the development of biofuels with even lower environmental impacts.

British Columbia has what it takes to be part of the solution. We have as much as 11 million tonnes of wood waste available every year, including about 2.5 million tonnes of beetle-killed wood. And while it is not easy to turn wood waste into

ethanol, the process can be highly efficient. Converting corn to ethanol gives you about 1.3 times more energy out than energy inputs required. Conservative estimates suggest that cellulosic ethanol is much more productive, producing five to six times as much energy out as the amount required to create it.

Cellulosic ethanol is also more effective than corn-based ethanol in addressing greenhouse gases. It results in a 76 per cent reduction of GHG emissions compared to gasoline. Corn has only an 18 per cent reduction (on an energy basis i.e. per kilometre driven). In addition, cellulosic ethanol production does not have the same “food versus fuel” concerns as have been associated with corn-based ethanol production.

B.C.’s 5 per cent renewable fuel requirements will create a market for biofuels and develop the infrastructure and customer awareness. Moving forward, the low-carbon fuel requirements will require fuel suppliers to reduce the carbon intensity of their products by 10 per cent between 2010 and 2020. Because cellulosic ethanol has a significantly reduced carbon intensity compared to any other gasoline substitutes, it will be the renewable fuel most wanted by gasoline suppliers to help meet their legal obligations.

Did you know?

In 2007, B.C. produced over 900,000 tonnes of wood pellets; 90 per cent was exported for power production overseas.

SUPPORTING INNOVATION IN PULP AND PAPER

B.C. pulp and paper mills have been working to make their operations cleaner for many years. They already meet more than a third of their electricity needs through on-site cogeneration projects that help reduce GHG emissions. Now they are actively exploring new ways to reduce their environmental footprints. Budget 2008 provides \$10 million to support eco-friendly pulp and paper energy efficiency initiatives, including the development of new technologies.

British Columbia will maximize the enormous potential and capacity of our forests beyond timber-use, for energy production as well as for carbon storage.

Section Three: Charting Our Progress

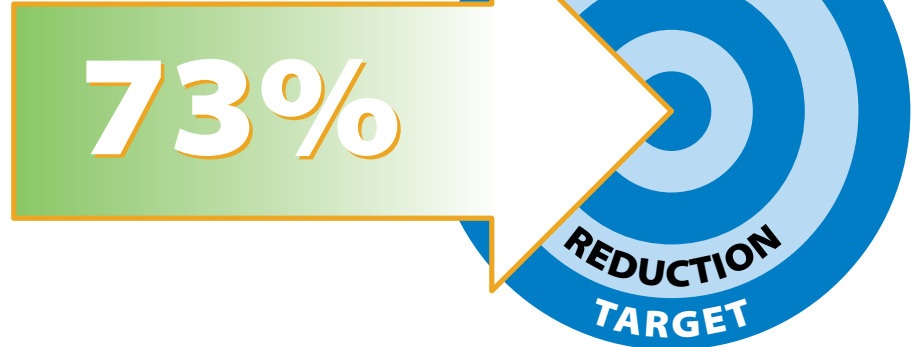
Exhibit A

This Climate Action Plan includes a wide range of initiatives designed to reduce greenhouse gas emissions in every sector of the Province's economy. So how will they affect our overall emissions?

According to independent economic analysis and modelling based on standard practices, the **initiatives included in this plan will take us 73 per cent of the way to our 2020 emissions reduction target.**

This represents significant progress, and is a testament to what we can achieve through early and decisive action.

**IDENTIFIED MEASURES WILL MEET
73% OF B.C.'S EMISSION REDUCTION
TARGET FOR 2020.**



What does this really mean?

When scientists and economists measure greenhouse gas emission reductions, they do so in relation to what is called the “business as usual” scenario. This scenario represents what experts believe emissions would be if left to grow unchecked. In British Columbia’s case, the “business as usual” scenario would result in emissions of approximately 78 million tonnes by 2020 (over 9 million tonnes more per year than today). This represents a 13 per cent increase in emissions over current levels, and can largely be accounted for by projected growth in population, economy and energy demand.

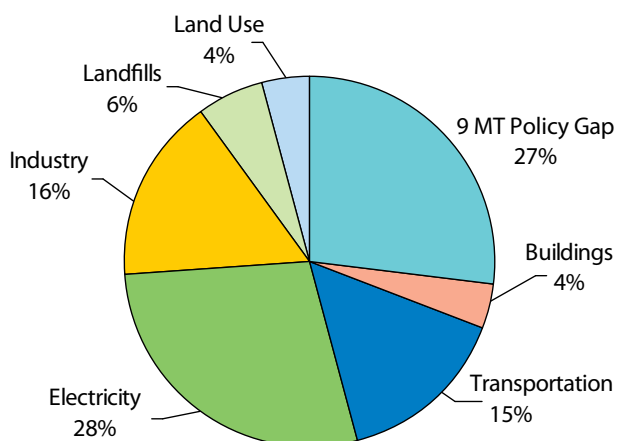
Policies already announced as part of the B.C. Climate Action Plan are expected to result in a significant change from the “business as usual” scenario, resulting in an estimated emissions level of 55 million tonnes (instead of 78) by 2020.

To achieve a 33 per cent reduction, we must reduce emission levels even further – to 46 million tonnes by 2020. That means we have a 9 million tonne emissions “gap” left to fully reach our goal, above and beyond the policy measures already identified for reducing emissions province-wide.



The roof of the Green Roof Research Facility at BCIT Centre for Architectural Ecology in Burnaby.

Percentage of Target Reductions Achieved by Sector



How do we know?

British Columbia's population and economy will continue to grow, create jobs, and create wealth. This does not mean that our greenhouse gas emissions will also have to grow. Rather, we can preserve and even expand economic growth while taking steps to reduce greenhouse gas emission related to fossil fuel consumption.

Predicting future greenhouse gas emissions will depend on the kinds of assumptions we make about how our population, economy, and energy sector may evolve over the coming years. And predicting the future is never easy.

The best we can do is to make realistic estimates based on probable assumptions. For example, B.C.'s population can reasonably be predicted to grow to 5 million by 2020. Other key assumptions are highly uncertain however. For example, oil prices are difficult to predict, having ranged from about \$30 a barrel to over \$135 a barrel over the past five years alone.

The assumptions we make about energy prices, population growth, and economic activity influence what kinds of cars and homes people are likely to buy and what technologies will be developed. This in turn has a significant impact on levels of greenhouse gas emissions. For example, the modelling used for this Climate Action Plan assumes an oil price of \$US85/barrel, a forecast that is significantly below the current price of oil, but higher than the long-term price forecasts of many leading international agencies. If that assumption changes, so does the estimated size of our gap: \$50/barrel oil increases our gap by 15 million tonnes, while \$120 oil would decrease it to 5 million tonnes.

Models to assess greenhouse gas emissions scenarios must take multiple variables into account, while also recognizing the uncertain effects of policies on behaviour.

This is further complicated by the fact that many policies designed to reduce greenhouse gas emissions have overlapping effects and interact with each other in complex and sometimes unpredictable ways.

A number of models have been developed to achieve greater clarity and certainty in predicting future emissions scenarios. Over the past few decades, comparative research has fostered a convergence whereby leading models used by governments in Canada and the U.S. have become quite similar – based on experience with what works best.

This Climate Action Plan uses the CIMS model, which was developed right here in British Columbia. Using baseline measurements of greenhouse gas emissions from Environment Canada, CIMS allows users to simulate the impacts of various changes over time, including the adoption of new technologies and the introduction of energy-environment policies (like those included in this Climate Action Plan).

Technical support, analysis and modelling for the **BC Climate Action Plan** was provided by MK Jaccard and Associates Inc. using the CIMS model. This Vancouver-based consulting group is associated with Simon Fraser University. Since 1990, the company has undertaken national and international research in areas related to resource and environmental management, with a focus on energy.

The actions described in this Climate Action Plan provide an integrated package to reduce greenhouse gas emissions. Many of the actions reinforce each other; some actions apply across a range of sectors of our economy, while others are more focused. Therefore, estimating the impact of individual actions necessarily misses important interactions between policies.

This model is based on the implementation of many of the key policies outlined in this plan as follows:

- the revenue-neutral carbon tax at \$30/ tonne in 2012 and subsequent years
- regulations on new residential and commercial buildings to be more efficient
- key transportation policies including – California tailpipe standards (including post-2016); renewable content in gasoline and diesel, a public transit system as announced in the Transit Plan
- landfill gas regulation
- a directive to BC Hydro for zero emissions from electricity generation
- a cap and trade system

It is important to note that the CIMS model outlined in Appendix I is an energy-technology model and does not include emissions associated with land use change. As a result, the baseline emissions used here are approximately 4 million

tonnes greater than those reflected in the results from the CIMS model. The B.C. government included emissions associated with land use change in its baseline data in order to accurately recognize their environmental impact, and to ensure that this impact is addressed through policy (in this case, through a commitment to net zero deforestation).

How will we close the 9-million tonne gap?

The British Columbia Climate Action Team - a diverse group of British Columbians with expertise in areas including science, business, First Nations and community development – was created to advise government on this critical question. It will recommend interim targets for 2012 and 2016 and identify the most efficient and economically viable means to fill the gap between existing policy measures and the 2020 reduction target. The team will also make recommendations related to the government's commitment to achieve a carbon-neutral public sector by 2012.

The entire independent modelling report commissioned by the B.C. government is provided in Appendix I. Here, more detail on the model's methodology and specific sector assumptions is available.



Members of the The Climate Action Team with Premier Gordon Campbell and Minister Barry Penner (Top Row: John Robinson, Teresa Coady, Premier Gordon Campbell, Sean Atleo, Minister Barry Penner, Cheryl Slusarchuk (Chair), Joe Van Belleghem, Andrew Weaver. Bottom Row: Lyn Brown, Donna Barnett, Naomi Divine, Ian Tostenson)

How much CO₂ do British Columbians' emit?

In B.C., our per-capita emissions from all sources are 15 tonnes. Approximately 4.5 tonnes of this is associated with individual actions such as driving and home heating. 4.5 tonnes of greenhouse gas would fill five average two-storey, three bedroom houses. Put another way, that's enough to fill about 90,000 party balloons.

LiveSmart BC is a key element in the fight against climate change. It also has the potential to dramatically improve our quality of life for future generations by encouraging and supporting the development of environmentally friendly communities.

By making smart choices, we can save on energy, water and fuel consumption. We can reduce waste and get better value from our land, our limited natural resources and our tax dollars. This will not only reduce greenhouse gas emissions. It will also drive innovation to create new jobs and opportunities. It will reward smart choices and create the competitive advantages of higher productivity, lower costs, less waste and higher quality products.

Overall, the goal is for communities to meet human needs and provide the highest long-term benefit possible, with the least possible impact on our environment.

To reach this goal, the B.C. government will:

- work with partners to provide climate action education and resources
- support people to make informed choices
- highlight the individual and cumulative effects of climate action from a financial, convenience and environmental point of view
- facilitate individual action by providing practical tools and programs, as well as links to other useful programs and services.
- introduce LiveSmart BC with a new efficiency program to help reduce energy consumption in homes and small businesses. Subsequent phases will include a green work sites initiative and a LiveSmart small business skills and training program to help small businesses succeed in the new low-carbon economy.

There are currently many opportunities for British Columbians to choose ways to reduce their greenhouse gas emissions and save money. The list that follows outlines some of these opportunities. More will be developed in the near future.

You Choose, You Save: Available Incentives

■ Save at home:

- PST exemption for ENERGY STAR qualified residential refrigerators, clothes washers and freezers (expires March 31, 2010).
- PST exemption for insulation designed to prevent heat or cold loss from hot water tanks, hot and cold water pipes, and ductwork.
- PST exemption for energy efficient residential gas-fired water heaters with an energy factor of 0.80 or greater (expires December 31, 2009).
- PST exemptions for: ENERGY STAR qualified windows, doors and skylights.

- PST exemptions for insulation designed to prevent loss of heat from a building, including weather stripping and caulking and window insulating systems.
- PST exemptions for ENERGY STAR qualified home heating equipment, including oil-fired forced-air furnaces, boilers, air-source heat pumps, and ground-source heat pumps.

▣ Save on the move:

- Incentives valued to a maximum of \$2,250 offered through the Scrap-it Program to help retire older polluting vehicles from the road.
- Exemption from passenger vehicle rental tax for rentals of eight hours or less.
- PST exemption for electric power-assisted two and three wheel cycles* and non-motorized adult-sized tricycles.
- PST reduction for electric motorcycles of 50% of the tax payable to a maximum of \$1,000.*
- PST exemption for certain aerodynamic devices purchased for use on commercial motor vehicles.
- PST reduction for: hybrid electric vehicles of 100% of the tax payable to a maximum of \$2,000;
- PST reduction for eligible alternative fuel vehicles (e.g. operate on ethanol, natural gas or propane) of 50% of the tax payable to a maximum of \$1,000.
- PST reduction for 50% of the tax payable to a maximum of \$5,000 for alternative fuel shuttle buses and \$10,000 for alternative fuel passenger buses.
- PST exemption for purchase of and charges to install kits to convert motor vehicles to operate on natural gas or propane, or to operate exclusively on electricity.
- PST refund on parts and labour to convert shuttle buses and passenger buses to operate as hybrid electric vehicles or to operate on HCNG (a blend of hydrogen and compressed natural gas).
- PST exemption for non-motorized two wheel bicycles.

▣ Save on fuel:

- PST reduction for certain conventional fuel efficient vehicles that meet the fuel efficiency criteria set out in the federal government's ecoAuto rebate program. The tax reduction is \$1,000, \$1,500, or \$2,000, and is based on fuel efficiency and vehicle type.*
- PST reduction for hydrogen fuel cell buses of 50% of the tax payable to a maximum of \$10,000.*
- PST exemption for biodiesel fuel, including the portion of biodiesel fuel used in a furnace oil blend, when used for heating or other non- motive uses.
- PST applied to coal and coke, except when purchased for use in a residential dwelling unit.

(* Measures have a sunset date of March 31, 2011.)



- Biodiesel and ethanol classified as alternative motor fuels for all purposes and are exempt from tax.
- Motor Fuel Tax exemptions for natural gas and alcohol-based fuels (blends of gasoline or diesel fuel and at least 85% ethanol or methanol) when purchased to propel a motor vehicle.
- Motor Fuel Tax exemptions for the ethanol portion, including denaturant, of an ethanol/gasoline or ethanol/diesel blend if the ethanol portion is not less than 5% or more than 25% of the volume of the blend.
- Motor Fuel Tax exemptions for biodiesel, including the biodiesel portion of any blend of biodiesel fuel and diesel fuel and pure biodiesel
- Motor Fuel Tax preferential tax rate (2.7¢/litre) for propane purchased for use in operating a motor vehicle or stationary engine.

■ Save on other energy:

- PST exemptions for eligible wind powered, solar powered, or micro-hydro powered generating equipment, including solar photovoltaic collector panels (can also be used for heating/hot water).
- PST exemption for penstock equipment used for hydroelectric power generation.
- Property (School) tax exemption for specified improvements to eligible wind power or hydroelectric power projects.

■ Save for your business:

- PST exemption for production machinery and equipment for local governments for lower production and cogeneration.
- Eligible intellectual property expanded to include green-related patents (patents with World Patent Office classifications related to power generation using forces of nature such as wind, solar and tidal).
- Equity tax credit budget increased by \$5 million per year, with \$7.5 million of tax credit budget dedicated to clean technology.

(* Measures have a sunset date of March 31, 2011.)

LiveSmart BC Efficiency Incentive Program

Homes account for one-third of B.C.'s total greenhouse gas emissions and, with energy costs on the rise, everyone can benefit from steps to make our homes more energy efficient. The pie chart to the right shows how the greenhouse gas emissions associated with the way we live our lives are distributed per household.

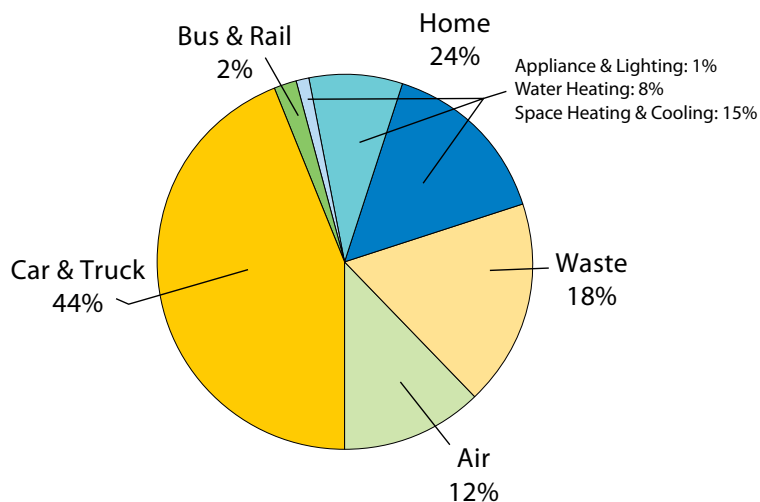
The first phase of LiveSmart BC is a three-year, \$60-million Efficiency Incentive Program that gives homeowners access to rebates for audits and energy efficiency retrofits.

As many as 40,000 homes will be audited through the voluntary program. Approximately 30,000 will be retrofitted over three years, along with 9,000 social housing units. Small businesses with annual electricity costs of less than \$50,000 will also be eligible for audit and retrofit assistance through the program.

In recognition of the different temperatures and costs of heating and cooling homes throughout the province, the LiveSmart BC Efficiency Incentive Program provides higher incentives for the interior and rural B.C. than it does for the south coastal region (comprised of the lower mainland and most of Vancouver Island). In this way, the Program equitably distributes savings throughout the province based on relative costs.

The Province estimates that the LiveSmart BC Efficiency Incentive program will reduce carbon dioxide emissions in B.C. by 200,000 tonnes by 2012. By making our homes more efficient, we will reduce our overall energy demand which will also help keep our electricity costs down.

Per Household B.C. GHG Emissions (2005)

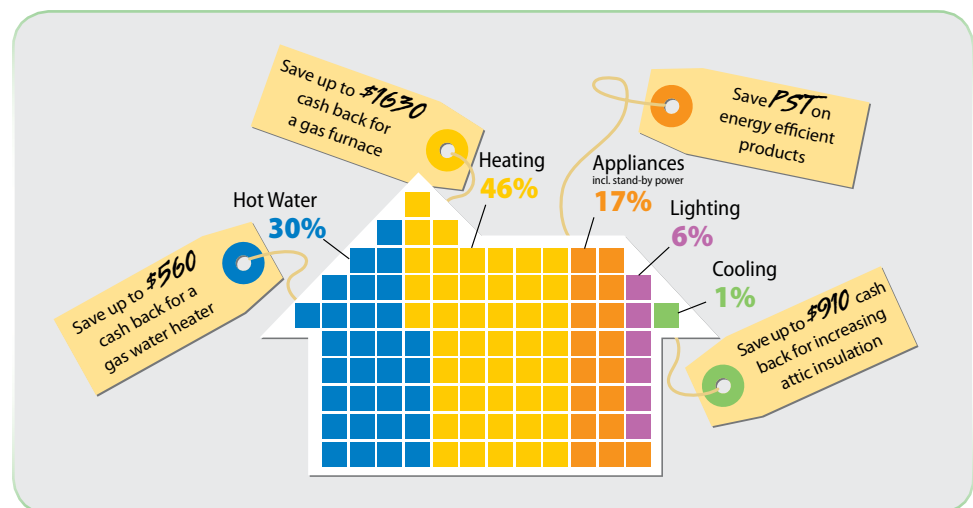


The LiveSmart Energy Efficiency Program: A Step-by-Step Guide

The new LiveSmart BC program can help you cut your energy costs and reduce your carbon footprint. Here's how it works:

-
- Step One:** Contact a certified energy advisor and schedule an evaluation for your home. To find a certified advisor, call 1-800-662-6232 or go to www.climateactionsecretariat.gov.bc.ca
-
- Step Two:** The energy advisor will inspect your doors, windows, insulation, heating and cooling systems and provide advice and information on improving your home's efficiency.
- LiveSmart BC will pay half the cost of the advisor's services. You will pay the other half – up to \$150. This will be refunded at the end of process if you make recommended improvements (see Step Five).
-
- Step Three:** Upgrade your home, and be sure to take advantage of the various rebates and incentives offered by the B.C. and federal governments, utility companies and, in some cases, manufacturers. The LiveSmart BC website includes links to incentive information.
-
- Step Four:** Have a follow-up evaluation to verify your energy savings and GHG emission reductions. You are responsible for the cost of this evaluation, which could be up to \$150.
-
- Step Five:** The energy advisor will process your incentive application, which will be forwarded to both the federal and B.C. governments. You will get two cheques in the mail to offset the cost of your energy retrofits.
-

LiveSmart BC will provide similar types of support for businesses. The program will eventually be expanded to assess not just energy use, but all activities that generate greenhouse gas emissions. For details, go to www.livesmartbc.ca



What Can I Do to Reduce Carbon Emissions and Save Money?

One of the most common questions people have about climate change is “What can I do to reduce greenhouse gas emissions?”

The table below provides examples of the emissions reductions and financial savings that can result from some specific choices.

Annual Savings from Carbon Emission Reductions

		Carbon Tax Rate				
Source of savings		\$10	\$15	\$20	\$25	\$30
		Dollars				
Regularly tune up vehicle: tune and maintain proper tire inflation can reduce fuel consumption by 10%: vehicle with fuel efficiency of 10 L/100km.	Fuel	260	260	260	260	260
	Carbon tax	5	7	9	12	14
	Total savings	265	267	269	272	274
Drive one day less per week: vehicle with fuel efficiency of 8 L/100km.	Fuel	296	296	296	296	296
	Carbon tax	5	8	11	13	16
	Total savings	302	304	307	310	312
Walk to work: 5 kilometre commute and vehicle with fuel efficiency of 8 L/100km.	Fuel	250	250	250	250	250
	Carbon tax	4	7	9	11	13
	Total savings	254	256	259	261	263
Switch to transit: assumes distance to work is 25 km, vehicle with fuel efficiency of 10L/100km and a two zone transit pass at \$87 per month	Fuel	1,560	1,560	1,560	1,560	1,560
	Carbon tax	28	42	56	70	84
	Total savings	1,588	1,602	1,616	1,630	1,644
	Less transit cost	(1,044)	(1,044)	(1,044)	(1,044)	(1,044)
	Net savings	544	558	572	586	600
Replace inefficient vehicle: 20,000 km per year and replace vehicle with fuel efficiency of 12 L/100 with 10 L/100km efficiency	Fuel	520	520	520	520	520
	Carbon tax	9	14	19	23	28
	Total savings	529	534	539	543	548
Weatherize windows and doors: Weatherizing all windows and doors can reduce space heating costs by 5%.	Fuel	42	42	42	42	42
	Carbon tax	2	3	4	5	6
	Total savings	44	45	46	47	48
Install programmable thermostat: A 5° Celsius reduction for 8 hours per day reduces heating costs by 10%.	Fuel	85	85	85	85	85
	Carbon tax	4	6	8	10	12
	Total savings	89	91	93	95	97
Replace gas furnace: Replace a 65% efficient with a 95% efficient gas furnace.	Fuel	254	254	254	254	254
	Carbon tax	12	17	23	29	35
	Total savings	266	271	277	283	289

Assumptions:

- Gasoline price of \$1.30 per litre and natural gas at \$11 per GJ (not including fixed monthly charges).
- Carbon tax is levied at the equivalent of \$10 per tonne July 1, 2008 rising by \$5 per tonne each year.
- Vehicles driven 20,000 kilometres per year.
- Heating costs assumes 77GJ per year.
- Not included are savings in insurance costs due to vehicle replacement and change of use, parking and the federal income tax credit for transit.
- All fuel prices based on BC lower mainland.

Note: Carbon tax cost savings reflect revised gasoline tax rate from budget. Rate was reduced from 2.41 cents per litre to 2.34 cents per litre.



British Columbians are already experiencing climate change and its impacts. Clearly, we need to take steps to ensure that we can adapt as the world around us changes and we see more extreme weather events.

As we move forward with the Climate Action Plan, the Province is also moving ahead with a range of co-ordinated actions to help B.C. adapt to climate change. These include:

Investing in New Ideas and Solutions

- With Budget 2008, the Province invested \$94.5 million to assist B.C.'s research intensive universities undertake research and generate solutions to key climate action questions and challenges.

The Pacific Institute for Climate Solutions brings together experts from the University of Victoria, University of British Columbia, Simon Fraser University and the University of Northern B.C. Based at UVic, the Pacific Institute for Climate Solutions will partner with governments, the private sector, other researchers and civil society, in order to undertake research on, monitor, and assess the potential impacts of climate change and to assess, develop and promote viable mitigation and adaptation options to better inform climate change policies and actions.

One key element of the Institute is the continuation of the vital climate modelling work being conducted by The Pacific Climate Impacts Consortium, a partnership between UVIC, BC Hydro, Environment Canada and the B.C. government. A unique opportunity to apply academic expertise to practical problems, the Pacific Institute for Climate Solutions will help position British Columbia as an important international site for climate change knowledge.

- The Province has also invested \$3 million to test the feasibility of new technology designed to capture the carbon emissions from oil and gas production and permanently sequester them underground. The research will be done at a natural gas plant in the North.
- A new **Bioenergy Network** will encourage valuable research and development in areas such as wood-waste cogeneration, biofuel production and wood pellet production. The network will also be responsible for directing research and initiating projects that promote the development and use of fuel from organic resources.
- An **Innovative Clean Energy (ICE) Fund** will also provide funding to help clean energy technology to move towards commercialization and to encourage the development of the clean energy sector in British Columbia.
- As we work to reduce greenhouse gas emissions in British Columbia, it is imperative that we have reliable models to help predict the outcomes of our actions – and to measure our progress going forward. B.C. is making significant investments in this area as well, with new funding dedicated to



developing models and other tools that enhance our ability to measure and forecast the impacts of GHG reduction strategies.

"The Pacific Institute for Climate Solutions holds enormous promise for British Columbia. It will provide a valuable resource to government and to the private sector—a single window to access the considerable intellectual capacity found in British Columbia's research-intensive universities.

"With an advisory board of industry leaders and senior government officials, the Institute will be in an unprecedented position to frame questions and provide answers on immediate technological, economic, regulatory and public-policy challenges. [It will] play a key role in positioning British Columbia as an international leader in climate-related research; in finding and designing climate change solutions; in capitalizing on opportunities for positive adaptation; and in establishing a vibrant, innovative low-carbon economy."

*Dr. David Turpin
President, University of Victoria*



■ Protecting our forests

Since 2001, the Province has committed more than \$600 million to mitigate the impacts of the pine beetle infestation in Interior pine forests, and to support economic diversification among affected communities.

The pine beetle epidemic has been directly linked to climate change. Beetle populations, normally controlled by sub-zero temperatures, exploded after a series of warmer than usual winters.

As part of this Climate Action Plan, the Province will continue implementation of the 2006 – 2011 Pine Beetle Action Plan, which sets out a vision for what Interior

British Columbia has two ocean observatories that will use the Internet to continuously feed data, sounds and images from the ocean depths to laboratories, classrooms, science centres and homes around the world. Scientists will gather continuous information on ocean change, seismic activity, fish and marine mammal movements, and seafloor ecology.

The NEPTUNE Canada (North-East Pacific Time-series Undersea Network Experiments) observatory, will lay 800 km of fibre optic cable and instruments off the outer coast of B.C. A sister observatory, VENUS (Victoria Experimental Network Under the Sea), is laying a total of 43 km of cable and instruments in two locations off the south coast of B.C.

By monitoring our oceans closely, we will be able to protect this incredible resource for generations to come.

forests, communities and industry could look like with increasing innovation and adaptation. For details on the Pine Beetle Action Plan, go to www.gov.bc.ca/for/

The Province is also implementing Forests for Tomorrow, which is designed to adapt forest and range management to a changing climate. This will involve planting an additional 60 million seedlings over the next four years.

In addition, the Province will reforest areas of Crown land that were affected by the catastrophic wildfires of 2003 and 2004 and by the mountain pine beetle that would otherwise remain unplanted.

■ Protecting our water

B.C.'s water, energy, and climate are intimately linked. Waterpower helped build our province and remains an important clean energy option today and for the future. Energy is necessary to move water through local supply systems, make it potable, and remove waste from water. In areas like the Okanagan, the hot, dry summer months that often lead to low water supplies coincide with times of high energy demands for cooling homes and businesses and for pumping irrigation water.

With climate change potentially increasing the magnitude and frequency of floods and droughts, the patterns of water supply for hydroelectricity will also be altered. Water conservation and efficiency are therefore even more important. Not only do they reduce water and energy use, but they may also better prepare us for adapting to the unavoidable impacts of climate change.

To support water conservation and efficiency, the B.C. government has introduced *Living Water Smart: British Columbia's Water Plan*, outlining how water will be protected in our province. Some measures being taken include:

- A new 10-year commitment to flood prevention, including \$100 million for flood protection to help communities manage flood loss.
- A conservation target that ensures that 50 per cent of new municipal demand is met via conservation by 2020.



- Increasing the number of water monitoring stations in the Province and making information on our drinking water more publicly accessible. Government will publish a report on the state of our water by 2010 and every five years after that.

The province is also working in partnership with the Pacific Coast Collaborative to protect our oceans. Investment in ocean observatory projects, like Project Neptune and Venus, demonstrates the provincial commitment to protecting our ocean resources.



■ Building Carbon Smart communities

Climate change increases the likelihood of severe weather events, which can undermine the safety and security of communities. To help our communities adapt to climate change, the Province is:

- Ensuring that all new development on flood plains will be flood-proofed to provincial standards
- Recognizing climate change impacts in awarding infrastructure grants through the B.C. Ministry of Community Services
- Developing a comprehensive plan for green community development for British Columbia
- Ensuring that community development strategies recognize the importance of streams, rivers, and the areas that surround them.

Weather related devastation across British Columbia

From fires in the Okanagan, to severe wind and rain storms on the west coast and Vancouver Island, to flooding in Squamish, British Columbians are seeing increasing evidence of how weather change can adversely affect their lives.

Climate change is the challenge of our generation, and meeting that challenge is a long-term commitment. As we move forward, the government will update and advance this Climate Action Plan, building on the firm foundation laid during Phase One. Key initiatives now in development will continue taking shape and, in the coming months, British Columbians can expect to see:

▣ **LiveSmart BC**

More support for individuals, families and businesses to reduce their carbon footprints will be announced in the coming months. These programs will assist British Columbians to make lifestyle choices that will save them money and help the environment.

▣ **Additional GHG Reduction Strategies**

The Climate Action Team will make recommendations to the government for greenhouse gas reduction policies that will assist the province to meet its 2020 target in the summer, 2008.

These recommendations will be publicly reviewed and the government will take these recommendations under advisement in determining future greenhouse gas reduction initiatives as required.

▣ **Interim Targets**

As part of its mandate, the Climate Action Team will advise government on appropriate greenhouse gas reduction targets for 2012 and 2016. Targets for these years will be set into law by the end of 2008 as required by the Greenhouse Gas Reduction Targets Act.

▣ **The Western Climate Initiative**

The beginnings of a new cap and trade system for industry will be formulated by British Columbia and its partners in the Western Climate Initiative. Broad parameters of the system's design are expected by September 2008.





Public Education and Information

The Cabinet Committee on Climate Action, chaired by the Premier, brings together key ministries to make policy related to greenhouse gas reduction and climate change adaptation. The CCCA includes the Ministries of Environment, Finance, Energy Mines and Petroleum Resources, Small Business and Revenue, Transportation, Forests and Range, Labour and Citizens' Services, and Community Services.

A Climate Action Secretariat has also been established and is co-ordinating climate action across government and in partnership with citizens, communities, industries and businesses. The Secretariat has ongoing dialogue with British Columbians from all over the province.

For details, go to www.climateactionsecretariat.gov.bc.ca/

Together, the Cabinet Committee on Climate Action and the Climate Action Secretariat have engaged with over 450 groups, individuals and businesses on the topic of climate action since May 2007. For details, see Appendix H.

■ Western Climate Initiative Stakeholder Engagement

The WCI is committed to including stakeholders in the development of the cap and trade program. Many opportunities have been provided to facilitate the collection of stakeholder feedback to subcommittee design work over the past several months, in the form of workshops, teleconferences and webinars.

Stakeholders have also provided written comments to subcommittees' Major Design Options released in January 2008. See appendix C for more details.

■ Citizens' Conservation Councils

Citizens' Conservation Councils (CCC) will be established in the coming months to help build a network for grassroots climate action across British Columbia. The regional councils will advise government and their local community public on the best ways for individuals to help reduce GHG emissions and contribute to climate action initiatives.

Climate Action Team

The Climate Action Team is a "blue ribbon" panel of leaders from environmental organisations, private enterprise, the scientific community, First Nations, and academia. Formed in November 2007, it consists of 22 members and is chaired by Cheryl Slusarchuk, president of the Premier's Technology Council.

The Climate Action Team's role is to make expert recommendations on credible, aggressive, and economically viable interim targets for 2012 and 2016. This will bridge the gap between policy measures that have already been announced and the 33 percent emissions reduction target. The group will also provide advice on the government's commitment to become carbon neutral by 2010. CAT will release its recommendations in a report due in the Summer 2008. This report will then be publicly reviewed via the Ministry of Environment's website.

■ Engaging British Columbians

The government is also moving forward to broaden the dialogue and better engage with British Columbians provincewide through the following forums:

- **Sectoral Consultations:** The Province has continued to engage in dialogue with industries to help identify the most practical greenhouse gas emissions strategies.

Symposiums have been held across the province involving the participation of the forest industry, mining, oil and gas producers, waste and landfill management, agriculture, labour, and transportation. The sessions are solution-oriented as government and key economic groups come together to explore options and determine next steps.

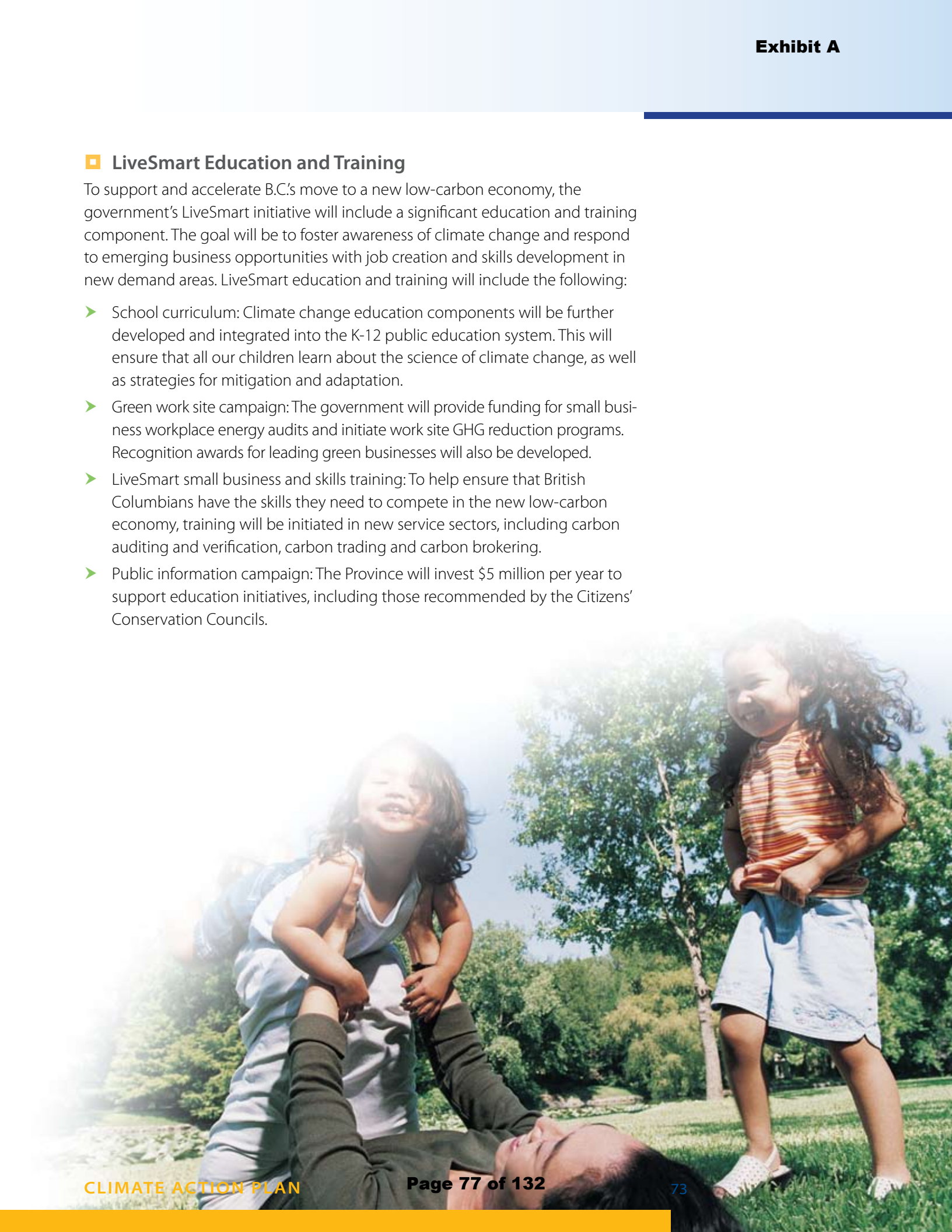
- **Youth Dialogue:** Youth representatives from across the Province gathered in Vancouver in April to discuss how youth and government could work together to inspire the Province's young people to take action on climate change issues and encourage more British Columbians to live lower-carbon lifestyles. At the same time, a Youth Climate Action Leadership Alliance was announced to provide a forum for youth to engage on climate action projects including public engagement activities, and projects related to mitigation and adaptation in the Province. This engagement with our province's youth will continue.
- **Faith Dialogue:** B.C. faith leaders came together in April to discuss climate change. The summit provided an opportunity for various religious communities to work together to support a low-carbon future. It is expected that Faith leaders will continue to engage positively on climate action in the future.



■ LiveSmart Education and Training

To support and accelerate B.C.'s move to a new low-carbon economy, the government's LiveSmart initiative will include a significant education and training component. The goal will be to foster awareness of climate change and respond to emerging business opportunities with job creation and skills development in new demand areas. LiveSmart education and training will include the following:

- School curriculum: Climate change education components will be further developed and integrated into the K-12 public education system. This will ensure that all our children learn about the science of climate change, as well as strategies for mitigation and adaptation.
- Green work site campaign: The government will provide funding for small business workplace energy audits and initiate work site GHG reduction programs. Recognition awards for leading green businesses will also be developed.
- LiveSmart small business and skills training: To help ensure that British Columbians have the skills they need to compete in the new low-carbon economy, training will be initiated in new service sectors, including carbon auditing and verification, carbon trading and carbon brokering.
- Public information campaign: The Province will invest \$5 million per year to support education initiatives, including those recommended by the Citizens' Conservation Councils.



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Appendix A: Status of 2007 Climate Action Commitments

OVERALL		PROGRESS
1.	Will look to new ways to encourage overall tax savings through shifts in behaviour that reduce carbon consumption.	B.C.'s revenue-neutral carbon tax was introduced in Budget 2008 and will begin July 1, 2008. Budget 2008 also included \$1 billion in new climate action spending.
2.	Will ensure school curricula inform students how they can reduce individual impacts.	The Ministry of Education and BC Hydro are implementing plans to inform students.
3.	Will work to develop a sensible, efficient system to register, trade, and purchase carbon offsets and credits.	The Climate Action Secretariat is working with B.C.'s Western Climate Initiative Partners to build a common system. Cap and trade legislation was passed in the spring, 2008.
4.	A Citizen's Conservation Council will be established and funded.	Under development and will be announced in late-2008.
5.	Will fund up to one-third of the infrastructure costs of a new sewage treatment facility for Greater Victoria.	The Province and the Capital Regional District have partnered and are determining options.
6.	A Climate Action Team will be established.	The Climate Action Team is meeting monthly and will release its report in summer, 2008.
7.	Interim targets will be set for 2012 and 2016.	The targets will be determined by the Climate Action Team and legally mandated, through regulation by the end of 2008.
8.	Longer-term 2050 target will be set.	The target has been legislated: at least 80 percent below 2007 levels by 2050.
9.	B.C. will work with California to assess and address the impacts of climate change on our ocean resources.	An MOU was signed May 31, 2007 formalizing B.C.'s and California's commitment.
10.	Forge new partnerships across both provincial and national boundaries.	B.C. has joined The Western Climate Initiative, The Climate Registry, the International Carbon Action Partnership and the Pacific Coast Collaborative.
11.	Forge a new Pacific Coast Collaborative.	B.C. has signed Memorandums of Understanding with California, Washington, Oregon and has invited others to join.
ENERGY		
12.	All electricity produced in B.C. will be required to have net-zero greenhouse gas emissions by 2016.	Completed February 2007 with launch of the Energy Plan.
13.	Eliminate all routine flaring at oil and gas producing wells and production facilities by 2016 with an interim goal of reducing flaring by half (50 per cent by 2011)	Completed February 2007 with launch of the Energy Plan.
14.	\$25-million Innovative Clean Energy Fund will be established to encourage the commercialization of alternative energy solutions.	Applications have been received and the first round of projects will be announced in mid 2008.
15.	90 per cent of B.C.'s electricity to come from clean, renewable sources.	Completed February 2007 with launch of the Energy Plan.
16.	Will require 100 per cent carbon sequestration for any new coal-fired project; no GHG emissions will be permitted for coal-fired electricity projects anywhere in British Columbia.	Completed February 2007 with launch of the Energy Plan.
17.	New technologies will be encouraged to "green the grid" and reduce energy losses in transmission.	Both BC Hydro and BCTC are working with EMPR.
TRANSPORTATION		
18.	California tailpipe emission standards for all new vehicles sold in B.C. will be phased in between 2009 and 2016.	Enabling legislation was passed in Spring, 2008.
19.	Low-carbon fuel standard will be established.	Legislation passed spring 2008.
20.	\$2,000 sales tax exemption on new hybrid vehicles will be extended.	Complete.

21.	Will create electrified truck stops and support anti-idling measures for heavy vehicles.	The Ministry of Transportation is working collaboratively with public and industry partners to develop a network of electrified truck stops across the Province.
22.	New regional transit options will be established for our major urban areas in the Lower Mainland, the Fraser Valley, the Capital Regional District and the Okanagan.	\$14-Billion Transit Plan announced in January 2008.
23.	New measures will be implemented to encourage and dramatically increase local transit alternatives.	\$14-Billion Transit Plan announced in January 2008.
24.	Electronic tolls will help restrain traffic growth.	Ministry of Transportation is examining options to address this issue.
25.	Transit funding to be developed and work in concert with decisions to increase densities, reduce sprawl, and reduce costs.	Green Communities Legislation was introduced April 2008 including provisions for compact developments and increasing alternate transportation use.
26.	A federal-provincial partnership will invest \$89 million for hydrogen fuelling stations and 20 fuel-cell buses.	Project is fully funded and contracts for buses and fuelling stations have been awarded. First bus will begin testing in Victoria in July 2008.
27.	Will encourage a hydrogen highway from Whistler to San Diego by 2020.	B.C. is partnering with Washington, Oregon and California. Update of Hydrogen Highway and Fuel Cell Strategy expected in 2008.
28.	The Province will seek to electrify ports and reduce container ship carbon emissions in all Canadian ports.	The Ministry of Transportation is working with the Vancouver Port Authority, BC Hydro and Cruise Operators to build cruise ship electrification facilities at the Canada Place Terminal in Vancouver.
29.	Canada Line to be built.	The Canada Line is being built and is anticipated to start service in late 2009.

BUILDINGS

30.	B.C. Green Building Code will be developed.	The first steps to greening the B.C. building code were announced April 2008. Energy and water efficiency revisions will go into effect September 2008.
31.	New incentives to retrofit existing homes and buildings to make them energy efficient will be introduced.	\$60-million LiveSmart BC Energy Incentive Program introduced as part of Budget 2008.
32.	New measures will help homeowners undertake "energy audits" to identify possible energy savings.	\$60-million LiveSmart BC Energy Incentive Program introduced as part of Budget 2008.
33.	Real-time, in-home smart metering will be introduced.	BC Hydro is delivering this \$400-million program. It will be complete by 2012.

PUBLIC SECTOR

34.	Government of British Columbia carbon neutral by 2010.	Greenhouse Gas Reductions Targets Act was given Royal Assent November 2007.
35.	All new cars leased or purchased by the Province will be hybrids.	Complete and ongoing.
36.	New strategies will be launched to promote Pacific Green universities, colleges, hospitals, schools, prisons, ferries, and airports.	A public sector carbon-neutral target has been set for 2010 in Greenhouse Gas Reduction Targets Act.
37.	As the Legislative Buildings are upgraded to meet modern seismic standards, new standards of energy efficiency will be set and met.	In progress. Exterior decorative lighting has been upgraded to LED.
38.	New measures will be taken to reduce energy consumption and emissions in the public sector.	Government has collaborated with B.C. Hydro to create the Public Sector Energy Conservation Agreement.

WASTE

39.	Legislation will be developed to phase in requirements for methane capture at landfills.	Legislated spring 2008.
40.	Beehive burners will be eliminated.	The Ministry of Environment is actively working with industry to prepare a plan to eliminate beehive burners.

FORESTRY	
41. Will substantially increase its tree-planting efforts.	\$161-million Forests for Tomorrow reforestation program underway.
42. Trees infested by the mountain pine beetle will be used to create new, clean energy.	B.C. Bioenergy Strategy was released in January 2008.
COMMUNITIES	
43. New \$40-million LocalMotion Fund will help get people out of their cars and back on their feet.	Complete.
44. New Green Cities Project will foster innovations that reduce our imprint on the planet through sustainable community planning.	First Green City Awards were awarded September 2007 as part of the Green Cities Project. Awards will be given annually for at least the next four years.
45. New measures will be developed to promote "urban forestry" and new community gardens.	Trees for Tomorrow urban afforestation initiative underway.
46. Green City Awards will recognize B.C.'s most environmentally friendly communities.	The First Green City Awards were awarded in September, 2007. Awards will be given annually for at least the next four years (\$2.5 million program).
47. \$21-million Towns For Tomorrow infrastructure program.	Funding provided and the program is in progress.
48. Local governments will be encouraged to exempt small-unit, supportive housing projects from development cost charges and levies.	Green Communities legislation spring 2008.
49. A new assessment class and new tax exemptions for small-unit, supportive housing will be developed for consideration by legislature.	Legislation passed spring 2008
50. Government will work with UBCM and the private sector to develop new incentives to encourage smaller lot sizes and smaller, more energy efficient homes that use less land, less energy, less water, and are less expensive to own.	Government and UBCM signatories of the B.C. Climate Action Charter are investigating new incentives.

Appendix B: Climate Action Team Members

Members

Cheryl Slusarchuk, Pres. Premier's Technology Council (Vancouver)

Shawn Atleo, B.C. Regional Chief for Assembly of First Nations (West Vancouver)

Donna Barnett, Mayor (District of 100 Mile House)

Jeff Burghardt, Pres. Prince Rupert Grain Ltd. (Prince Rupert)

Lyn Brown, VP, Catalyst Paper (Richmond)

Randy McLeod, Pres. BP CanadaEnergy Co. (Calgary)

Joe Van Belleghem, Partner, Three Point Properties (Victoria)

Teresa Coady, Architect, Bunting Coady Architects (Vancouver)

Ian Tostenson, Pres. B.C. Restaurant & Foodservices Assoc. (Vancouver)

Andrew Weaver, School of Earth & Ocean Sciences, UVic (Victoria)

John Robinson, Institute for Resources, Environment & Sustainability, UBC (Vancouver)

Naomi Devine, Common Energy UVic (Victoria)

Peter Robinson, CEO, David Suzuki Foundation (Vancouver)

David Keith, Earth Sciences, University of Calgary (Calgary)

John Walker, President/CEO, FortisBC (Kelowna)

Mossadiq Umedaly, Chairman, Xantrex Technology Inc. (Burnaby)

Ex-Officio Members

Werner Kurz, Pacific Forestry Center (Victoria)

Ken Denman, Cdn. Center for Climate Modelling & Analysis, UVic (Victoria)

Greg Flato, Cdn. Centre for Climate Modelling & Analysis, UVic (Victoria)

John Fyfe, Cdn. Centre for Climate Modelling & Analysis, UVic (Victoria)

Terry Prowse, Dept of Geography, UVic (Victoria)

Frederick Wrona, Dept of Geography, UVic (Victoria)

Special Advisor to CAT

Mark Jaccard, School of Resource & Environmental Management, SFU (Vancouver)

Appendix C: The Western Climate Initiative

www.westernclimateinitiative.org

DESCRIPTION:

The Western Climate Initiative is a collaboration launched in February 2007 to develop regional strategies to address climate change. WCI is identifying, evaluating and implementing collective and cooperative ways to reduce greenhouse gases in the region.

WCI PARTNERS ("F" indicates a founding member):

Arizona (F)	Manitoba	Oregon (F)
British Columbia	Montana	Utah
California (F)	New Mexico (F)	Washington (F)

Quebec

WCI OBSERVERS:

UNITED STATES	CANADA	MEXICO
Alaska	Ontario	Baja California
Colorado	Saskatchewan	Chihuahua
Idaho		Coahuila
Kansas		Nuevo Leon
Nevada		Sonora
Wyoming		Tamaulipas

STAKEHOLDER ENGAGEMENT:

The WCI is committed to including stakeholders in the development of the cap and trade program. Many opportunities have been provided to facilitate the collection of stakeholder feedback to subcommittee design work over the past several months.

Major Documents for Stakeholder Comment

- Jan 3, 2008 - Summary of Major Options (5 documents by subcommittee).
- Mar-Apr 2008 - WCI Draft Recommendations (5 documents by subcommittee).
- May 2008 - WCI Draft Design Recommendations (integrated all subcommittee recommendations and described stakeholder comments to date).

Stakeholder Meetings/teleconferences to August 2008 (more teleconferences may be added by subcommittees)

- Oct-Dec 2007 – 4 public teleconferences to brief stakeholders on progress of the Subcommittees in implementing the WCI Workplan and to seek public comment.
- Jan 10 ~ Portland ~ WCI's First Public Stakeholder Workshop. WCI Partners presented option papers for each subcommittee.
- Week of Feb 11 – Five stakeholder calls divided by subcommittee to review public comments.
- March 26, 2008 - Public Workshop in Vancouver, BC ~ "Designing an Offsets Program for the WCI."
- March 28, 2008 Stakeholder Teleconference - Economic Analysis & Modeling Stakeholder teleconference / webinar.
- April 8, 2008 Stakeholder Teleconference on the Draft Design Recommendations on Reporting.
- April 8, 2008 Stakeholder Teleconference on the Draft Design Recommendations on Allocations.
- April 14, 2008 Stakeholder Teleconference and Webinar on the WCI Economic Modeling Team's work and the assumptions behind the Energy 2020 model and the elements going into the first model runs. This call included a question and answer session for the public.
- May 12, 2008 Stakeholder Teleconference and Webinar on the WCI Economic Modeling team. Preview of initial modeling, including reference case scenario.
- May 21 ~ Salt Lake City ~ Public Workshop: WCI's second major Stakeholder Workshop. WCI Partners presented Draft Design Recommendations.
- June 9th - Economic Modeling Team Stakeholder Teleconference/Webinar
- July 21, 2008 Teleconference and Webinar on the WCI Economic Modeling Team's work: Present initial Phase 2 results using updated model inputs and reflecting stakeholder comments.
- July 29, 2008 ~ San Diego ~ Public Workshop: WCI's third major Stakeholder Workshop. WCI Partners will present the preferred fully integrated plan for consideration and public input.

Appendix D: The Pacific Coast Collaborative

The Pacific Coast Collaborative is a partnership between British Columbia and the states of Washington, Oregon and California. It recognizes our common interests in reducing greenhouse gases, ocean stewardship and the synergies behind collaborative action.

Memorandums of Understanding have been signed with California, Washington and Oregon mapping out areas of common interest and forging new protocols for the sharing of information, best practices and research. They set out a framework for joint actions on climate change and Pacific Ocean conservation, and further strengthen collaboration between the jurisdictions. They include commitments to:

- cap greenhouse gas emissions;
- reduce greenhouse gases from the transportation sector;
- pursue aggressive clean and renewable energy policies; and,
- combine efforts to improve air quality.

Work is underway on standardizing environmental practices and standards for the Ports of Los Angeles, Long Beach, Seattle/Tacoma, Portland, Vancouver and Prince Rupert.

The collaborative will play a significant role in coordinating climate action policy and building public literacy on climate change across the region.

B.C.-CALIFORNIA AGREEMENT (May 31, 2007)

Memorandum of Understanding between The Province of British Columbia and The State of California on Pacific Coast Collaboration to Protect Our Shared Climate and Ocean

PREAMBLE

THE PROVINCE OF BRITISH COLUMBIA AND THE STATE OF CALIFORNIA,

Committed to leading the world in sustainable environmental management;

Agreed that the science is clear, global warming is real, and the more timid the response, the harsher the consequences will be;

Resolved to see decisive and immediate action taken to address greenhouse gas emissions that are impacting the climate and the environment of Pacific coastal jurisdictions, and the world;

Recognizing that greenhouse gas emissions, and specifically excess CO₂, is also acidifying the ocean and significantly threatening and altering habitats and wildlife;

Committed to collaboration with other North American governments to maximize the impact of our joint actions on climate change, and protect and maintain the health and productivity of our oceans;

Agreed that the full engagement of our governments on climate change with citizens, leaders from business, communities, tribes, First Nations, environmental advocates, the academic and scientific community, and federal and local governments is crucial to fostering a new personal conservation ethic and to ultimate success;

Sharing a common vision of Pacific North America as the centre of innovation and sustainable living in the Pacific Century;

NOW THEREFORE HEREBY AGREE AS FOLLOWS:

Action on Climate Change

- I. British Columbia and California commit to work together to:
 - A. **Cap greenhouse gas emissions.**
By 2020, greenhouse gas emissions will be reduced to 1990 levels or below in our respective jurisdictions consistent with provincial and state policies. This will be accomplished through reductions in British Columbia and California, but also through our participation in the Western Regional Climate Action Initiative. British Columbia and California will continue to work with the other jurisdictions involved to develop a multi-sector market-based program and promote regional climate change emission reduction policies.
 - B. **Reduce greenhouse gases from the transportation sector.**
Adopt a low-carbon fuel standard and greenhouse gas tailpipe emissions standards in British Columbia that would be consistent with California's laws and regulations.
 - C. **Pursue aggressive clean and renewable energy policies.**
Support and adopt policies to create more renewable energy development and transmission, and energy efficiency consistent with the laws and regulations of California, British Columbia, or other governments in the region that may choose to participate in this effort.
 - D. **Build a Hydrogen Highway from British Columbia to Baja California.**
Work with Baja California, Oregon, and Washington to extend the Hydrogen Highway so that by 2010, a hydrogen-powered vehicle may be able to travel and refuel from Baja California to British Columbia ("BC to BC").
 - E. **Combine efforts to improve air quality.**
Explore policies to reduce pollution from traffic along the Pacific highway corridor, including support for measures that reduce truck idling such as electrification of truck stops and congestion reduction.
 - F. **Coordinate efforts to encourage clean technologies.**
Identify opportunities to encourage the use of clean technologies, such as enhanced carbon capture and sequestration in the region, both terrestrial and geologic.
 - G. **Monitor and record improvements.**
Develop a common data inventory with respect to air quality and greenhouse gas emissions.

Action on our Shared Pacific Ocean

- II. British Columbia and California commit to work together to share information about coastal and ocean resources; and develop a common data inventory, data systems and indicators of oceans health, to undertake initiatives including, but not limited to:
 - A. The development, monitoring and management of marine protection areas off our coasts.
 - B. Synchronization of environmental protection at our ports to reduce greenhouse gas emissions and improve air quality, and to protect ocean resources around port complexes, working with our respective federal governments as necessary.

- C. Strengthen linkages and build upon the investments made in “sea -floor observatories” such as NEPTUNE, VENUS and MARS (Saanich Inlet, Juan de Fuca tectonic plate and Monterey Bay respectively).

Partnerships

1. British Columbia and California commit to work together to:
 - A. Form alliances with leaders from business, California tribes and British Columbia First Nations, environmental advocates, and scientists, and work with federal and local governments, to assist with the accomplishment of climate change goals.
 - B. Foster collaborative academic and industry research, development and commercialization activities delivering the technology solutions necessary to accomplish climate change goals.
 - C. Identify opportunities for collaboration in other areas of mutual interest.

Measuring Progress – Ensuring Results

2. British Columbia and California will set common benchmarks for measuring the health of our ocean and climate to ensure that agreed actions produce results.

Limitations

- V. This Memorandum of Understanding is not intended to be legally binding or to impose legal obligations on either British Columbia or California and will have no legal effect. Neither British Columbia nor California is responsible for the actions of third parties or associates who may be involved in activities outlined in this Memorandum of Understanding.

B.C.-WASHINGTON AGREEMENT (June 8, 2007)

THE STATE OF WASHINGTON AND THE PROVINCE OF BRITISH COLUMBIA,

Sharing a common border and a longstanding relationship of friendship and trust;

Acting on our Memorandum of Cooperation of 2005 to enter into specific cooperative arrangements on matters of common interest;

Committed to leading the world in sustainable environmental management;

Agreed that the science is clear, global warming is real, and the more timid the response, the harsher the consequences will be;

Resolved to see decisive and immediate action taken to address greenhouse gas emissions that are impacting the climate and the environment of Pacific coastal jurisdictions, and the world;

Recognizing that greenhouse gas emissions, and specifically excess CO₂, is also acidifying the ocean and significantly threatening and altering habitats and wildlife;

Committed to collaboration with other North American governments to maximize the impact of our joint actions on climate change, and protect and maintain the health and productivity of our oceans;

Agreed that the full engagement of our governments on climate change with citizens, leaders from business, communities, tribes, First Nations, environmental advocates, the academic and scientific community, and federal and local governments is crucial to fostering a new personal conservation ethic and to ultimate success;

Sharing a common vision of Pacific North America as the center of innovation and sustainable living in the Pacific Century;

NOW THEREFORE HEREBY AGREE AS FOLLOWS:

Action on Climate Change

- I. Washington and British Columbia commit to work together to:
 - A. **Cap greenhouse gas emissions.**
By 2020, greenhouse gas emissions will be reduced to 1990 levels or below in our respective jurisdictions consistent with provincial and state policies. This will be accomplished through reductions in Washington and British Columbia, but also through our participation in the Western Regional Climate Action Initiative. Washington and British Columbia will continue to work with the other jurisdictions involved to develop a multi-sector market-based program and promote regional climate change emission reduction policies.
 - B. **Reduce greenhouse gases from the transportation sector.**
Explore alternative fuel sources and adopt a greenhouse gas tailpipe emissions standard in Washington and British Columbia that would be consistent with California laws and regulations.
 - C. **Pursue aggressive clean and renewable energy policies.**
Support and adopt policies to create more renewable energy development and transmission, and energy efficiency consistent with the laws and regulations of Washington, British Columbia, or other governments in the region that may choose to participate in this effort.
 - D. **Combine efforts to improve air quality.**
Explore policies to reduce pollution from traffic along the Pacific highway corridor, including support for measures, reduce truck idling, such as electrification of truck stops, traffic congestion, ferry emissions, and encourage smart community growth.
 - E. **Coordinate efforts to encourage clean technologies.**
Identify opportunities to encourage the use of clean technologies, such as enhanced carbon capture and sequestration in the region, both terrestrial and geologic.
 - F. **Monitor and record improvements.**
Develop a common data inventory with respect to air quality and greenhouse gas emissions.

Action on our Shared Pacific Ocean

- II. Washington and British Columbia commit to work together to:
 - A. Share information about coastal and ocean resources and develop a common data inventory, data systems and indicators of ocean health including building upon the investments made in “sea-floor observatories” such as NEPTUNE and VENUS.
 - B. Share best practices on protecting marine habitat off our coasts.
 - C. Synchronize environmental protection at our ports to reduce greenhouse gases emissions and improve air quality, and to protect ocean resources around port complexes, working with our respective federal governments as necessary.

- D. Establish a Washington-British Columbia Coastal and Ocean Task Force to coordinate and act on these and other coastal and oceans issues.

Partnerships

- III. Washington and British Columbia commit to work together to:
 - A. Form alliances with leaders from business, Washington tribes and British Columbia First Nations, environmental advocates and scientists, and work with federal and local governments to assist with the accomplishment of climate change goals.
 - B. Foster collaborative academic and industry research, development and commercialization activities delivering the technology solutions necessary to accomplish climate change goals.

Action on Additional Areas for Mutual Benefit

- 3. Washington and British Columbia commit to work together to:
 - A. Bring Pacific Coast governors and their key cabinet members together to forge a new Pacific Coast Collaborative to establish a framework for leadership and cooperative action on additional areas of mutual interest and benefit for the Pacific coast region, including:
 - Climate change;
 - Oceans;
 - Clean Energy;
 - Regional transportation;
 - Innovation, research and development;
 - Enhancing a sustainable regional economy, especially with respect to environmental goods and services;
 - Emergency management; and
 - Other areas as determined that would benefit from cooperative action.
 - B. Implement, as a first step, the initiatives set out in the Appendix of this Memorandum, that have been agreed by our respective Cabinet members, including:
 - Washington – British Columbia Coastal and Ocean Task Force
 - Washington – British Columbia Forest Memorandum of Understanding

Limitations

- 4. The undersigned signatories agree that this Memorandum of Understanding shall have no legal effect or impose a legally binding obligation on either Washington or British Columbia. Neither Washington nor British Columbia shall be responsible for the actions of third parties who may participate in the activities outlined in this Memorandum of Understanding.

Washington - British Columbia Coastal and Ocean Task Force

TERMS OF REFERENCE

Mandate:

The Washington – British Columbia Coastal and Ocean Task Force (COTF) is established to provide a mechanism to enhance collaboration between the State of Washington and the Province of British Columbia on coastal and ocean issues. The geographic area of interest includes Puget Sound, the Georgia Basin, and the outer coasts of Washington and British Columbia.

Task Force Goals:

- Increase communication between governments on ocean and coastal issues.
- Foster collaborative activities to improve the health of shared marine waters.
- Monitor, and report on progress to protect our marine waters.

Objectives:

To provide a transboundary forum to share information and collaborate on activities that:

- protect and restore coastal and marine habitats;
- encourage the development of ecosystem management approaches for ocean and coastal resources; and
- foster sustainable coastal communities and development.

Activities:

The Task Force will undertake activities to:

- promote the exchange of technical and scientific information;
- identify priority transboundary issues and recommend collaborative actions; and
- sponsor and participate in international conferences and workshops on issues of mutual interest.

Task Force Membership:

Washington and British Columbia will appoint co-chairs who will be responsible for ensuring broad representation on the Task Force from coastal and ocean resource management agencies in respective jurisdictions.

Task Force Operations

The Task Force will develop an Annual Work Plan for approval the British Columbia-Washington Environmental Cooperation Council.

The Task Force will develop action plans and status reports on priority issues.

The Task Force will generally meet two times a year or as required.

Reporting:

The Task Force will report to the Governor and Premier through the British Columbia-Washington Environmental Cooperation Council and report on progress at an annual meeting of Washington and British Columbia governments.

B.C.–OREGON AGREEMENT (Oct 23, 2007)

MEMORANDUM OF UNDERSTANDING BETWEEN THE PROVINCE OF BRITISH COLUMBIA AND THE STATE OF OREGON ON PACIFIC COAST COLLABORATION TO PROTECT OUR SHARED CLIMATE AND OCEAN

PREAMBLE

THE PROVINCE OF BRITISH COLUMBIA AND THE STATE OF OREGON,

Sharing a common ocean and a strong common vision for protecting the resource and the environment of Pacific coastal jurisdictions;

Recognizing that scientific consensus has developed that increasing emissions of human-caused greenhouse gases (GHGs), including carbon dioxide, methane and other GHGs, that are released into the atmosphere are affecting the Earth's climate;

Recognizing that climate change could have severe environmental and economic impacts on Pacific North America in coming decades;

Agreed that action is needed to reduce greenhouse gas emissions and that many of these actions can have significant economic and environmental benefits for British Columbia and Oregon;

Agreed therefore that action now is both a moral and economic imperative;

Committed to collaboration with other North American governments, such as through the Western Climate Initiative and the Climate Registry, to maximize the impact of our joint actions on climate change, and protect and maintain the health and productivity of our oceans;

Agreed that the full engagement of our governments on climate change with citizens, leaders from business, communities, British Columbia First Nations and Oregon Tribes, environmental advocates, the academic and scientific community, and federal and local governments is crucial to fostering a new personal conservation ethic and to ultimate success;

Sharing a common vision of Pacific Coast jurisdictions as the world leader in sustainable technologies and sustainable living;

NOW THEREFORE HEREBY AGREE AS FOLLOWS:

Action on Climate Change

I. British Columbia and Oregon commit to work together to:

A. *Cap greenhouse gas emissions.*

Ensure the success of regional efforts to combat global warming by active engagement in the Western Climate Initiative, an ambitious collaboration to develop a cap and trade system for Western North America, as well as other market-based mechanisms to reduce greenhouse gas emissions. As part of the Western Climate Initiative, both jurisdictions have committed to the regional goal of reducing greenhouse gas emissions to 15 percent below 2005 levels by 2020, and have also committed to ambitious individual provincial and state goals. British Columbia and Oregon will also continue to work with the other Western Climate Initiative jurisdictions to develop other strategies to reduce greenhouse gas emissions, particularly in the transportation sector.

- B. ***Reduce greenhouse gases from the transportation sector.***
Explore cleaner transportation solutions, including biofuels, innovative engine technologies and transportation strategies, and the adoption of a low-carbon fuel standard and greenhouse gas tailpipe emissions standards in British Columbia and Oregon that would be consistent with California laws and regulations.
- C. ***Pursue aggressive clean and renewable energy policies.***
Support and adopt policies to create more renewable energy development, with a particular joint focus on policies to promote our shared interest in the promising ocean renewable energy sector.
- D. ***Build a Pacific “Hydrogen Highway.”***
Promote collaboration on promising hydrogen and fuel cell technology and explore developing hydrogen fueling infrastructure so that by 2010, a hydrogen-fueled vehicle can travel and refuel from British Columbia through Washington and Oregon to California.
- E. ***Combine efforts to improve air quality.***
Explore policies to reduce pollution from traffic along the Pacific highway and ports corridors, including support for measures which reduce truck idling such as electrification of truck stops, congestion reduction, and smart community growth.
- F. ***Climate Change Adaptation.***
Build regional capacity to understand and address the challenges posed by climate change to Pacific coastal jurisdictions by enhancing and coordinating within our jurisdictions climate monitoring networks, regional centers of applied climate science and regional emergency planning.

Action on our Shared Pacific Ocean

- II. British Columbia and Oregon commit to work together to:
 - A. ***Share information about coastal and ocean resources.***
Share research and information gained through our existing and expanding ocean observation systems with a particular focus on sharing research regarding near-shore species and habitats.
 - B. ***Cooperate on environmental protection at our ports.***
Cooperate on environmental protection at our ports to reduce greenhouse gas emissions, improve air quality, and combat entry of non-native invasive marine species.
 - C. ***Keep our ocean clean.***
Work together to keep our common ocean clean, including efforts to decrease non-point source pollution and to respond effectively to oil spills.

Partnerships

- 5. British Columbia and Oregon commit to work together to:
 - A. Form alliances with leaders from business, British Columbia First Nations and Oregon tribes, environmental advocates, and scientists, and work with federal and local governments, to assist with the accomplishment of climate change goals.

- B. Foster collaborative academic and industry research, development and commercialization activities delivering the technology solutions necessary to accomplish climate change goals.

Action on Additional Areas for Mutual Benefit

- 6. British Columbia and Oregon commit to work together to:
 - A. Investigate using an integrated ecosystems marketplace to create economic opportunities and incentives to sustain our natural environments and the range of services they provide.
 - B. Establish a framework for leadership and cooperative action on additional areas of mutual interest and benefit for the Pacific coast region, such as:
 - Clean Energy;
 - Regional transportation;
 - Innovation, research and development;
 - Enhancing a sustainable regional economy, especially with respect to environmental good and services;
 - Emergency management; and
 - Other areas as determined that would benefit from cooperative action.

Limitations

- 7. The undersigned signatories agree that this Memorandum of Understanding shall have no legal effect or impose a legally binding obligation on either British Columbia or Oregon. Neither British Columbia nor Oregon shall be responsible for the actions of third parties or associates who may participate in activities outlined in this Memorandum of Understanding.

AGREED as to form and content and signed and dated in two (2) duplicate originals in Vancouver, British Columbia this 23rd day of October, 2007.

Appendix E: The Climate Registry Members

www.theclimateregistry.org

Mandate:

The Registry's goal is to provide an accurate, complete, consistent, transparent and verified set of greenhouse gas emissions data supported by a robust reporting and verification infrastructure. Through this effort, the Registry encourages early action to reduce greenhouse gas emissions and supports future greenhouse gas reduction efforts across North America.

Members:

CANADIAN PROVINCES		
British Columbia	Ontario	Saskatchewan
Manitoba	Prince Edward Island	Quebec
New Brunswick		
AMERICAN STATES		
Alabama	Maryland	Oklahoma
Arizona	Massachusetts	Oregon
California	Michigan	Pennsylvania
Colorado	Minnesota	Rhode Island
Connecticut	Missouri	South Carolina
Delaware	Montana	Tennessee
Florida	Nevada	Utah
Georgia	New Hampshire	Vermont
Hawaii	New Jersey	Virginia
Idaho	New Mexico	Washington
Illinois	New York	Washington, D.C.
Iowa	North Carolina	Wisconsin
Kansas	Ohio	Wyoming
Maine		
AMERICAN INDIAN TRIBES		
Campo Kumeyaay Nation	Pueblo of Acoma	Southern Ute Indian Tribe
MEXICAN STATES		
Baja California	Coahuila	Sonora
Chihuahua	Nuevo Leon	Tamaulipas

Appendix F: International Carbon Action Partnership

<http://www.icapcarbonaction.com/>



A coalition of European countries, U.S. states, Canadian provinces, New Zealand and Norway launched the International Carbon Action Partnership (ICAP) on October 29, 2007 in Lisbon, Portugal. ICAP is made up of countries and regions that have implemented or are actively pursuing the implementation of carbon markets through mandatory cap and trade systems. The partnership will provide a forum to share experience and knowledge and to ensure the programs are able to work together as the foundation of a global carbon market. Such a market will boost demand for low-carbon products and services, promote innovation, and allow cost effective reductions in greenhouse gas emissions.

European Union Members

- European Commission
- France
- Germany
- Greece
- Ireland
- Italy
- Netherlands
- Portugal
- Spain
- United Kingdom

Regional Greenhouse Gas Initiative (RGGI) Members

- Maine
- Maryland
- Massachusetts
- New Jersey
- New York

Western Climate Initiative (WCI) Members

- Arizona
- British Columbia
- California
- Manitoba
- New Mexico
- Oregon
- Washington

Other Members

- New Zealand
- Norway
- Australia

Appendix G: Local Communities Climate Action Charter

Local governments that sign the B.C. Climate Action Charter pledge to become carbon neutral, and measure and report on their community's greenhouse gas emissions profile, and work to create compact, more energy-efficient communities. The Province introduced the B.C. Climate Action Charter to work collaboratively with signatory local governments and UBCM to positively affect climate change. More than 125 local governments are now signed on to the B.C. Climate Action Charter with the Province and the Union of BC Municipalities (UBCM), committing to become carbon neutral by 2012.

THE BRITISH COLUMBIA CLIMATE ACTION CHARTER BETWEEN THE PROVINCE OF BRITISH COLUMBIA (THE PROVINCE) AND THE UNION OF BRITISH COLUMBIA MUNICIPALITIES (UBCM) AND SIGNATORY LOCAL GOVERNMENTS (THE PARTIES)

1. **The Parties share the common understanding that:**
 - a. Scientific consensus has developed that increasing emissions of human caused greenhouse gases (GHG), including carbon dioxide, methane and other GHG emissions, that are released into the atmosphere are affecting the Earth's climate;
 - b. the evidence of global warming is unequivocal and the effects of climate change are evident across British Columbia;
 - c. reducing GHG emissions will generate environmental and health benefits for individuals, families, and communities;
 - d. climate change and reducing GHG emissions are issues of importance to British Columbians;
 - e. governments urgently need to implement effective measures to reduce GHG emissions and anticipate and prepare for climate change impacts;
 - f. protecting the environment can be done in ways that promote economic prosperity; and
 - g. it is important to take action and to work together to share best practices, to reduce GHG emissions and address the impacts of climate change.
2. **The Parties acknowledge that each has an important role in addressing climate change and that:**
 - a. The Province has taken action on climate change, including commitments made in the 2007 Speech from the Throne, the BC Energy Plan, and the Western Climate Initiative on climate change;
 - b. Local Governments have taken action on climate change, including planning livable, sustainable communities, encouraging green developments and transit oriented developments, and implementing innovative infrastructure technologies including landfill gas recapture and production of clean energy; and
 - c. these actions create the foundation for the Parties to be leaders in affecting climate change
3. **This Charter acknowledges that:**
 - a. The interrelationship between each Order of Government's respective jurisdictions and accountabilities with respect to communities, and activities related to and within communities, creates both a need and an opportunity to work collaboratively on climate change initiatives;

- b. both Orders of Government have recognized a need for action, both see that the circumstances represent a Climate for Change in British Columbia, and both are responding; and
- c. the actions of each of the Parties towards climate change will be more successful if undertaken jointly with other Parties.

4. **The Parties share the common goals of:**

- a. Fostering co-operative inter-governmental relations;
- b. aiming to reduce GHG emissions, including both their own and those created by others;
- c. removing legislative, regulatory, policy, or other barriers to taking action on climate change;
- d. implementing programs, policies, or legislative actions, within their respective jurisdictions, that facilitate reduced GHG emissions, where appropriate;
- e. encouraging communities that are complete and compact and socially responsive; and
- f. encouraging infrastructure and a built environment that supports the economic and social needs of the community while minimizing its environmental impact.

5. **In order to contribute to reducing GHG emissions:**

- a. Signatory Local Governments agree to develop strategies and take actions to achieve the following goals:
 - i. being carbon neutral in respect of their operations by 2012, recognizing that solid waste facilities regulated under the Environmental Management Act are not included in operations for the purposes of this Charter.
 - ii. measuring and reporting on their community's GHG emissions profile; and
 - iii. creating complete, compact, more energy efficient rural and urban communities (e.g. foster a built environment that supports a reduction in car dependency and energy use, establish policies and processes that support fast tracking of green development projects, adopt zoning practices that encourage land use patterns that increase density and reduce sprawl.)
- b. The Province and the UBCM will support local governments in pursuing these goals, including developing options and actions for local governments to be carbon neutral in respect of their operations by 2012.

6. **The Parties agree that this commitment to working together towards reducing GHG emissions will be implemented through establishing a Joint Provincial-UBCM Green Communities Committee and Green Communities Working Groups that support that Committee, with the following purposes:**

- a. To develop a range of actions that can affect climate change, including initiatives such as: assessment, taxation, zoning or other regulatory reforms or incentives to encourage land use patterns that promote increased density, smaller lot sizes, encourage mixed uses and reduced GHG emissions; development of GHG reduction targets and strategies, alternative transportation opportunities, policies and processes that support fast-tracking of green development projects, community gardens and urban forestry; and integrated transportation and land use planning;
- b. to build local government capacity to plan and implement climate change initiatives;

- c. to support local government in taking actions on becoming carbon neutral in respect of their operations by 2012, including developing a common approach to determine carbon neutrality for the purposes of this Charter, identifying carbon neutral strategies and actions appropriate for the range of communities in British Columbia and becoming reporting entities under the Climate Registry; and,
 - d. to share information and explore additional opportunities to support climate change activities, through enhanced collaboration amongst the Parties, and through encouraging and promoting climate change initiatives of individuals and businesses within communities.
7. **Once a common approach to carbon neutrality is developed under section (6)(c), Signatory Local Governments will implement their commitment in 5 (a) (i).**
 8. **To recognize and support the GHG emission reduction initiatives and the climate change goals outlined in this Charter, Signatory Local Governments are invited by the other Parties to include a statement of their initiatives and commitments as an appendix to this Charter.**
 9. **This Charter is not intended to be legally binding or impose legal obligations on any Party and will have no legal effect.**

Sixty-two local governments presented Premier Gordon Campbell with a copy of their signed B.C. Climate Action Charter on Sept. 26, 2007 and since then an additional 44 local governments have signed the charter, including:

100 Mile House	Nakusp
Abbotsford	Nanaimo City
Bowen Island	Nanaimo, RD
Cache Creek	Nelson
Campbell River	New Denver
Capital Regional District	North Cowichan
Cariboo Regional District	North Saanich
Castlegar	North Vancouver City
Central Kootenay Regional District	North Vancouver District
Central Okanagan Regional District	Oak Bay
Central Saanich	Okanagan-Similkameen Regional
Chase	District
Chetwynd	Osoyoos
Chilliwack	Peace River Regional District
Colwood	Peachland
Comox Strathcona Regional District	Penticton
Coquitlam	Pitt Meadows
Courtenay	Port Clements
Cowichan Valley Regional District	Port Moody
Creston	Pouce Coupe
Dawson Creek	Powell River City
Delta	Powell River Regional District
Duncan	Prince George

Enderby	Prince Rupert
Fernie	Qualicum Beach
Fort St. John	Queen Charlotte
Fort St. James	Quesnel
Fraser Valley Regional District	Saanich
Fraser Fort George Regional District	Salmon Arm
Fruitvale	Sayward
Gibsons	Sidney
Golden	Skeena Queen Charlotte Regional District
Grand Forks	Sooke, District
Harrison Hot Springs	Spallumcheen
Highlands	Sunshine Coast Regional District
Islands Trust	Surrey
Kamloops	Tahsis
Kaslo	Taylor
Kelowna	Telkwa
Keremeos	Terrace
Kimberley	Thompson Nicola Regional District
Ladysmith	Trail
Lake Country	Ucluelet
Lake Cowichan	Valemount
Langford	Vancouver
Langley, Township	Vanderhoof
Lantzville	Vernon
Lumby	Victoria
Logan Lake	View Royal
Mackenzie	Warfield
Maple Ridge	Whistler
Merritt	White Rock
Metro Vancouver	Williams Lake
Mission	

Appendix H: Groups Engaged with the Cabinet Committee on Climate Action and the Climate Action Secretariat

The following list reflects organizations that have either presented to the Cabinet Committee on Climate Action, met with Climate Action Secretariat staff, or been invited to attend the Premier's symposia across the province.

A Rocha Canada Field Study Centre	BC Cattlemen's Association	Beth Tikvah Congregation
Adanac Molybdenum Corp.	BC Chamber of Commerce	Better Environmentally Sound Transportation
Advisory Committee Meeting - UBC	BC Chicken Growers' Association	Bill Reid Foundation
Ahavat Olam Synagogue	BC Conservation Corp	Biodiversity BC
Air and Waste Management Association	BC Cranberry Growers' Association	BP Canada Energy Company
Air Spray Ltd.	BC Egg Producers' Association	Brandt Tractor
Akaki Singh Sikh Temple	BC Farm Industry Review Board	British Columbia Salmon Farmers Association
Alcan Inc.	BC Federation of Labour	British Columbia Women's Institute
Alliance Pipeline	BC First Nations Forestry Council	British Consul General
Anglican Diocese of New Westminster	BC Food Processors Association	Brookfield LePage Johnson Controls - Workplace Solutions Inc. (BLJC-WSI)
Aqua-Tex Scientific Consulting	BC Forest Safety Council	Buddhist Churches of Canada
Asset Strategics Ltd.	BC Fruit Growers Association	Building Owners and Managers Association BC
Assoc. for Mineral Exploration BC	BC Government Employees Union	Bull, Housser & Tupper LLP
Associated Ginseng Growers of BC	BC Grain Producers Association	Bunting-Coady Architects
Association of BC Forestry Professionals	BC Grasslands Conservation Council	Business Council of British Columbia
Association of International Automobile Manufacturers of Canada	BC Greenhouse Growers Association	California Energy Commission
Association of Professional Economists of BC	BC Hydro	Campus Climate Action Network
Association of Professional Engineers and Geoscientists of B.C.	BC Innovation Council	Canada Green Building Council
Aza-e-Hussain Association of BC	BC Institute for Technology	Canada Maritime Conference
Az-Zahraa Islamic Centre	BC Investment Management Corporation	Canada West Foundation
B.C. Federation of Labour	BC Landscape and Nursery Association	Canadian Association of Petroleum Producers
B.C. Log Spill Recovery Co-operative Association	BC Livestock Producers Co-op	Canadian Bioenergy Corp
B.C. Solar Roofs	BC Milk Producers	Canadian Boreal Initiative
Baha'i Council of British Columbia and the Yukon	BC Muslim Association	Canadian Carbon Trust
Baha'i Vancouver	BC Public Affairs Bureau	Canadian Chemical Producers' Association
Ballard Power Systems Inc.	BC Public Service Agency	Canadian Energy Pipeline Association
Baptist Union of Western Canada	BC Raspberry Growers' Association	Canadian Homebuilder's Association of BC
BC Agriculture Council	BC Raspberry Growers' Association	Canadian Jewish Congress
BC Agriculture Environmental Initiatives	BC Sheep Breeders Co-op	Canadian Lime Institute
BC Association of Aboriginal Friendship Centres	BC Stats	Canadian Manufacturers and Exporters Assoc.
BC Association of Cattle Feeders	BC Sustainable Energy Association	Canadian Memorial Environmental Group
BC Automobile Association	BC Technology Institute Association	Canadian Memorial Peace Centre
BC Blueberry Council	BC Transit	Canadian Memorial United Church
BC Business Council	BC Turkey Growers' Association	Canadian Merchant Service Guild
BC Camous Ministries	BC Water & Waste Association	Canadian Natural Resources Limited
BC Car Dealers Association	BC Wine Institute	Canadian New West Group Inc.
	BC Wood Specialties Group	Canadian Parks and Wilderness Society
	Beth Israel Congregation	

Canadian Petroleum Products Institute	ConocoPhillips Canada	Forest Products Association of Canada
Canadian Ramgharia Society	Copper Canyon Resources	Forest Science Board
Canadian Renewable Fuels Association	Cornell University, NY	Forest Stewardship Council
Canadian Singh Sabha Gurdwara	Council Of Forests Industries	Forestry Innovation Investment Ltd.
Canadian Society for Unconventional Gas	Council of the Haida Nation	Forestry Roundtable
Canadian Wind Energy Association	Creston Valley Wildlife Management	FortisBC
Canfor Corporation	CSA International	FPIInnovations
Canwest Waste	Daimler AG	Frances Kelsey Secondary
Capital Regional District	Dali Lama Society	Fraser Basin Council
Carbon Credit Corp.	Dart Marine Inc.	Free-Will Productions
Carbon Planet Pty Ltd	David Suzuki Foundation	Friends of Northwest Weather & Avalanche Center
Carbonetworks	Daybreak	Friends Society
Cariboo Horse Loggers Association	Deloitte & Touche LLP	Fuji Hindu Temple
Cascadia Biofuels	Department for Environment, Food and Rural Affairs, UK	Genome BC
Catalyst Paper Corporation	Devon Canada Corporation	GeoExchange BC
Catholic Archdiocese of BC	Dockside Green Development	Graymont Ltd.
Catholic Justice and Social Service	Domtar Pulp and Paper Company Inc	Greater Victoria Public Library
Canadian Center for Policy Alternatives - Climate Justice Project	Earth Charter Youth Initiative	Greek Orthodox Community of East Vancouver
Center for Energy and Environmental Innovation	Eckankar Canada	Green Business Magazine
Cement Association of Canada	EcoEco - Ecology, Economy Community	Green Dragon's Den Event
Center for Integral Economics	Ecotrust Canada Capital	Greenpeace
Chamber of Shipping of BC	Edward Milne Secondary	Gulf Log Salvage Co-Operative Association
Church of Jesus Christ of Latter Day Saints	Eitzchaim Congregation	Gurdwara Khalsa Darbar
Cisco Systems Inc.	Elevate Consulting	Gurdwara Sahib York Centre Society,
City of Vancouver	Elk Valley Coal Corporation	Gurdwara Shri Hargobind Sahib Sikh Society
Climate Action Partnership	Emily Carr Institute	Guru Nanak Sikh Temple
Cloverdale Sikh Society	Enbridge Inc.	Gurwara Sahib Dasmesh Darbar
CN Rail	EnCana Corporation	Halcrow Consulting Inc
Coast Forest Loggers Association	Energy Climate Action Roundtable	Hare Krishna Temple
Collaborative for Advanced Landscape Planning	Environment for Change	Harris/Decima Research
Columbia Bible Institute	Environmental Defence	Heenan Blaikie LLP
Colwood City Hall	EPCOR Utilities Inc.	Helifor Canada Corp
Committee for Racial Justice	Equity Research Associates	HeliJet Intl. Inc.
Common Energy, UVic	European Union	Hollyhock Leadership Institute
Community Economic Development Network	Finning Canada	Homebuilders Assoc.
Community Energy Association	First Baptist Church	Howe Sound Pulp and Paper
Conair Group Inc.	First Nation Summit	Hupacasath First Nation (Port Alberni)
Conference Board of Canada	First Nations Agriculture Association	Hydrogen and Fuel Cells Canada
Congregation Beth Hamidrash	First Nations Leadership Council	IISD (International Institute for Sustainable Development)
Congregation Har El	Fleet Challenge Canada	Imperial Metals Corporation
Congregation Or Shalom	Forest Nursery Association of BC	Independent Lumber Remanufacturers Assoc. of B.C.
Congregationalist Wiccan Association of BC	Forest Practices Board	

Institute for Research on Public Policy	Metro Vancouver	North West Community College Mining department
Institute of Public Administration of Canada	Millwork Manufacturers Association	North West Loggers Association
Insurance Bureau of Canada	Mining Assoc of BC	NorthWest CruiseShip Association
Insurance Corporation of BC	Ministry of Aboriginal Relations	NovaGold Resources
Integrated Land Management Bureau	Ministry of Ad Ed	Novex Clean Couriers
InterFaith Chaplains Society	Ministry of AG	Oil and Gas Commission
Interior Logging Association	Ministry of AgLand	Okanagan Kootenay Cherry Growers Assn
International Emissions Trading Association	Ministry of Children and Families	Olympic Secretariat
International Finance Corporation	Ministry of Community Services	Ormat Technologies Inc.
International Financial Centre	Ministry of Econ Devel	Pace Group
International Forest Products	Ministry of Education	Pacific Academy
International WOOD MARKETS Group Inc.	Ministry of EMPR	Pacific Climate Impacts Consortium (PCIC)
Interspiritual Centre	Ministry of ENV	Pacific Energy Group
Investment Agriculture Foundation of BC	Ministry of Finance	Pacific Forestry Centre
IPPBC - Independent Power Producers BC	Ministry of Forests	Pacific InterChristian Community
Ismaili Council of BC	Ministry of Health	Pacific Interfaith Citizenship Association
ITT Technical Institute	Ministry of LCS	Pacific Northwest Economic Region
James Hoggan & Associates Inc.	Ministry of SBR	Pacific Redeemer College
Jewish Federation of Greater Vancouver	Ministry of Transportation	Pacific Regeneration Technologies
Kabir Cultural Centre	Ministry of TSA	Pacific Schools
Kairos - Vancouver	Mission Gur Sikh Society	Partnerships BC
Kal Tire	Multifaith Action Society	Pearson College
Khalsa Diwan Society Sikh Temple	Municipal Finance Authority	Pembina Institute
KinderMorgan Canada	Murphy Oil Company	PHH Fleet Management Corporation
Kwantlen College	Muslim Canadian Federation	Plasco Energy Corp.
Lafarge North America Cement	Musqueam First Nation	Polaris Minerals Corp.
Lakeland Productions	NaiKun Wind Development Inc.	Pope and Talbot
Land Conservancy	Namgis First Nations	Powerex - BC Hydro
Land Reserve Commission	Nanaksar Gurdwara Gursikh Temple	Powerex Corp.
Langara College	National Assoc. of Canadians of Origin India	Premier's Technology Council
LegaciesNow	National Research Council	Presbyterian Church in Canada
Legend Power	National Research Council's Institute for Fuel Cell Innovation	Presbyterian Synod of BC
Legislative Assembly staff	National Roundtable on the Environment and the Economy	PriceWaterhouse Coopers
Lehigh Northwest Cement Limited	Native Friendship Centre	Professional Engineers and Geologists of BC
Living Offset	Natsource LLC	Professional Institute of the Public Service of Canada
Lutheran BC Synod	Nature Trust	Progress Energy Trust
Lutheran Urban Mission Society	New Car Dealers Association of BC	Progressive Animal Welfare Society
Mark K Jaccard & Associates	NewTec Environmental Services	Projecting Change Film Festival
Markron Tech	Nexen Inc.	Provincial Capital Commission
Mathematics of Information Technology & Complex Systems	Next Generation of Industrial Gasifications Systems	Pulp and Paper Technical Association of Canada
Mennonite Church of British Columbia	Norman Keevil Mining School at UBC	PW Trenchless Construction
Merit Mining Corporation		Quantification Protocol Development Session

Quarterly Provincial Forum with NGOs	Taku River Tlingit FN	Vancouver Port Authority
Raymond James Equity Research Canada	Taseko Mines Limited	Vancouver School of Theology
Redcorp Ventures Ltd.	Teck Cominco Limited	Vedic Cultural Society of BC
Reel Green BC	Temple Shalom	Vedic Hindu Society of B.C.
Resort Municipality of Whistler	Teresen Gas	Victoria Real Estate Board
Richmond Intercultural Advisory	Terrane Metals Corp.	Victoria Transport Policy Institute
Rimfire Minerals Corporation	The Climate Group	Washington Forest Protection Association
Rivendell Retreat Centre	The Coca Cola Company	Wastewater Research Centre
Roman Catholic Archdiocese of Vancouver	Thomas Merton Society	West Coast Dharma Society
Royal BC Museum	Thompson Creek Metals	West Fraser Timber Co. Ltd
Royal Roads University	Thompson Rivers University	Western Canada Wilderness Cttee
S.U.C.C.E.S.S.	Tibetan Buddhist Society	Western Canadian Coal Corp.
Salman Partners Inc.	Tides Canada Foundation	Western Dynasonics
Salvation Army	Tin Lok Ng, Chinese community outreach	Western Keltic Mines Inc.
Sandor Derrick Consulting	Tolko Industries Ltd.	WestPac LNG
Sauder School of Business	TransCanada Pipelines	Westport Innovations Inc.
Schara Tzedek Congregation	Translink	Windmill Developments
School of Community and Regional Planning	Trinity Western University	Wood Mackenzie
Sealweld/GES (TL)	Truck Loggers' Association	Wood Pellet Association of Canada
Selkirk Metals Corporation	Trucking Association	World Wildlife Fund Canada
Selkirk Secondary	Ts'kw'aylaxw	Youth for Environmental Stewardship BC
Shaarey Tefilah Synagogue	Tzu Chi Society	Zawiyah Foundation
Shell Canada Limited	Union of BC Municipalities	Zen Centre of Vancouver
Shiv Mandir Temple	United Church of Canada	Zoroastrian Society of B. C.
Shree Mahalakshmi Temple	United Flower Growers Cooperative Association	
Sierra Club BC	UnityBlue Energy Insight Consulting	
Sierra Club Youth Coalition	University Campus Ministries	
Sierra Systems Group Inc.	University College of the Fraser Valley	
Sikh Temple Sukhsagar	University of Calgary	
Simon Fraser University	University of British Columbia	
Simon Fraser University	University of Victoria	
SLR Consulting (Canada) Ltd.	University President's Council	
Soka Gakkai International Vancouver	Upper Similkameen Indian Band	
Southern Interior Local Government Association	Urban Development Institute	
Spectra Energy Corp.	UVic - Institute for Climate Change Solutions	
Spectra Energy Transmission	VanCity	
Spirit in the Workplace	Vancouver Board of Trade	
St. George Greek Orthodox Cathedral	Vancouver Community College	
Surrey Board of Trade, Youth Leaders of Today	Vancouver Foundation	
Sustainable Forestry Initiative Inc.	Vancouver Island Health Authority	
Sustainable Poultry Farming Group	Vancouver Native Health Society	
Tahltan Central Council	Vancouver Olympic Committee	
Take the Lead BC	Vancouver Order of Sufi Order International	

Appendix I: A Quantitative Analysis of British Columbia's Climate Action Plan – Prepared by MK Jaccard and Associates Inc

A Quantitative Analysis of British Columbia's Climate Action Plan

June 12, 2008

Prepared for:
British Columbia Climate Action Secretariat

Prepared by:
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Introduction

Context

The Climate Action Secretariat has retained M.K. Jaccard and Associates to refine the analysis of climate change mitigation options for British Columbia. MKJA uses a detailed energy-economy model called CIMS to evaluate energy and climate change policies and to determine the cost of reducing greenhouse gas emissions. A description of CIMS is provided as an appendix to this report.

In this project, the CIMS model is used to estimate the magnitude of greenhouse gas reductions that would be obtained throughout British Columbia's economy when different types and strengths of policy signals are applied (e.g., various levels of emissions charge applied through a cap-and-trade system, or direct regulation of absolute emissions and emissions intensity).

The concept of a reference scenario and policy scenario is used to determine the greenhouse gas abatement opportunities in British Columbia over time. The reference scenario shows how British Columbia's economy might evolve in the absence of specific policies to reduce greenhouse gas emissions. The policy scenario shows how the economy might evolve under a given policy. The difference between the two scenarios is due to the effect of the policy.

The purpose of this report is to allow staff at the CAS to review a reference scenario and policy scenario that include the policies announced by the provincial government. The report also tests how sensitive the results are to different forecasts of energy prices.

A Quantitative Analysis of British Columbia's Climate Action Plan

The reference scenarios

The reference scenarios described in this report are based on internally consistent assumptions about how the economy may evolve over the coming 12 years to 2020. Many key assumptions underlying the reference scenario are highly uncertain, and if the economy evolves differently than as shown in this reference scenario, energy consumption and emissions will also differ from what we show here. We have used credible sources to guide key assumptions wherever possible, but no amount of research allows perfect foresight into the future of the economy. As a result, the scenarios described here should be considered possible scenarios out of an array of scenarios. We consider the results to be good forecasts, based on historic trends and research into likely future technological and economic evolution, but the uncertainty remains large.

To capture some of the uncertainty about the evolution of the economy over the simulation period, we provide two alternative reference scenarios that reflect different assumptions about future energy markets and energy prices. The first scenario uses energy prices based on the National Energy Board's (NEB) "Continuing Trends" scenario from Canada's Energy Future (2007). In this scenario, the high current energy prices spur investment in new energy supplies around the world, causing energy prices to moderate over the simulation period. The second scenario uses higher energy prices, based on the NEB's "Fortified Islands" scenario. This scenario is characterized by geopolitical tensions; major energy consuming countries pursue energy security by emphasizing the development of resources within their sphere of influence. Despite high energy prices, many countries with relatively cheap energy resources have difficulty accessing capital to develop their resources, and high energy prices persist throughout the simulation period. We also developed a third policy scenario with very high energy prices, which we discuss at the end of the report.

The differences in energy consumption and emissions between the two energy price scenarios are not meant to represent the effect of government policy. Instead, they are intended to show the results under different assumptions about future energy markets, and they are both possible outcomes. We have not attached probabilities to the different scenarios.

We begin by highlighting our key assumptions and then show the results of our forecast.

Key economic drivers and assumptions

CIMS uses an external forecast for the economic or physical output of each economic sector to develop the business as usual forecast, which can be internally adjusted when a policy is applied.

For all demand sectors, the external forecast through 2020 is based on the same data used by Natural Resources Canada (NRCAN) to develop the Canada's Energy Outlook¹. The population forecast used here is based on the growth scenario reported by BCStats², and is shown in Table 1.

1 Natural Resources Canada, 2006, "Canada's Energy Outlook: The Reference Case 2006", Analysis and Modelling Division, Natural Resources Canada.

2 BCStats, 2007, "Population Projections – BC and Regional : 2007-2036", available from: <http://www.bcstats.gov.bc.ca/DATA/pop/pop/popproj.asp>.

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Table 1: British Columbia demographic forecast

	UNITS	2005	2010	2015	2020
Population	thousands	4,258	4,527	4,808	5,073

For the energy supply sectors, the output forecast is based on the demand for energy from all other sectors, coupled with a forecast of imports and exports of energy commodities. The import and export forecast for electricity is based on NRCan's CEO 2006 forecast through 2020. We have assumed coal generation is allowed to compete in the reference case, and that no nuclear generation will be built in British Columbia.

The import and export forecast for fossil fuels is calculated by subtracting our in-house forecast of domestic oil and gas consumption from a forecast of total production of crude oil and natural gas. British Columbia's crude oil production forecast between 2000 and 2020 is based on the moderate growth case of the Canadian Association of Petroleum Producers 2007 report. Marketable natural gas production in British Columbia between 2000 and 2020 is based on NRCan's CEO 2006 forecast.³ Due to the depletion of conventional oil and gas reserves in British Columbia and reflection of the moratorium on offshore development, natural gas supply in British Columbia is projected to continue decline afterwards. However, the development of tight gas, coal bed methane and other less conventional resources offsets part of the natural gas supply reduction during the modelling period.

The development of oil and gas supplies in British Columbia is assumed to remain the same in both energy price scenarios. The development of oil and gas may be higher in the higher energy price scenario and additional sensitivities can be examined to evaluate this potential.

In the policy scenarios, we assume that net exports of electricity and coal remain fixed at the levels in the reference case. For crude oil and natural gas in the policy scenarios, we assume that total provincial production of the commodity is fixed (this is shown in Table 2), and adjust net exports based on the difference between total production and domestic demand.

The reference case economic outlook adopted for this analysis is shown in Table 2. The outlook for year 2005 is based on historic data, and is the same in all energy price scenarios. During each policy simulation, the output of each sector may change in response to changes in the costs of the sector. For example, an increase in the cost of air travel is likely to cause a decline in the person kilometers travelled by air.

Table 2 shows more moderate growth rates in most sectors in the high energy price scenario, with the exception of the electricity generation and biofuels sectors. The higher energy prices are likely to reduce the rate of growth in sectors that rely on refined petroleum products and natural gas, specifically the transportation sector. However, the higher prices for refined petroleum products and natural gas also encourage the consumption of electricity, coal and biofuels, and these sectors increase at a faster rate in the high energy price scenario.

³ Canadian Association of Petroleum Producers, 2007, "Crude oil forecast, markets, and pipeline expansions", June 2007; Natural Resource Canada "Canada's Energy Outlook: The Reference Case 2006". Analysis and Modelling Division; National Energy Board, 2007, "Canada's Energy Future: Reference Case and Scenarios to 2030".

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Table 2: Reference case output forecast

UNITS		2005	LOW ENERGY PRICE			HIGH ENERGY PRICE		
			2010	2015	2020	2010	2015	2020
Demand Sectors								
Residential	thousands of households	1,676	1,862	2,037	2,206	1,862	2,037	2,206
Commercial	million m ² of floorspace	85	100	117	134	99	114	130
Transportation								
Passenger	billion passenger-km	71	80	87	95	79	85	92
Freight	billion tonne-km	121	145	161	176	139	150	160
Manufacturing Industry								
Chemical Products	million tonnes ^a	0.5	0.6	0.8	0.9	0.6	0.8	0.9
Industrial Minerals	million tonnes ^b	2.7	2.9	3.2	3.4	2.9	3.1	3.3
Metal Smelting	million tonnes ^c	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Mining	million tonnes	85	91	93	93	90	92	92
Pulp and Paper	million tonnes ^d	2.9	2.9	3.0	3.1	2.8	2.9	3.0
Other Manufacturing	Billion \$ 2005 GDP	14.8	16.8	19.1	21.5	16.8	18.9	21.3
Supply Sectors								
Electricity Generation	TWh	64	74	79	78	77	87	90
Petroleum Refining	million m ³	2.7	3.6	4.7	5.5	3.0	3.4	4.0
Crude Oil	thousand barrels per day	30	27	23	19	27	23	19
Natural Gas	billion m ³ ^e	27	28	31	30	28	31	30
Coal Mining	million tonnes	28	28	30	30	27	32	32
Ethanol	TJ	101	302	377	417	313	420	497
Biodiesel	TJ	101	218	259	320	245	377	578

Notes: ^a chemical product output is the sum of chlor-alkali, sodium chlorate, hydrogen peroxide, ammonia, methanol, and petrochemical production.

^b industrial mineral output is the sum of cement, lime, glass, and brick production

^c metal smelting is the sum of aluminum, nickel, lead, copper and zinc smelting

^d pulp and paper output is the sum of linerboard, newsprint, coated and uncoated paper, tissue and market pulp production

^e natural gas production includes coalbed methane

CIMS requires an external forecast for fuel prices. As for sectoral output, fuel prices can change while a policy scenario is running if the policy induces changes in the cost of fuel production. Reference case prices for most fuels through 2020 are derived from the recent energy outlook published by the NEB. The prices in the low energy price scenario are based on the NEB's "Continuing Trends" scenario, and the prices in the high energy price scenario are based on the "Fortified Islands" scenario. The industrial and electricity coal price forecasts were derived from forecasts by the US Environmental Protection Agency and NRCAN's forecast.⁴ Table 3 shows the fuel price forecasts used to develop the reference case forecasts in this report.

⁴ National Energy Board, 2007, "Canada's Energy Future: Reference Case and Scenarios to 2030", National Energy Board; Natural Resources Canada, 2006, "Canada's Energy Outlook: The Reference Case 2006", Analysis and Modelling Division, Natural Resources Canada.

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Table 3: Reference case price forecast

UNITS		LOW ENERGY PRICE			HIGH ENERGY PRICE		
		2010	2015	2020	2010	2015	2020
World Energy Price							
Crude Oil ^a	2005 \$US / barrel	50.00	50.00	50.00	85.00	85.00	85.00
Natural Gas ^b	2005 \$US / GJ	6.77	6.77	6.77	11.51	11.51	11.51
Exchange Rate	\$US / \$CDN	0.94	1.01	1.07	0.93	1.01	1.08
British Columbia							
Natural Gas							
Industrial	2005 \$ / GJ	8.58	7.42	7.18	10.56	12.13	11.73
Residential	2005 \$ / GJ	11.65	9.25	8.94	13.63	13.95	13.49
Commercial	2005 \$ / GJ	10.52	8.14	7.87	12.52	12.84	12.42
Electricity	2005 \$ / GJ	7.59	6.39	6.42	9.35	10.44	10.49
Coal							
Market	2005 \$ / GJ	3.36	3.36	3.36	4.66	4.66	4.66
Electricity	2005 \$ / GJ	1.22	1.19	1.48	1.69	1.65	2.05
Gasoline	2005 \$ / GJ	24.61	23.36	22.58	30.60	29.04	28.07
Diesel	2005 \$ / GJ	19.42	18.43	17.81	25.40	24.11	23.30
Electricity							
Industrial	2005 \$ / GJ	10.94	10.98	11.21	11.40	12.19	12.85
Residential	2005 \$ / GJ	18.33	18.36	18.71	19.10	20.38	21.45
Commercial	2005 \$ / GJ	15.49	15.53	15.86	16.14	17.24	18.18

Notes: ^a West Texas Intermediate crude oil price at Cushing, Oklahoma

^b Henry Hub natural gas price at Erath, Louisiana

The oil prices in both scenarios are considerably lower than prices at time of writing, but higher than the long-term price forecasts of many leading international agencies, which are in turn based on estimates of the long-run production costs of conventional oil and its closest substitutes.

Policies included in the reference case

Both the federal and provincial governments have developed energy and climate policies over the past few years. We have attempted to include the most important of these in the reference case developed here. In particular, we include:

- The federal renewable power production incentive, which provides \$0.01/kWh for renewable energy production during the first 10 years after commissioning of a new renewable energy facility;
- The federal ethanol excise tax exemption of \$0.10/L and the provincial \$0.11/L tax exemption for ethanol;
- The planned federal minimum energy performance standards for household appliances.
- Subsidies to energy efficient personal vehicles, household appliances and residential shells provided under the federal ecoENERGY program.

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Reference case energy and emissions outlook

Based on the key economic assumptions highlighted above, we used CIMS to develop an integrated reference case forecast for energy consumption and greenhouse gas emissions through 2020. The CIMS model captures virtually all energy consumption and production in the economy.

The reference case forecast for total energy consumption for both scenarios is shown in Table 4, while Table 5 through Table 7 show natural gas, refined petroleum product, and electricity consumption. The residual energy consumption of other fuel types (total minus natural gas, refined petroleum product, and electricity) is not explicitly shown in this report.

Table 4: Reference case total energy consumption

	UNITS	2005	LOW ENERGY PRICE			HIGH ENERGY PRICE		
			2010	2015	2020	2010	2015	2020
Demand Sectors								
Residential	PJ	155	160	168	182	158	160	168
Commercial	PJ	123	136	155	174	134	147	161
Transportation	PJ	359	398	431	462	378	391	411
Manufacturing Industry	PJ	419	421	435	449	415	424	436
Supply Sectors								
Electricity Generation	PJ	262	317	357	354	324	405	427
Petroleum Refining	PJ	10	13	17	21	11	13	15
Crude Oil	PJ	6	5	4	3	5	4	3
Natural Gas	PJ	127	121	125	114	121	122	110
Coal Mining	PJ	21	21	22	22	21	23	24
Ethanol	PJ	0	0	0	0	0	0	0
Biodiesel	PJ	0	0	0	0	0	0	0
Total	PJ	1,482	1,593	1,715	1,781	1,567	1,689	1,755

Note: Producer consumption of energy (e.g., consumption of hog fuel in the pulp and paper sector or refinery gas in the petroleum refining sector) is included in these totals. Energy consumption in the electricity generation sector includes consumption of water, wind, and biomass using coefficients adopted from the International Energy Agency.⁵

⁵ International Energy Agency, 2007, "Energy Balances of OECD Countries: 2004-2005". Renewable electricity generation is assumed to require 1 GJ of energy (e.g., wind, hydro) for each GJ of electricity generated.

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Table 5: Reference case natural gas consumption

	UNITS	2005	LOW ENERGY PRICE			HIGH ENERGY PRICE		
			2010	2015	2020	2010	2015	2020
Demand Sectors								
Residential	PJ	84	78	80	89	71	61	63
Commercial	PJ	59	64	74	85	62	65	70
Transportation	PJ	2	1	0	0	1	0	0
Manufacturing Industry	PJ	93	87	93	101	80	69	62
Supply Sectors								
Electricity Generation	PJ	17	47	56	55	37	47	51
Petroleum Refining	PJ	1	2	3	4	2	2	2
Crude Oil	PJ	4	3	3	2	3	3	2
Natural Gas	PJ	111	105	106	95	104	102	91
Coal Mining	PJ	2	2	2	1	1	1	1
Ethanol	PJ	0	0	0	0	0	0	0
Biodiesel	PJ	0	0	0	0	0	0	0
Total	PJ	373	389	417	433	362	352	343

Table 6: Reference case refined petroleum product consumption

	UNITS	2005	LOW ENERGY PRICE			HIGH ENERGY PRICE		
			2010	2015	2020	2010	2015	2020
Demand Sectors								
Residential	PJ	0	1	1	2	1	1	2
Commercial	PJ	4	3	4	4	3	3	4
Transportation	PJ	357	396	430	460	376	389	408
Manufacturing Industry	PJ	21	16	16	16	16	18	19
Supply Sectors								
Electricity Generation	PJ	0	0	0	0	0	0	0
Petroleum Refining	PJ	8	11	14	16	9	10	12
Crude Oil	PJ	1	1	1	1	1	1	1
Natural Gas	PJ	11	11	13	13	11	13	13
Coal Mining	PJ	12	11	12	12	11	13	13
Ethanol	PJ	0	0	0	0	0	0	0
Biodiesel	PJ	0	0	0	0	0	0	0
Total	PJ	415	451	491	524	430	449	471

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Table 7: Reference case electricity consumption

	UNITS	2005	LOW ENERGY PRICE			HIGH ENERGY PRICE		
			2010	2015	2020	2010	2015	2020
Demand Sectors								
Residential	PJ	62	73	79	82	78	90	96
Commercial	PJ	60	69	77	85	69	78	87
Transportation	PJ	0	1	1	1	1	1	1
Manufacturing Industry	PJ	100	104	105	105	108	120	131
Supply Sectors								
Electricity Generation	PJ	0	0	0	0	0	0	0
Petroleum Refining	PJ	1	1	1	0	1	1	0
Crude Oil	PJ	0	0	0	0	0	0	0
Natural Gas	PJ	5	5	6	6	5	7	7
Coal Mining	PJ	1	1	1	1	1	1	1
Ethanol	PJ	0	0	0	0	0	0	0
Biodiesel	PJ	0	0	0	0	0	0	0
Total	PJ	229	253	270	281	263	298	324

Based on total energy consumption as well as process emissions in the industrial sector and energy supply sectors, we show our calculated greenhouse gas emissions associated with the reference case forecast in Table 8.

Table 8: Reference case greenhouse gas emissions

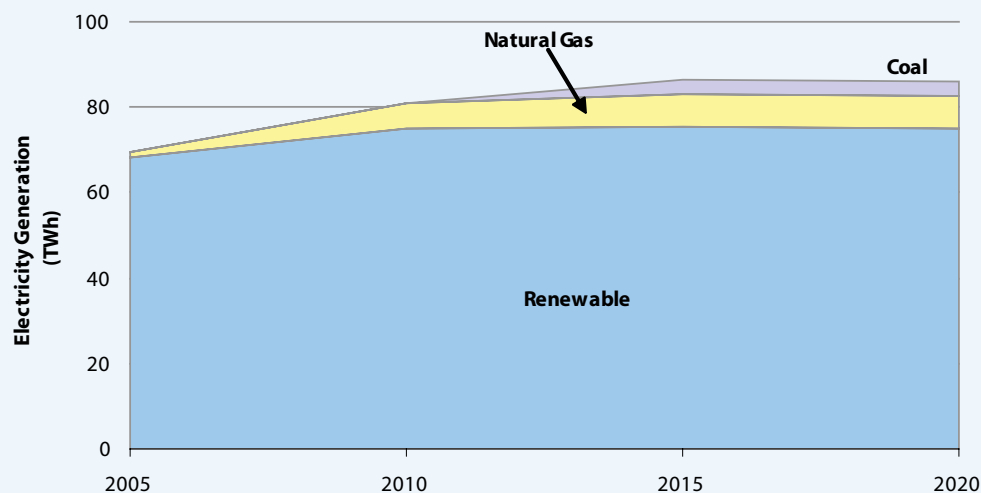
	UNITS	2005	LOW ENERGY PRICE (L-REF)			HIGH ENERGY PRICE (H-REF)		
			2010	2015	2020	2010	2015	2020
Demand Sectors								
Residential	Mt CO2e	4.4	4.1	4.3	4.8	3.8	3.3	3.4
Commercial	Mt CO2e	3.2	3.5	4.0	4.6	3.4	3.6	3.8
Transportation	Mt CO2e	25.6	28.4	30.7	32.9	27.0	27.8	29.2
Manufacturing Industry	Mt CO2e	9.5	9.0	9.3	9.8	8.4	7.9	7.6
Waste and Agrosystems	Mt CO2e	6.0	6.3	6.5	6.7	6.3	6.5	6.7
Supply Sectors								
Electricity Generation	Mt CO2e	0.9	2.4	5.5	5.3	1.9	8.3	9.3
Petroleum Refining	Mt CO2e	0.5	0.8	1.0	1.2	0.6	0.7	0.9
Crude Oil	Mt CO2e	0.7	0.7	0.5	0.4	0.7	0.5	0.4
Natural Gas	Mt CO2e	11.1	10.8	11.4	10.7	10.7	11.2	10.4
Coal Mining	Mt CO2e	2.1	2.1	2.3	2.2	2.1	2.4	2.5
Ethanol	Mt CO2e	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Biodiesel	Mt CO2e	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	Mt CO2e	64.3	68.0	75.5	78.7	64.8	72.3	74.3

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Table 8 shows that in the absence of new policies to control greenhouse gas emissions, emissions are expected to grow from current levels in both energy price scenarios. However, the growth in greenhouse gas emissions is more moderate in the high energy price scenario – emissions grow by 16% between 2005 and 2020 in the high energy price scenario, and by 22% in the low energy price scenario. In the low energy price scenario, greenhouse gas emissions increase in all sectors of British Columbia's economy except natural gas and oil extraction. The transportation sector contributes the greatest increase in emissions in this scenario. In the high energy price scenario, many sectors experience a decline in greenhouse gas emissions; however the decline is offset by a substantial increase in emissions from the electricity sector.

Figure 1 and Figure 2 illustrate the utility generation of electricity by fuel type in the low and high energy price scenarios, respectively. The supply of electricity is met mostly by renewable sources – primarily hydroelectricity with some wind. In the absence of any regulatory policy, we also project an increase in the electricity generated from fossil fuels – coal and natural gas. The high energy price scenario shows a greater increase in electricity generation from coal, because the price for natural gas is much more sensitive to the higher world prices for energy. The price for natural gas in the high energy price scenario is approximately \$4/GJ higher than the low energy price scenario, whereas the price for coal is only \$0.6/GJ higher, therefore discouraging electricity generation from natural gas.

Figure 1: Utility generation of electricity by fuel type in L-Ref



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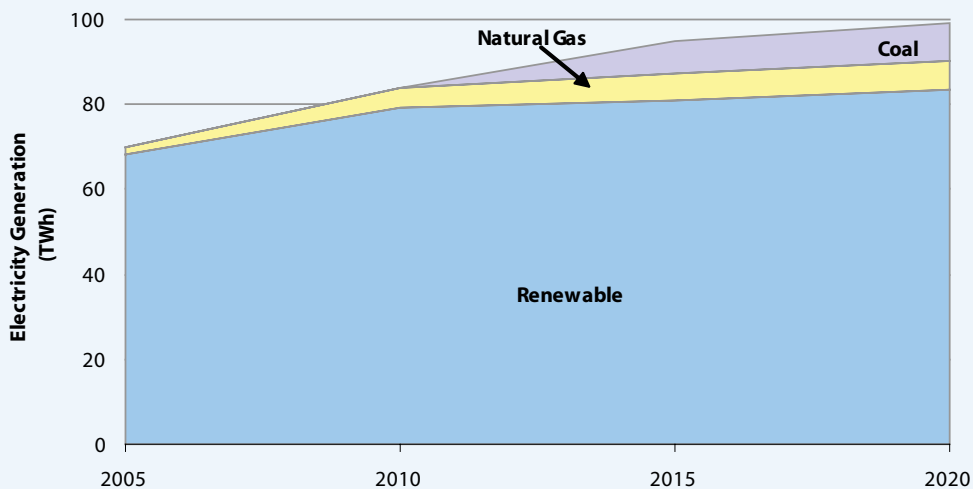
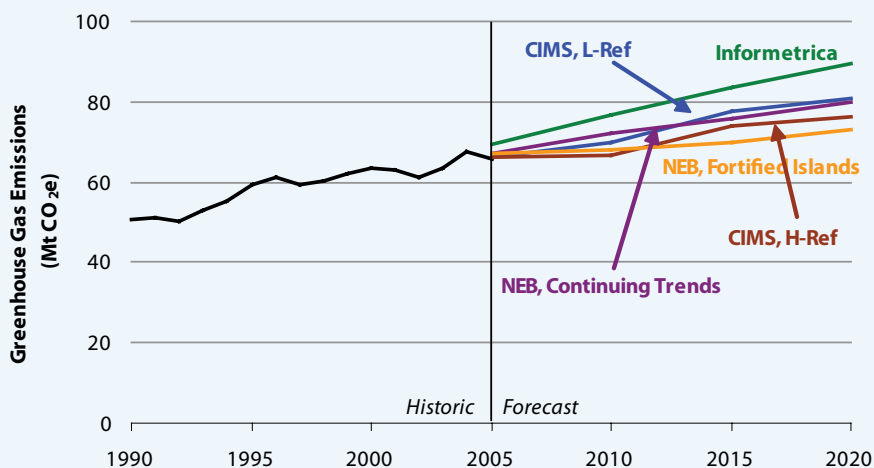
Figure 2: Utility generation of electricity by fuel type in H-Ref**The reference case in context**

Figure 3 compares the total greenhouse gas emissions reported in this reference case to the forecasts by the NEB in Canada's Energy Future 2007, and a recent forecast by Informetrica Ltd. prepared for the federal government. The figures show that the results from CIMS are similar to other efforts to project the greenhouse gas emissions from British Columbia. The NEB forecast shows British Columbia's greenhouse gas emissions increasing from 51 Mt CO₂e in 1990 to 80 Mt and 73 Mt in 2020, in the "Continuing Trends" and "Fortified Islands" scenarios respectively. The results from CIMS show greenhouse gas emissions increasing to 79 Mt and 74 Mt in 2020 in the low and high energy price scenarios – which use the energy prices from the "Continuing Trends" and "Fortified Islands" scenarios, respectively. The difference between the forecasts from CIMS and the NEB is due primarily to higher emissions growth from electricity generation.

Figure 3: Reference case greenhouse gas emissions

Source: Historic data are from Environment Canada, 2008, "Greenhouse gas Inventory".

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Quantitative policy analysis

This section provides a quantitative analysis of the greenhouse gas mitigation policies that have been announced by the government of British Columbia. The policy scenario in this section includes most of the key policies that have been announced as a part of British Columbia's Climate Action Plan. The policies included in this analysis are not a comprehensive list of the announced policies. Additionally, the policies as simulated do not always correspond perfectly to the way the policy will finally be implemented. For example, the carbon tax on combustion greenhouse gas emissions will rise in one year increments when it is implemented. In CIMS, we have approximated the projected rise in the carbon tax by increasing it in five year increments, because CIMS solves in five-year increments.

We provide the policy scenario under two assumptions about future energy prices. The scenarios with low energy prices are labelled "L", and the scenario labelled "H" use high energy prices. In the figures, the policy scenario is labelled "AP", so the policy scenario with low energy prices is labelled "L-AP".

The policies simulated in the announced policies scenario include:

- Revision to the residential building code. British Columbia has introduced changes to the Building Code that will require all new houses to meet new energy efficiency standards equivalent to EnerGuide 77, effective September 2008. The Building Code will also be updated periodically to increase efficiency requirements. The quantitative analysis incorporates this policy by modelling a requirement that new houses built after 2010 must have an EnerGuide rating of at least 80, which represents an energy efficiency improvement of roughly 27 to 30 percent compared to current standard practice.⁶
- Provincial sales tax exemption for energy efficient household technologies. We model a policy that exempts ENERGY STAR residential refrigerators, clothes washers and freezers, efficient natural gas water heaters and electric power assisted bicycles from the provincial sales tax.
- B.C. LiveSmart program. We model a policy where the government of British Columbia provides funding to double the size of subsidies provided under the federal ecoENERGY Retrofit program. The federal ecoENERGY Retrofit program provides subsidies to several energy efficient technologies available in the residential sector.
- Revision to the commercial building code. We model a policy that requires new commercial buildings built after 2010 to meet ASHRAE 90.1-2004 standards, which represent an energy efficiency improvement of roughly 10% compared to the current standard practice. Additionally, all new commercial buildings built for the public sector are required to meet LEED Gold™ standards. The analysis includes continuous improvement in building codes after 2015.⁷
- Vehicle emissions standard for new vehicles. We model a policy that requires the average greenhouse gas intensity of new vehicles sold in British Columbia to be less than a specified level. Table 9 illustrates the standard simulated for this project, and compares it to California's vehicle emissions standard (on which the policy modelled here is based).

⁶ The Natural Resources Canada rates residential buildings on a scale of 0 to 100. A typical new house would achieve an EnerGuide rating of between 66 and 74, whereas an advanced house that does not require any purchased energy would achieve an EnerGuide rating of 100. A house that attains an EnerGuide rating of 80 or higher is considered to be highly energy efficient (Natural Resources Canada, 2007).

⁷ While commercial buildings can achieve LEED™ certification by incorporating several environmental improvements (e.g.: improvements to waste management or a reduction in water use), we only model the standard's effect on energy intensity (Canada Green Building Council, 2007).

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Table 9: Maximum average fleet greenhouse gas standard modelled in this report

YEAR	MAXIMUM AVERAGE FLEET GREENHOUSE GAS STANDARD (G CO ₂ /KM)		
	PROPOSED REGULATION IN CALIFORNIA		MODELED IN CIMS
	PASSENGER CARS / SMALL TRUCKS	LARGE TRUCKS	
2011	166	243	172
2012	145	225	
2013	142	221	
2014	138	218	
2015	133	213	
2016	128	207	139
2017	121	193	
2018	115	177	
2019	112	168	
2020	109	165	

Source: Air Resources Board, California Environmental Protection Agency, 2008.

- Improvements to public transit. The government of British Columbia has committed to investing \$14 billion until 2020 to expand transit ridership and to purchase clean transit technologies. To simulate this policy, we exogenously specify that these initiatives will increase transit ridership by a minimum of 100% in 2020 from 2005 levels. The increase in ridership may exceed 100% if other policies, such as the vehicle emissions standard, encourage mode switching to public transit. 90% of the increase in transit ridership is met by an increase in light rapid transit technology (i.e., the same technology used by the Sky-Train in Vancouver). The remaining 10% increase in transit ridership is met by increased bus service. In order to simulate the purchase of clean transit technologies, we simulate a \$1.6 billion investment in new clean technology buses between 2011 and 2020.
- Sales tax exemption for low emission vehicles. Low emissions vehicles (e.g., hybrid cars) sold in British Columbia receive a sales tax exemption equal to \$2,000 (2005\$).
- Increase the renewable content of gasoline and diesel fuels. We simulate a policy that requires gasoline and diesel fuel sold in British Columbia to have 5% renewable content by volume after 2010, and 10% renewable content by energy in 2020. The renewable fuel standard applies to all sectors that consume diesel and gasoline for transportation purposes.
- Zero emissions standard for new electricity generation facilities. All electricity generation in British Columbia is required to have zero net emissions by 2016. The sector has the option of purchasing offsets to cover unabated emissions. Additionally, the construction of any coal-fired generation stations must employ carbon capture and storage.
- Emissions cap-and-trade for large industrial emitters. After 2012, large industrial emitters participate in an emissions trading system provided under the Western Climate Initiative; therefore, the selling price for emissions permits within British Columbia will be equal to the price of emissions permits within the trading system under the Western Climate Initiative. In Table 10 we show the market clearing price

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of emissions permits we assumed for the cap-and-trade system. Table 10 shows the expected price of emissions permits after 2020, because firms make investments in CIMS with some anticipation of projected future emissions prices. Therefore, the emissions price that firms expect in the future may influence the decisions they make in the present.

Table 10: Price of emissions permits in industrial cap-and-trade (\$2005 CDN/tonne CO₂e)

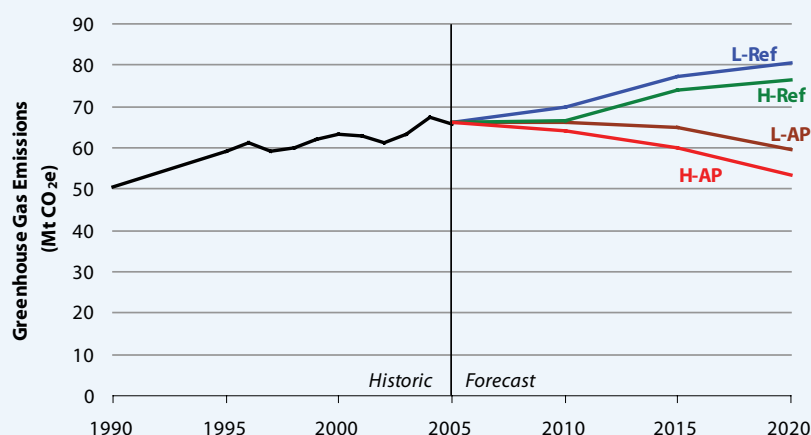
	2011-2015	2016-2020	2021-2025	2026-2030
Emissions Price	\$25	\$50	\$100	\$150

- Carbon tax on combustion greenhouse gas emissions. We model a tax on all combustion sources of greenhouse gas emissions starting in 2008. In 2008, the carbon tax is set at \$10/tonne CO₂e, and is scheduled to rise in \$5/tonne CO₂e increments until 2012. Between 2008 and 2012, the tax is applied to all sectors of the economy. The government has stated that the carbon tax will be integrated with the cap-and-trade system. This is reflected in the analysis by applying cap and trade to the large industrial emitters and the carbon tax to the rest of the economy. We model that the revenue from the carbon tax will be recycled, so that the tax is revenue neutral.
- Regulation on landfill gas. We simulate a policy that requires landfills in British Columbia to capture and flare landfill gas by 2015.
- Energy Funds. We simulate the Innovative Clean Energy Fund and Bioenergy Network through government investments of \$50 million in innovative technologies that are expected to reduce emissions. We divide the investment among zero emissions technologies in the electricity generation, commercial, residential and manufacturing sectors.
- Remove provincial sales tax exemption for coal and coke. We model a policy that removes the exemption from the provincial sales tax exemption for coal and coke.

Emissions projection from the announced policies

Figure 4 shows the projected effect of the announced policies on greenhouse gas emissions in British Columbia.

Figure 4: Greenhouse gas emissions project with announced policies



Source: Historic data are from Environment Canada, 2008, "Greenhouse gas Inventory".

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Table 11 shows the emissions reductions from the policy by sector for each energy price scenario. The values in the table represent a reduction from the reference case in a given year (e.g., greenhouse gas emissions from the commercial sector are reduced by 0.9 Mt CO₂e in 2020 from the reference case in 2020 in the low energy prices scenario). The reductions for the participants in the emissions cap-and-trade system represent reductions attained domestically, not reductions attained elsewhere from purchasing emissions permits.

Table 11: Annual emissions reductions from announced policies by sector (Mt CO₂e)

	UNITS	LOW ENERGY PRICE			HIGH ENERGY PRICE		
		2010	2015	2020	2010	2015	2020
Demand Sectors							
Residential	Mt CO2e	0.0	0.3	0.5	0.0	0.3	0.5
Commercial	Mt CO2e	0.0	0.2	0.9	0.0	0.1	0.7
Transportation	Mt CO2e	1.9	3.3	6.0	1.2	2.4	4.7
Manufacturing Industry	Mt CO2e	0.3	0.9	1.4	0.1	0.5	1.0
Waste and Agrosystems	Mt CO2e	0.0	1.7	2.1	0.0	1.7	2.1
Supply Sectors							
Electricity Generation	Mt CO2e	1.6	4.8	4.8	1.2	7.7	8.9
Petroleum Refining	Mt CO2e	0.2	0.4	0.6	0.1	0.3	0.5
Crude Oil	Mt CO2e	0.0	0.0	0.4	0.0	0.0	0.3
Natural Gas	Mt CO2e	0.0	0.5	3.5	0.1	0.5	3.5
Coal Mining	Mt CO2e	0.0	0.2	0.2	0.0	0.3	0.4
Ethanol	Mt CO2e	-0.3	-0.3	-0.5	-0.3	-0.3	-0.4
Biodiesel	Mt CO2e	-0.1	-0.1	-0.2	-0.1	-0.1	-0.2
Electricity Generation Offsets	Mt CO2e	0.0	0.0	0.5	0.0	0.0	0.5
Total	Mt CO2e	3.7	11.8	19.9	2.4	13.4	21.9

We also modelled an additional policy scenario where the price of crude oil remains at \$US 120/barrel throughout the simulation period. In this policy scenario, greenhouse gas emissions decline in 2020 are more than 4 MT lower than emissions in H-AP.

Appendix – The CIMS Model

INTRODUCTION TO THE CIMS MODEL

CIMS has a detailed representation of technologies that produce goods and services throughout the economy and attempts to simulate capital stock turnover and choice between these technologies realistically. It also includes a representation of equilibrium feedbacks, such that supply and demand for energy intensive goods and services adjusts to reflect policy.

CIMS simulations reflect the energy, economic and physical output, greenhouse gas emissions, and CAC emissions from its sub-models as shown in Table 12. CIMS does not include solvent, or hydrofluorocarbon (HFC) emissions. CIMS covers nearly all CAC emissions in Canada except those from open sources (like forest fires, soils, and dust from roads).

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Table 12: Sector Sub-models in CIMS

SECTOR	BC	ALBERTA	SASK.	MANITOBA	ONTARIO	QUEBEC	ATLANTIC
Residential							
Commercial/Institutional							
Transportation							
Personal							
Freight							
Industry							
Chemical Products							
Industrial Minerals							
Iron and Steel							
Non-Ferrous Metal Smelting*							
Metals and Mineral Mining							
Other Manufacturing							
Pulp and Paper							
Energy Supply							
Coal Mining							
Electricity Generation							
Natural Gas Extraction							
Petroleum Crude Extraction							
Petroleum Refining							
Ethanol							
Biodiesel							
Agriculture & Waste							

* Metal smelting includes Aluminium.

Model structure and simulation of capital stock turnover

As a technology vintage model, CIMS tracks the evolution of capital stocks over time through retirements, retrofits, and new purchases, in which consumers and businesses make sequential acquisitions with limited foresight about the future. This is particularly important for understanding the implications of alternative time paths for emissions reductions. The model calculates energy costs (and emissions) for each energy service in the economy, such as heated commercial floor space or person kilometres travelled. In each time period, capital stocks are retired according to an age-dependent function (although retrofit of un-retired stocks is possible if warranted by changing economic conditions), and demand for new stocks grows or declines depending on the initial exogenous forecast of economic output, and then the subsequent interplay of energy supply-demand with the macroeconomic module. A model simulation iterates between energy supply-demand and the macroeconomic module until energy price changes fall below a threshold value, and repeats this convergence procedure in each subsequent five-year period of a complete run.

CIMS simulates the competition of technologies at each energy service node in the economy based on a comparison of their life cycle cost (LCC) and some technology-specific controls, such as a maximum market share limit in the cases where a technology is constrained by physical, technical or regulatory means from capturing

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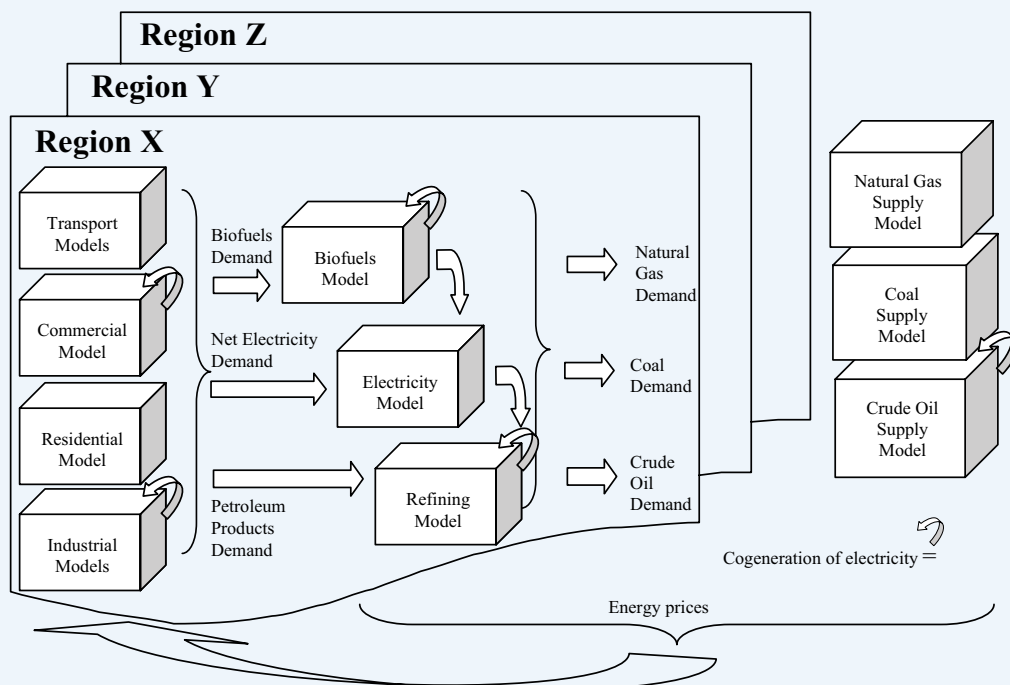
all of a market. Instead of basing its simulation of technology choices only on financial costs and social discount rates, CIMS applies a definition of LCC that differs from that of bottom-up analysis by including intangible costs that reflect consumer and business preferences and the implicit discount rates revealed by real-world technology acquisition behaviour.

1. Equilibrium feedbacks in CIMS

CIMS is an integrated, energy-economy equilibrium model that simulates the interaction of energy supply-demand and the macroeconomic performance of key sectors of the economy, including trade effects. Unlike most computable general equilibrium models, however, the current version of CIMS does not equilibrate government budgets and the markets for employment and investment. Also, its representation of the economy's inputs and outputs is skewed toward energy supply, energy intensive industries, and key energy end-uses in the residential, commercial/institutional and transportation sectors.

CIMS estimates the effect of a policy by comparing a business-as-usual forecast to one where the policy is added to the simulation. The model solves for the policy effect in two phases in each run period. In the first phase, an energy policy (e.g., ranging from a national emissions price to a technology specific constraint or subsidy, or some combination thereof) is first applied to the final goods and services production side of the economy, where goods and services producers and consumers choose capital stocks based on CIMS' technological choice functions. Based on this initial run, the model then calculates the demand for electricity, refined petroleum products and primary energy commodities, and calculates their cost of production. If the price of any of these commodities has changed by a threshold amount from the business-as-usual case, then supply and demand are considered to be out of equilibrium, and the model is re-run based on prices calculated from the new costs of production. The model will re-run until a new equilibrium set of energy prices and demands is reached. Figure 5 provides a schematic of this process. For this project, while the quantities produced of all energy commodities were set endogenously using demand and supply balancing, endogenous pricing was used only for electricity and refined petroleum products; natural gas, crude oil and coal prices remained at exogenously forecast levels (described later in this section), since Canada is assumed to be a price-taker for these fuels.

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Figure 5: CIMS energy supply and demand flow model

In the second phase, once a new set of energy prices and demands under policy has been found, the model measures how the cost of producing traded goods and services has changed given the new energy prices and other effects of the policy. For internationally traded goods, such as lumber and passenger vehicles, CIMS adjusts demand using price elasticities that provide a long-run demand response that blends domestic and international demand for these goods (the “Armington” specification).⁸ Freight transportation is driven by changes in the combined value added of the industrial sectors, while personal transportation is adjusted using a personal kilometres-travelled elasticity (-0.02). Residential and commercial floor space is adjusted by a sequential substitution of home energy consumption vs. other goods (0.5), consumption vs. savings (1.29) and goods vs. leisure (0.82). If demand for any good or service has shifted more than a threshold amount, supply and demand are considered to be out of balance and the model re-runs using these new demands. The model continues re-running until both energy and goods and services supply and demand come into balance, and repeats this balancing procedure in each subsequent five-year period of a complete run.

Empirical basis of parameter values

Technical and market literature provide the conventional bottom-up data on the costs and energy efficiency of new technologies. Because there are few detailed surveys of the annual energy consumption of the individual capital stocks tracked by the model (especially smaller units), these must be estimated from surveys at different levels of technological detail and by calibrating the model’s simulated energy consumption to real-world aggregate data for a base year.

⁸ CIMS’ Armington elasticities are econometrically estimated from 1960-1990 data. If price changes fall outside of these historic ranges, the elasticities offer less certainty.

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Fuel-based greenhouse gas emissions are calculated directly from CIMS' estimates of fuel consumption and the greenhouse gas coefficient of the fuel type. Process-based greenhouse gas emissions are estimated based on technological performance or chemical stoichiometric proportions. CIMS tracks the emissions of all types of greenhouse gas emissions, and reports these emissions in terms of carbon dioxide equivalents.⁹

Both process-based and fuel-based CAC emissions are estimated in CIMS. Emissions factors come from the US Environmental Protection Agency's FIRE 6.23 and AP-42 databases, the MOBIL 6 database, calculations based on Canada's National Pollutant Release Inventory, emissions data from Transport Canada, and the California Air Resources Board.

Estimation of behavioural parameters is through a combination of literature review, judgment, and meta-analysis, supplemented with the use of discrete choice surveys for estimating models whose parameters can be transposed into behavioural parameters in CIMS.

Simulating endogenous technological change with CIMS

CIMS includes two functions for simulating endogenous change in individual technologies' characteristics in response to policy: a declining capital cost function and a declining intangible cost function. The declining capital cost function links a technology's financial cost in future periods to its cumulative production, reflecting economies-of-learning and scale (e.g., the observed decline in the cost of wind turbines as their global cumulative production has risen). The declining capital cost function is composed of two additive components: one that captures Canadian cumulative production and one that captures global cumulative production. The declining intangible cost function links the intangible costs of a technology in a given period with its market share in the previous period, reflecting improved availability of information and decreased perceptions of risk as new technologies become increasingly integrated into the wider economy (e.g., the "champion effect" in markets for new technologies); if a popular and well respected community member adopts a new technology, the rest of the community becomes more likely to adopt the technology.

⁹ CIMS uses the 2001 100-year global warming potential estimates from Intergovernmental Panel on Climate Change, 2001, "Climate Change 2001: The Scientific Basis", Cambridge, UK, Cambridge University Press.

Appendix J: 52 ways you can reduce your carbon footprint

1. Insulate your house
2. Conserve heat by caulking around vents and window and door frames, sills, and joints (and any objects that penetrate exterior walls).
3. Plug gaps around pipes, ducts, fans and vents that go through walls, ceilings and floors from heated to unheated spaces.
4. Install weather-stripping on windows, doors, and attic hatches.
5. Apply shrink-film to windows and glass doors.
6. Move furniture, rugs, and drapes away from air grills and heating vents so that heat can circulate efficiently throughout the home.
7. Install energy-efficient windows.
8. Install heavy curtains on windows and glass doors to keep in the heat.
9. On sunny days, open south facing drapes and let the sun in, a natural source of heat. If you have large windows that don't receive direct sun, keep the drapes closed.
10. Close your drapes and blinds at night.
11. Close the damper in your wood-burning fireplace, and ensure that the damper fits properly, so heat does not escape out the chimney.
12. Turn down the heat in your home by two degrees in the winter (and save on home cooling by turning it up by two degrees in the summer).
13. Turn down the heat by three to five degrees Celsius at night and while on vacation.
14. Turn off the heat in your garage, and turn it on only prior to using it.
15. Install an Energy Star programmable thermostat.
16. Use your microwave or an electric heating element instead of a gas element when heating food.
17. Buy a high-efficiency furnace with a variable speed motor, such as one certified by EnergyStar.
18. Get your furnace tuned up annually.
19. Wrap your water heater in an insulation blanket.
20. Set your water heater to 49 degrees Celsius .
21. Install a solar water heating system to heat your water.
22. Wash your dishes in cold water when possible.
23. Wash your clothes in cold water.
24. Install low-flow shower heads and faucets.
25. Take shorter showers.
26. If washing clothes with hot water, use a front-loading washing machine, which saves water.
27. Hang your laundry to dry instead of using a gas clothes dryer.
28. Compost organic waste at home in your garden or with a worm composter if you live in an apartment.
29. Use a rake or an electric leaf blower instead of a gas-powered one.
30. If planting trees near your house, plant deciduous trees to the south of your house.
31. "Grasscycle" – leave grass clippings on your lawn instead of bagging them and sending them to the landfill.
32. Use your own mulch or compost on your garden instead of buying fertilizing products.
33. Walk, cycle or inline skate to work one day a week.
34. Replace incandescent light bulbs with compact fluorescents.

35. Buy an electric bicycle or scooter instead of a car. This reduces vehicle emissions.
36. Take transit to work one day a week (or carpool).
37. Join a car sharing co-operative instead of owning a car.
38. Walk or cycle with your children to school, instead of driving. This reduces vehicle emissions.
39. If driving, do many short-distance errands at once so your engine stays warm,
40. Purchase vehicle fuel mixed with renewable ethanol.
41. Drive below 90km/hr.
42. While driving, drive moderately and accelerate slowly.
43. Maintain proper tire inflation for your car; check your tires weekly.
44. Schedule regular maintenance checks for your car.
45. Turn off your car instead of idling for periods longer than 10 seconds.
46. Travel by train instead of air when possible.
47. Buy products that are recyclable.
48. Buy products that have recyclable packaging.
49. Buy products that are reusable.
50. Buy good-quality, long-lasting products that you will not have to replace so soon.
51. Recycle as much waste as possible.
52. Plant a tree.

Appendix K: Public Sector Energy Conservation Agreement

Public Sector Energy Conservation Agreement

THE GOVERNMENT OF BRITISH COLUMBIA
(hereinafter called "the Province")

and

BC HYDRO CORPORATION
(hereinafter called "BC Hydro")

WHEREAS the Province believes it must take action to halt and reverse the growth in greenhouse gases.

WHEREAS the Province has directed BC Hydro to meet 50 percent of new electricity needs through conservation.

WHEREAS BC Government operations will be carbon neutral by 2010.

WHEREAS the Province is reducing greenhouse gas emissions in provincial Ministries, Crown corporations, agencies and authorities.

WHEREAS enhancing energy conservation reduces the operating costs of providing valuable services for British Columbians, promotes energy self-sufficiency and encourages alternative energy sources.

WHEREAS the above objectives are achievable by pursuing a wide range of energy options for British Columbians.

Public Sector Energy Conservation Agreement

The Province and BC Hydro are entering a comprehensive agreement to significantly increase energy conservation and expand the use of alternative energy options¹ across 6,500 public sector buildings in British Columbia, including Crown corporations, education and health care facilities, office buildings, social housing and other government operations.

The Province will take concerted action in the Public Sector to halt and reverse the growth in greenhouse gases. The Public Sector Energy Conservation Agreement will create benefits for all British Columbians by:

- delivering valuable public services in more cost-effective, energy-efficient ways;
- converting to alternative energy sources where feasible to support the goal of making provincial government operations carbon neutral by 2010; and
- contributing to the goal to meet 50 percent of new electricity needs through conservation by 2020.

The Agreement has three pillars that serve as a framework to achieve challenging new energy conservation goals for the public sector in 2020.

Public Sector Energy Conservation Agreement

Pillar One: Aggressive conservation targets

The Province is taking bold action to reduce energy consumption across government operations by setting aggressive new conservation targets.

Targets include lowering electricity consumption across government by:

- five percent below baseline energy use in 2011²;
- 14 percent below baseline in 2016; and
- 20 percent below baseline energy use in 2020.

In 2010, the public sector will reduce electricity consumption by 55 GWh that year.

Pillar Two: Enhanced energy assessment, portfolio audits and employee engagement

The Province and BC Hydro are expanding assessments and audits of energy consumption at government buildings to:

- achieve energy efficiency upgrades for lighting and heating systems;
- broaden energy management expertise within government by establishing 20 Energy Managers across the public sector by 2010; and
- complete an enhanced energy management assessment and audit program by 2010.

The Province and BC Hydro are also initiating employee and public engagement activities, including a joint initiative with the provincial Climate Action Secretariat to encourage government employees to be energy conservation leaders at work and at home. Through the initiative, BC Hydro is collaborating with Ministry Green Teams by providing annual sustainable energy planning workshops and information to develop and implement climate action plans. Provincial Crown corporations, authorities and agencies are included.

Pillar Three: Accelerated alternative energy innovation

The Province and BC Hydro are working together to foster alternative energy by:

- identifying and supporting innovative, emerging alternative energy technologies;
- initiating alternative energy demonstration projects; and
- employing alternative energy options where appropriate.

¹ Alternative energy is defined as energy derived from renewable sources that have limited environmental impacts. Sources include wind, solar, micro-turbine, earth, waste heat and other clean energy options. Projects involving a conversion to alternative energy sources will be consistent with the Province's 2007 Energy Plan goals for conservation, energy efficiency and reducing greenhouse gases.

² 2006 Baseline consumption is equivalent to approximately 1710 GWh.

Implementation

The Agreement will be directed by a Steering Committee, including representatives from:

- The Climate Action Secretariat;
- The Ministry of Energy, Mines and Petroleum Resources;
- The Ministry of Labour and Citizens' Services;
- The Crown Agencies Secretariat; and
- BC Hydro Power Smart.

The Steering Committee will be comprised of one representative of each Ministry and two of BC Hydro.

The Steering Committee will work directly with Crown corporations, agencies, authorities and the Ministries of Health, Education and Advanced Education to develop and recommend annual targets specific to each. Progress reporting will be required annually.³

Plans to achieve the targets will be based on assessments of:

- whether technology is readily available to complete the project;
- whether the benefits to British Columbians warrant the investment; and / or
- the likelihood the investment will result in significant behavioural change.

This agreement will undergo a periodic review to ensure its ongoing effectiveness. Material amendments will be subject to the review and approval of the Steering Committee.

The Public Sector Energy Conservation Agreement will be in place from 2008 through 2020.

THE GOVERNMENT OF BRITISH COLUMBIA

BC HYDRO CORPORATION

Appendix L: Glossary of Terms

Adaptation: Changing behaviour to adjust to the predicted changes in the natural environment due to climate change. “Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities” (IPCC Third Assessment Report: Glossary of Terms¹).

Afforestation: Planting trees where none existed before. “The process of establishing and growing forests on bare or cultivated land, which has not been forested in recent history” (Carbon Finance at the World Bank: Glossary of Terms²).

Allowance: “A government issued authorization to emit a certain amount. In greenhouse gas markets, an allowance is commonly denominated as one ton of CO₂e per year... The total number of allowances allocated to all entities in a cap and trade system is determined by the size of the overall cap on emissions” (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary³).

Baseline: “A hypothetical scenario for what GHG emissions, removals or storage would have been in the absence of the GHG project or project activity” (The Greenhouse Gas Protocol: Glossary⁴). It is often used to measure GHG emission reductions or removals from an offset project, which are determined as the difference between actual emissions and the baseline scenario.

Base year emissions: GHG emissions in a specified (usually historical) year, against which future emissions are measured. “Targets for reducing GHG emissions are often defined in relation to a base year,” e.g. 10% below 1990 emission levels (Glossary of Key Terms: The Pew Center on Global Climate Change⁵).

Cap and trade system: “A system designed to limit and reduce emissions. Cap and trade regulation creates a single market mechanism as opposed to a command and control approach that prescribes reductions on a source-by-source basis. Cap and trade regulation sets an overall limit on emissions and allows entities subject to the system to comply by undertaking emission reduction projects at their covered facilities and/or by purchasing emission allowances (or credits) from other entities that have generated emission reductions in excess of their compliance obligations” (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary⁶).

Carbon Dioxide (CO₂): A naturally occurring gas (0.03% of atmosphere) that is also a by-product of burning fossil fuels and biomass, land-use changes, and other industrial processes. It is the principal anthropogenic greenhouse gas. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1 (IPCC Third Assessment Report: Glossary of Terms⁷).

Carbon Dioxide Equivalent (CO₂e): “The universal unit of measurement to indicate the global warming potential (GWP) of each of the six greenhouse gases, expressed in terms of the GWP of one unit of carbon dioxide. It is used to

1 Glossary of Terms used in the IPCC Third Assessment Report. <http://www.ipcc.ch/pub/syrgloss.pdf>

2 Carbon Finance at the World Bank: Glossary of Terms. <http://carbonfinance.org/Router.cfm?Page=Glossary>

3 “Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California.” Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

4 World Business Council for Sustainable Development and World Resources Institute. “The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard.” <http://www.ghgprotocol.org/DocRoot/7e9ttsv1gVKeh7BFhqo/ghg-protocol-revised.pdf>

5 Glossary of Key Terms: The Pew Center on Global Climate Change. http://www.pewclimate.org/global-warming-basics/full_glossary/glossary.php

6 “Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California.” Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

7 Glossary of Terms used in the IPCC Third Assessment Report. <http://www.ipcc.ch/pub/syrgloss.pdf>

evaluate releasing (or avoiding releasing) different greenhouse gases against a common basis" (The Greenhouse Gas Protocol: Glossary⁸).

Carbon Intensity: "The relative amount of carbon emitted per unit of energy or fuels consumed" (The Climate Trust⁹).

Carbon Neutral: An organization is carbon neutral if it has (1) calculated the total emissions for which it is responsible, (2) pursued actions to minimize those emissions, and (3) applied emissions offsets to net those emissions to zero.

Carbon sequestration: The process of increasing the carbon stored in a reservoir other than the atmosphere. "Biological approaches to sequestration include direct removal of carbon dioxide from the atmosphere through land-use change, afforestation, reforestation, and practices that enhance soil carbon in agriculture. This removal is considered temporary as the carbon dioxide returns to the atmosphere when plants die or are burned. Physical approaches include separation and disposal of carbon dioxide from flue gases or from processing fossil fuels to produce hydrogen- and carbon dioxide-rich fractions and long-term storage in underground in depleted oil and gas reservoirs, coal seams, and saline aquifers (IPCC Third Assessment Report: Glossary of Terms¹⁰).

Climate: "The long-term statistical average of weather-related aspects of a region including typical weather patterns, the frequency and intensity of storms, cold spells, and heat waves. Climate is not the same as weather. A description of the climate of a certain place would include the averages and extremes of such things as temperature, rainfall, humidity, evapotranspiration and other variables that can be determined from past weather records during a specified interval of time" (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary¹¹).

Climate Change: "Refers to changes in long-term trends in the average climate, such as changes in average temperatures" (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary¹²).

Credits (a.k.a. carbon credits): "Credits can be distributed by the government for reductions achieved by offset projects or by achieving environmental performance beyond a regulatory standard" (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary¹³).

Deforestation: "Conversion of forest to non-forest" (IPCC Third Assessment Report: Glossary of Terms¹⁴).

Emissions: "The release of substances (e.g., greenhouse gases) into the atmosphere. Emissions occur both through natural processes and as a result of human activities" (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary¹⁵).

8 World Business Council for Sustainable Development and World Resources Institute. "The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard." <http://www.ghgprotocol.org/DocRoot/7e9ttsv1gVKekh7BFhqq/ghg-protocol-revised.pdf>

9 The Climate Trust. http://www.climatetrust.org/solicitations_open_glossary.php

10 Glossary of Terms used in the IPCC Third Assessment Report. <http://www.ipcc.ch/pub/syrgloss.pdf>

11 "Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California." Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

12 "Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California." Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

13 "Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California." Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

14 Glossary of Terms used in the IPCC Third Assessment Report. <http://www.ipcc.ch/pub/syrgloss.pdf>

15 "Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California." Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

Emissions Cap: “A mandated constraint in a scheduled timeframe that puts a “ceiling” on the total amount of anthropogenic greenhouse gas emissions that can be released into the atmosphere” (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary¹⁶).

Emission Factor: “A factor allowing GHG emissions to be estimated from a unit of available activity data (e.g. tonnes of fuel consumed, tonnes of product produced) and absolute GHG emissions” (The Greenhouse Gas Protocol: Glossary¹⁷).

Emissions trading: “The process or policy that allows the buying and selling of credits or allowances created under an emissions cap” (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary¹⁸).

European Union Emissions Trading Scheme (EU ETS): “The world’s largest greenhouse gas emissions trading system is the European Union’s Emissions Trading Scheme, which limits CO₂ emissions from 12,000 facilities in the 25 EU member states. Launched in 2005, the ETS covers electricity and major industrial sectors (including oil, iron and steel, cement, and pulp and paper) that together produce nearly half the EU’s CO₂ emissions. ETS rules are set at the regional level but decisions on emission allowance allocation are left to member states. An initial phase runs through 2007; a second will coincide with the Kyoto Protocol compliance period (2008-2012). Excess emissions incur a penalty (100 Euros/ton in phase II) and must be made up in the next phase. EU policymakers have said the ETS will continue beyond 2012 with or without new international climate agreements” (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary¹⁹).

Global Warming: “The trend of rising Earth’s average surface temperature caused predominantly by increased concentrations of GHGs in the atmosphere. Strictly speaking, global warming refers only to warming trends. However, the term “global warming” has become a popular term encompassing all aspects of climate change, including, for example, the potential changes in precipitation that will be brought about by an increase in global temperatures. The term is used interchangeably with the term, ‘climate change’” (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary²⁰).

Global Warming Potential (GWP): “Greenhouse gases differ in their effect on the Earth’s radiation balance depending on their concentration, residence time in the atmosphere, and physical properties with respect to absorbing and emitting radiant energy. By convention, the effect of carbon dioxide is assigned a value of one (1) (i.e., the GWP of carbon dioxide =1) and the GWPs of other gases are expressed relative to carbon dioxide. For example, in the U.S. national inventory, the GWP of nitrous oxide is 310 and that of methane 21, indicating 93 that a ton of nitrous oxide has 310 times the effect on warming as a ton of carbon dioxide. Slightly different GWP values for greenhouse gases have been estimated in other reports. Some industrially produced gases such as sulfur hexafluoride (SF₆), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs) have extremely high GWPs. Emissions of these gases have a much greater effect on global warming than an equal emission (by mass) of the naturally occurring gases. Most of these gases have GWPs of 1,300 - 23,900 times that of CO₂. The US and other Parties to the UNFCCC report national greenhouse gas inventories using GWPs from the IPCC’s Second Assessment Report (SAR). SAR GWPs are also used for the Kyoto Protocol and the

16 “Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California.” Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

17 World Business Council for Sustainable Development and World Resources Institute. “The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard.” <http://www.ghgprotocol.org/DocRoot/7e9ttsv1gVKekh7BFhqo/ghg-protocol-revised.pdf>

18 “Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California.” Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

19 “Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California.” Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

20 “Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California.” Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

EU ETS. GWPs indicated in this document also refer to the IPCC's Second Assessment Report" (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary²¹).

Greenhouse gases (GHGs): "Greenhouse gases include a wide variety of gases that trap heat near the Earth's surface, slowing its escape into space. Greenhouse gases include carbon dioxide, methane, nitrous oxide and water vapor and other gases. While greenhouse gases occur naturally in the atmosphere, human activities also result in additional greenhouse gas emissions. Humans have also manufactured some gaseous compounds not found in nature that also slow the release of radiant energy into space" (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary²²).

Intergovernmental Panel on Climate Change (IPCC): "Recognizing the problem of potential global climate change, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988. It is open to all members of the UN and WMO. The role of the IPCC is to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. The IPCC does not carry out research nor does it monitor climate related data or other relevant parameters. It bases its assessment mainly on peer reviewed and published scientific/technical literature" (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary²³).

Inventory: "A greenhouse gas inventory is an accounting of the amount of greenhouse gases emitted to or removed from the atmosphere over a specific period of time (e.g., one year). A greenhouse gas inventory also provides information on the activities that cause emissions and removals, as well as background on the methods used to make the calculations. Policy makers use greenhouse gas inventories to track emission trends, develop strategies and policies and assess progress. Scientists use greenhouse gas inventories as inputs to atmospheric and economic models" (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary²⁴).

Metric Tonne: "Common international measurement for the quantity of GHG emissions, equivalent to about 2,204.6 pounds or 1.1 short tons" (California Climate Action Registry General Reporting Protocol²⁵)

Mitigation: "In the context of climate change, a human intervention to reduce the sources or enhance the sinks of greenhouse gases. Examples include: using fossil fuels more efficiently for industrial processes or electricity generation, switching from oil to natural gas as a heating fuel, improving the insulation of buildings, and expanding forests and other "sinks" to remove greater amounts of carbon dioxide from the atmosphere" (United Nations Framework Convention on Climate Change: Glossary of climate change acronyms²⁶)

Offset: "Projects undertaken outside the coverage of a mandatory emissions reduction system for which the ownership of verifiable GHG emission reductions can be transferred and used by a regulated source to meet its emissions

21 "Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California." Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

22 "Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California." Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

23 "Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California." Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

24 "Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California." Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

25 California Climate Action Registry General Reporting Protocol Version 2.0. <http://www.ieta.org/ieta/www/pages/getfile.php?docID=328>

26 United Nations Framework Convention on Climate Change. "Glossary of climate change acronyms" http://unfccc.int/essential_background/glossary/items/3666.php#M

reduction obligation. If offsets are allowed in a cap and trade program, credits would be granted to an uncapped source for the emissions reductions a project (or plant or soil carbon sink) achieves. A capped source could then acquire these credits as a method of compliance under a cap” (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary²⁷).

Reforestation: “Planting of forests on lands that have recently previously contained forests but that have been converted to some other use” (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary²⁸).

Regional Greenhouse Gas Initiative (RGGI): “The Regional Greenhouse Gas Initiative (RGGI) is establishing the first mandatory U.S. cap and trade program for carbon dioxide, and currently includes ten Northeastern and mid-Atlantic states. The governors of Connecticut, Delaware, Maine, New Hampshire, New Jersey, New York, and Vermont established RGGI in December 2005. Massachusetts and Rhode Island joined in early 2007, and Maryland is expected to join later in June 2007 under a law passed last year. Additional states can join the program with the agreement of the participating states. RGGI sets a cap on carbon dioxide emissions from power plants and allows sources to trade emission allowances. The program will cap emissions at current levels in 2009 and then reduce emissions 10% by 2019. Each state that intends to participate in RGGI must adopt a model rule through legislation or regulation and determine how to distribute emissions allowances. Member states agree to set aside at least 25% of their emission allowances for public benefit” (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary²⁹).

Registries, registry systems: “Electronic databases that track and record emissions and emission allowance holdings, retirements, cancellations and transfers” (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary³⁰).

Reservoir: “A component of the climate system, other than the atmosphere, which has the capacity to store, accumulate, or release” carbon or a greenhouse gas. “Oceans, soils, and forests are examples of reservoirs of carbon” (IPCC Third Assessment Report: Glossary of Terms³¹).

Sink: “A naturally occurring process, activity, or mechanism that removes a GHG from the atmosphere. Examples of sinks are oceans, forests, and photosynthesis” (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary³²).

Source: “Any process, activity, or mechanism that releases a greenhouse gas” into the atmosphere (IPCC Third Assessment Report: Glossary of Terms³³).

Verification: “The act of checking or testing, by an independent and certified party, to ensure that an emission reduction project actually achieves emission reductions commensurate with the credits it receives” (Recommendations of the Market Advisory Committee to the California Air Resources Board: Glossary³⁴).

27 “Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California.” Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

28 “Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California.” Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

29 “Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California.” Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

30 “Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California.” Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

31 Glossary of Terms used in the IPCC Third Assessment Report. <http://www.ipcc.ch/pub/syrgloss.pdf>

32 “Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California.” Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

33 Glossary of Terms used in the IPCC Third Assessment Report. <http://www.ipcc.ch/pub/syrgloss.pdf>

34 “Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California.” Recommendations of the Market Advisory Committee to the California Air Resources Board. http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF

ENVIRONMENTAL BENEFITS STATEMENT

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**BRITISH
COLUMBIA**

The Best Place on Earth

Meeting British Columbia's Targets

A Report from the B.C. Climate Action Team

July 28, 2008

Meeting British Columbia's Targets

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Meeting British Columbia's Targets

MESSAGE FROM THE CHAIR

British Columbia's Climate Action Team (CAT) was established in November 2007 to help the government reduce provincial greenhouse gas emissions by 33 per cent by 2020. The team's mandate is threefold:

- to offer expert advice to the province's Cabinet Committee on Climate Action on the most credible, aggressive and economically viable targets possible for 2012 and 2016;
- to identify further actions in the short and medium term to reduce emissions and meet the 2020 target, and
- to provide advice on the provincial government's commitment to become carbon neutral by 2010.

This is an extremely challenging mandate, and one the Climate Action Team has taken very seriously. As chair, I am honoured to work with so many exceptional individuals and grateful for their willingness to share their time, energy and expertise. The 21-member team includes some of the province's best minds, and we are united in the belief that we can find solutions to climate change if governments, business, the scientific and environmental communities and First Nations come together to support constructive actions.

I would like to express my sincere personal appreciation to all the members of the team for contributing their energy, ideas and enthusiasm. I also want to thank the government for providing us with this opportunity to leave a sustainable environmental and economic legacy for future generations.

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Sincerely,

Cheryl Slusarchuk
On behalf of the BC Climate Action Team

Meeting British Columbia's Targets

SUMMARY OF RECOMMENDATIONS TO THE GOVERNMENT OF BRITISH COLUMBIA

PRICING EMISSIONS

1. Government should review progress related to B.C.'s emissions targets, the impact of existing policy measures, actions by other jurisdictions to price emissions, and key economic factors like the cost of oil. Based on this data and recognizing the impact of emissions pricing as a core policy for emissions reduction, the government should:
 - 1.1 After 2012, if required to achieve the emissions targets, increase the British Columbia carbon tax in a manner that aligns with the policies of other jurisdictions and key economic factors.
 - 1.2 By 2012, either expand the carbon tax to cover all greenhouse gas emissions – including those from industrial processes – or include these additional emissions as part of a cap and trade system. Again, this should be done in light of progress toward B.C.'s reduction target, policies of other jurisdictions, and key economic factors.
2. Revenues from the carbon tax should continue to be offset by equivalent reductions in personal, corporate and small business tax rates. Support for low income families should be continued.

PUBLIC ENGAGEMENT AND OUTREACH

3. In collaboration with public and private partners, develop a comprehensive, multidimensional public engagement and outreach campaign that will: 1) educate British Columbians about the importance of climate change and the policies that are necessary to address this issue, 2) help British Columbians reduce their greenhouse gas emissions in the most efficient way possible, and 3) make British Columbians aware of the incentives and savings available by taking action to address climate change.

3

TRANSPORTATION

4. To further reduce emissions from all fossil fuel-based forms of transportation, increase the low-carbon fuel standard from 10 per cent to 15 per cent by 2020.
5. Introduce program and policy measures to improve the efficiency of heavy-duty vehicles, including niche-market regulation.
6. Remove barriers to improve the efficiency of port operations and explore such options as shifting traffic to off-peak hours, reducing the number of one-way truck movements, and optimizing the use of Prince Rupert and Vancouver Ports.
7. Enhance the role of rail in moving freight in B.C.
8. Work with the other partners in the Western Climate Initiative to include emissions from air travel in the new cap and trade system currently under development. Mandatory carbon credit payments at points of air travel to offset emissions associated with air travel could be considered should the proposed cap and trade system not be in place by January 2012.

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BUILDINGS

9. Update B.C.'s Green Building Code at least every three years to ensure the B.C. code is a leader among North American energy codes.
10. Work with local governments on a strategy to ensure a high level of compliance with energy codes through proper building code enforcement in all areas of the province.
11. Introduce new regulations under B.C.'s Energy Efficiency Act to adopt leading North American and international standards. B.C. should also consider portfolio standard approaches to improve the energy performance of appliances and equipment.
12. Require that, by 2016, all new publicly-funded buildings in the province have net-zero GHG emissions and that by 2020 all new houses and buildings in the province have net-zero GHG emissions.
13. By no later than 2012, require all houses and buildings to have a current energy efficiency rating or label when they are sold or transferred.
14. Introduce an aggressive energy efficiency and renewable energy program for houses and buildings, combining incentive and regulatory approaches and co-ordinated across governments and utilities.

ENERGY

15. Build generation and transmission capacity for clean and renewable electricity generation and create a surplus.
16. Create a conservation culture to ensure energy efficiency.
17. Introduce policies and regulations to promote electrification in new oil and gas developments.
18. Accelerate carbon capture and storage deployment.

INDUSTRY

19. Create a cap and trade system that will place a hard cap on large industrial emitters (e.g., through partnerships such as the Western Climate Initiative) or expand the carbon tax to apply to all greenhouse gas emissions, including those from industrial processes by 2012. Ensure the method chosen is consistent with the province's 33 per cent reduction target.

COMMUNITIES

20. Ensure that rural and remote communities have continued access to energy efficiency and clean energy programs and incentives, and access to training to support local green jobs.
21. Create a regulatory regime that encourages compact, smart community development.
22. Double the transportation mode share of cycling and walking by 2020.

Meeting British Columbia's Targets

- 23.** Take steps to ensure that federal and provincial infrastructure funding for communities is directly tied to demonstrated progress towards achieving complete, compact and energy-efficient communities.

AGRICULTURE

- 24.** Identify and remove regulatory and institutional barriers to clean energy development in the agricultural industry.
- 25.** Work with industry to identify and implement mitigation and adaptation solutions tailored to British Columbia's environment and agricultural markets.

WASTE

- 26.** By 2020, B.C. ends its growing dependency on disposing municipal solid waste in landfills both here and the United States, through a strategy that is based on requiring that the pollution prevention hierarchy (reduce, reuse, recycle, recover, residuals management) be considered in waste management planning and requiring the management of waste as close to the source as possible.

FOREST SECTOR

- 27.** Include forests, land use, the forest-product sector, bioenergy and other renewable wood-derived bio-products in the government's climate action strategy. This should be done with the involvement of stakeholders in a full assessment of mitigation options in terms of greenhouse gas benefits, biodiversity values and other co-benefits.

5

CARBON-NEUTRAL GOVERNMENT

- 28.** Amend the province's Core Policy and Procedures Manual to emphasize that, when determining the lowest price by a qualified bidder, the government take into account the full lifecycle cost of the goods or services being procured.
- 29.** Remove capital funding restrictions limiting the ability of the public-sector to fund strategic energy retrofits that will achieve significant energy conservation, GHG reductions and operating cost savings.

INTERIM TARGETS

- 30.** By 2012, the growth in emissions must be reversed and emissions must begin to decline significantly, to between five and seven per cent below 2007 levels.
- 31.** By 2016, the decline in emissions needs to accelerate. In order to ensure that B.C.'s 2020 target can be reached, emissions should fall to between 15 and 18 per cent below 2007 levels by 2016.

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INTRODUCTION

There is almost complete consensus among leading scientists that we are presenting the planet and ourselves with huge risks by emitting greenhouse gases. Indeed, the science of climate change has now advanced to the point where the evidence is overwhelming: the Earth's climate is rapidly changing, mainly as a result of increases in greenhouse gases caused by human activities.

Scientists, economists and other experts agree that, in the coming years, climate change will affect the most basic elements of life including access to water, food production, health and the environment. British Columbia is feeling the effects of climate change already – from the devastation of the pine beetle epidemic to the increasing frequency of floods and wildfire.

However, as the independent Stern Review¹ concluded in 2006, there is still time to avoid the worst impacts of climate change – if we take strong action now. For example, the report estimates that if we do not act, the overall costs and risks of climate change will be equivalent to losing 20 per cent of global gross domestic product (GDP), whereas the cost of early action can be limited to around one per cent of global GDP.

The independent Stern Review estimates that failing to act on climate change could result in costs and risks equivalent to losing 20 per cent of global GDP. By contrast, the report says the cost of early action can be limited to about one per cent of GDP.

6

In April 2008, Stern further strengthened his earlier conclusions by noting that the Stern Review had “badly underestimated the degree of damages and the risk of climate change” and clearly demanded immediate action.² British Columbia has heeded this advice. The Province has taken aggressive action on a wide range of fronts and, with Phase One of its Climate Action Plan, is moving forward to reduce emissions in every economic sector.

The Climate Action Team sees responding to climate change as an environmental imperative. It is also an enormous economic opportunity for the province. While making the changes necessary to reduce our reliance of fossil fuels will present some costs to our economy, the economic benefits opened up by transitioning to a low-carbon economy are real and substantial.

¹ Nicholas Stern, *The Economics of Climate Change: The Stern Review* (Cambridge: University of Cambridge Press, 2006).

² <http://www.independent.co.uk/news/business/news/stern-warns-that-climate-change-is-far-worse-than-2006-estimate-810488.html>

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These economic opportunities are already being realized elsewhere in the world as the global economy begins to recognize the need to transition to low-carbon energy alternatives. We have only to look to the great success of Germany in the field of solar energy or Denmark in wind to see the huge opportunities that could open up for British Columbia in the future. It is imperative that our province begin to prepare for the realities of a global low-carbon economy as soon as possible.

The Climate Action Team's Challenge

The provincial government has engaged an independent consultant (MK Jaccard and Associates) to conduct the comprehensive economic modeling required to translate climate action measures into actual reductions in greenhouse gas emissions. The Climate Action Team has reviewed this analysis (published in the Climate Action Plan – Phase One, and available online at www.livesmartbc.ca), which concludes that initiatives announced to date will reduce British Columbia's emissions by approximately 23 million tonnes by 2020. This represents approximately 73 per cent of the way to the 2020 target. This means there is a gap of 27 per cent – or nine million tonnes – that the province must close to meet its targets.

These figures are estimates, generated through economic modeling, which is not an exact science. As the Province pointed out in its Climate Action Plan, the best we can do is make realistic estimates based on probable assumptions. For example, B.C.'s population can reasonably be expected to grow to five million by 2020 but other assumptions are much less certain. Oil prices, for example, are difficult to predict, having ranged from about \$30 a barrel to over \$135 in the space of only five years. To ensure consistency in measuring progress, the Climate Action Team has prepared this report based on the same modeling methodologies used for the government's Climate Action Plan.

The team has also used the independent modeling of MK Jaccard and Associates to estimate the impact of some of the key policies recommended in this report, including regulations on buildings and energy, incentive programs, and a continued emphasis on emissions pricing. The modeling suggests that these initiatives could reduce emissions by eight million tonnes by 2020. However, the actual amount of reduction achieved will depend on how the key policies are implemented, which should be determined in the light of prevailing economic circumstances and progress toward the 2020 target. Team members are confident that, if carried out, the balance of the actions recommended in this report will enable the province to meet its 2020 target.

The Climate Action Team has focused its attention specifically on closing this gap. However, it is important to note that this report also includes some policy measures, particularly related to buildings, communities, and forestry, that will have much longer term impacts and will not result in significant emission reductions by 2020. Such measures are included because the team believes these actions must be taken now if the province is to meet its longer term 2050 target and move toward more sustainable communities in the new low-carbon economy of the future. The report also includes a list of key policy measures that have already been taken by government related to each sector. This "Background – Key Government Actions To Date" sub-section is intended to provide context to the incremental policy recommendations included in the report.

Meeting British Columbia's Targets

To meet its climate action targets, the province must reduce emissions by another nine million tonnes by 2020 – over and above the initiatives in Phase One of the B.C. Climate Action Plan.

Because the Province's plans to date are so comprehensive, identifying further steps and actions has been challenging. Adding to the challenge is the fact that many of the government's key climate action policies, such as the B.C. carbon tax, are still in the early stages of implementation. We believe these policies need some time to work before their impacts can be assessed and appropriate next steps developed.

In addition, while we recognize the need to measure progress towards B.C.'s targets, members of the Climate Action Team caution against focusing too intensely on economic models that, at best, can provide only plausible estimates. The goal of reducing emissions – as much as possible wherever possible – must not be eclipsed by concerns about differing assumptions based on uncertain variables.

The recommendations in this report were generated through vigorous debate and represent a balance of perspectives among Climate Action Team members whose areas of expertise range from sustainable community planning to corporate leadership to earth and ocean sciences.

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The Key Themes

In many cases, the Climate Action Team is recommending that the Province move forward with and build on the strategies and actions identified in the Climate Action Plan. For example, we strongly support the government's decision to emphasize and seize the economic opportunities inherent in the climate action agenda. By embracing innovation and leveraging its natural advantages, British Columbia has a tremendous opportunity to lead and succeed in the new low-carbon economy of the future.

Another theme arising in the team's discussions involves the need to continue to engage First Nations peoples, in keeping with the spirit and intent of the New Relationship. First Nations' knowledge of local lands, their connection to local ecosystems, and their long history of environmental stewardship are critical resources in the fight against climate change. As the United Nations has noted,³ indigenous and tribal peoples are "the human face" of the effects of global warming, and the traditional knowledge in their communities should be tapped in the search for answers.

A third key theme is public engagement, which the Climate Action Team considers very important. Simply put, B.C. will find it easier to attain its greenhouse gas reduction targets with the support and participation of the people of British Columbia. Our daily habits – as consumers, as employers and employees, as members of geographic communities and communities of interest – will have to change if we truly wish to avoid the worst impacts of global warming.

³ See <http://www.un.org/Pubs/chronicle/2007/>

Meeting British Columbia's Targets

Simply put, B.C. will find it easier to attain its greenhouse gas reduction targets with the support and participation of the people of British Columbia.

Human behaviour is not an exact science. Changing our ways is never easy and what we are driving now, as a province, is perhaps the largest and most significant shift in public attitudes ever. We are attempting to alter, in the span of just a few years, behaviours that in many cases have been entrenched for generations. This does not mean we should set our sights lower. It does, however, highlight this final theme in this Climate Action Team report.

Members of the team are encouraged by the level of public discussion and debate generated since the introduction of the government's climate action targets. British Columbians may not agree universally on all related issues, but there is no doubt that the need for climate action has become among the most discussed issues in our province. Further, when polled, British Columbians continually identify climate change as the most pressing environmental issue facing our province.⁴ It is critically important that the government meet its emission reduction targets. At the same time, it is the opinion of team members that raising awareness, mobilizing people and achieving momentum towards our targets can be considered a success in its own right.

As the government pointed out in its 2008 Speech from the Throne, every molecule of carbon dioxide emitted into the atmosphere matters. So too does every molecule not emitted. So, even on a global scale, British Columbia's actions are important. They contribute to the efforts of people around the world who are acting today to prevent the problem from growing even worse.

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It is critically important that the Province meet its emission reduction targets. At the same time, it is the opinion of team members that raising awareness, mobilizing people and achieving momentum towards our targets can be considered a success in its own right.

⁴ Environics, *Canadian Environmental Barometer*, June 2008.

Meeting British Columbia's Targets

As noted earlier in this report, the Stern Review has estimated that the cost of not addressing climate change could be equivalent to losing fully 20 per cent of global gross domestic product.⁵ By contrast, the costs of mitigating climate change are likely to be a fraction of that – estimated at between one and two per cent of global GDP.⁶

These figures underline the critical importance of advancing our climate action agenda. The need cannot be ignored and, while we still have much work to do, British Columbia's strong early action has laid a firm foundation on which we can build – and from which we hope other jurisdictions will take inspiration and encouragement.

⁵ Nicholas Stern, *The Economics of Climate Change: The Stern Review* (Cambridge: University of Cambridge Press, 2006).

⁶ Nicholas Stern, *The Economics of Climate Change: The Stern Review* (Cambridge: University of Cambridge Press, 2006). Similar conclusions were made by the Intergovernmental Panel on Climate Change (IPCC). See *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Meeting British Columbia's Targets

PRICING EMISSIONS**CAT Recommendations:**

- 1. Government should review progress related to B.C.'s emissions targets, the impact of existing policy measures, actions by other jurisdictions to price emissions, and key economic factors like the cost of oil. Based on this data and recognizing the impact of emissions pricing as a core policy for emissions reduction, the government should:**
 - 1.1 After 2012, if required to achieve the emissions targets, increase the British Columbia carbon tax in a manner that aligns with the policies of other jurisdictions and key economic factors.**
 - 1.2 By 2012, either expand the carbon tax to cover all greenhouse gas emissions – including those from industrial processes – or include these additional emissions as part of a cap and trade system. Again, this should be done in light of progress toward B.C.'s reduction target, policies of other jurisdictions, and key economic factors.**
- 2. Revenues from the carbon tax should continue to be offset by equivalent reductions in personal, corporate and small business tax rates. Support for low income families should be continued.**

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Background: Key Government Actions to Date

- Introduced a revenue-neutral carbon tax “to encourage low-carbon economic development while reinvesting every penny of carbon tax revenue into targeted tax cuts for individuals and businesses.”⁷
- The tax will be paid by all British Columbians, including business and industry. It applies to all fossil fuels based on their greenhouse gas intensity – including gasoline, diesel, natural gas, fuel oil, propane and coal.
- The tax is being phased in, starting at a rate of \$10 per tonne of CO₂-equivalent emissions, rising to \$30 a tonne by 2012. In the absence of other GHG reduction strategies, it could cause a reduction in B.C.'s emissions of up to three million tonnes per year by 2020.
- For most B.C. families, the value of income tax reductions will typically exceed the cost of the carbon tax in 2008 and 2009. Lower-income families will also receive a climate action tax credit of \$100 per adult and \$30 per child per year, paid quarterly along with the federal GST credit.

⁷ Climate Action Plan, Phase One . See www.livesmartbc.ca

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- The Province has also begun to work with other jurisdictions in the Western Climate Initiative to develop a cap and trade system – a market-based mechanism that uses free market principles to reduce GHG emissions.

For details on these and any other existing provincial climate action initiatives, go to www.livesmartbc.ca and consult the BC Climate Action Plan – Phase One.

THE B.C. CARBON TAX

The introduction of the B.C. carbon tax, effective July 2008, is a critical element in making the transition to low-carbon energy alternatives. By putting a price on carbon emissions, the tax creates new and powerful incentives for consumers, business and industry to change the habits and technologies that created global warming in the first place. Higher prices for higher-carbon choices also make greener options more commercially viable, encouraging the development of innovative new solutions.

It is important to note that the tax is not intended, on its own, to “solve” global warming. It is simply the most effective instrument available that will, over time, support and encourage the shift we must make to reduce our reliance on fossil fuels. The world’s leading climate experts and a number of international groups, including the United Nations Intergovernmental Panel on Climate Change, agree that an effective response to the challenges of climate change must include pricing carbon emissions and making clear that the atmosphere is not a free dumping ground.

Putting a price on carbon is probably the single most important thing a government can do right now.

- Jeff Rubin, Chief Economist, CIBC World Markets, February 21, 2008

Discussion

Just as leading scientists worldwide have reached consensus on the facts and realities of global warming, leading economists agree that the solution must include putting a price on greenhouse gas emissions. As Harvard University professor N. Gregory Mankiw, a former advisor to U.S. President George W. Bush, wrote in a recent article in the New York Times, “Basic economics tells us that when you tax something, you normally get less of it. So if we want to reduce global emissions of carbon, we need a global carbon tax.”⁸

⁸ See *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

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Closer to home, the David Suzuki Foundation calls a carbon tax “one of the most powerful incentives and tools that governments have to encourage companies and households to pollute less and invest in cleaner technologies and practices.”⁹ Members of the Climate Action Team agree with this assessment.

There is also a strong agreement among many in British Columbia that any carbon tax introduced by government must be revenue-neutral – with all proceeds “recycled” through reductions to other taxes. Again, the Climate Action Team agrees with this perspective.

In our view, the B.C. carbon tax, which took effect on July 1, is a critical part of the government's plan to reduce greenhouse gas emissions. It applies to all GHG emissions from the combustion of fossil fuels that are captured in Environment Canada's National Inventory Report. Putting a clear price on carbon emissions is imperative if we are to have any success in reducing emissions.

The tax is currently set at \$10 per tonne of CO₂-equivalent emissions with the rate set to rise by \$5 a year to a total of \$30 in 2012.

The Climate Action Team strongly supports the carbon tax and its concomitant tax reductions. Pricing emissions sends a signal to industry, business and consumers and encourages cleaner, more sustainable choices while tax reductions will help to stimulate further economic growth. For example, in 2009, B.C. will have the lowest personal income tax rates of any Canadian province on incomes up to \$111,000 and income taxes will be reduced further as carbon tax revenue increases.

Although we appreciate the government's decision to introduce the tax at a low rate and phase it in slowly to allow people time to adapt, we believe that higher rates will be required to achieve the province's GHG reduction targets. However, we believe that this should be done in the light of prevailing economic circumstances and progress toward the 2020 reduction target.

The government has laid out a careful path in introducing the carbon tax in such a way that does not adversely affect the competitiveness of the province. The government should continue to ensure that tax cuts play an important role in the structure of the carbon tax and keep a keen eye both on how other jurisdictions are responding to climate change, and how well British Columbia business is able to compete internationally. With this in mind however, it remains the belief of the Climate Action Team that the benefits of taking action on climate change in our province far outweigh the costs of not acting.

It is also imperative that the Province continue to protect low-income British Columbians by providing equitable carbon tax shifting measures, and by providing alternatives and incentives that allow people to make choices that will help reduce their personal greenhouse gas emissions and save money at the same time.

The Climate Action Team therefore recommends that the government review progress related to B.C.'s emissions targets, the impact of existing policy measures, actions by other jurisdictions to

⁹ http://www.davidsuzuki.org/files/climate/Briefing_Note_-_BC_Budget_2008.pdf

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price emissions, and key economic factors like the cost of oil. Based on this data and recognizing emissions pricing as a core policy for emissions reduction, the government should:

- 1.1 After 2012, if required to achieve the emissions targets, increase the British Columbia carbon tax in a manner that aligns with the policies of other jurisdictions and key economic factors.**

Although the tax applies to the combustion of fossil fuels by industry, as well as personal and business uses, it does not apply to non-combustion emissions that result from industrial processes. Examples of these emissions include venting of CO₂ in the processing of natural gas, curing cement and smelting of aluminium. It is important to note that no other jurisdiction has applied a carbon tax to these emissions either. Nevertheless, these emissions account for about 11 per cent of British Columbia's total greenhouse gas emissions.

Given that putting a price on greenhouse gas emissions is a foundational policy for mitigating climate change, the Climate Action Team recommends that the Province should:

- 1.2 By 2012, either expand the carbon tax to cover all greenhouse gas emissions – including those from industrial processes – or include these additional emissions as part of a cap and trade system. Again, this should be done in light of progress toward B.C.'s reduction target, policies of other jurisdictions, and key economic factors.**

Finally, as discussed above, the Climate Action Team strongly supports the policy of tax shifting and the use of carbon tax revenue to fund tax reductions in other areas. As a result, the team recommends that:

- 2. Revenues from the carbon tax should continue to be offset by equivalent reductions in personal, corporate and small business tax rates. Support for low income families should be continued.**

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PUBLIC ENGAGEMENT AND OUTREACH

CAT Recommendations:

3. *In collaboration with public and private partners, develop a comprehensive, multidimensional public engagement and outreach campaign that will: 1) educate British Columbians about the importance of climate change and the policies that are necessary to address this issue, 2) help British Columbians reduce their greenhouse gas emissions in the most efficient way possible, and 3) make British Columbians aware of the incentives and savings available by taking action to address climate change.*

Background: Key Government Actions to Date

- Extensive public engagement across the province including climate action summits with youth and the faith community as well as symposia with key industry sectors.
- Committed to establish Citizens' Conservation Councils across the province to build a network for grassroots climate action.
- Introduced the LiveSmart BC Energy Efficiency Incentive Program, a broad-based initiative to engage British Columbians in the fight against climate change. This three-year, \$60-million program offers a range of new incentives for reducing energy consumption in homes and small businesses, including provincial sales tax exemptions on energy-efficient appliances, vehicles, machinery and equipment.
- The Province estimates that this initial phase of LiveSmart BC will reduce greenhouse gas emissions by 200,000 tonnes by 2012.
- Launched the LiveSmart website, which will provide a central location for information about programs that will help British Columbians make lifestyle choices that will save them money and help the environment.

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For more on LiveSmart BC, go to www.livesmartbc.ca

Discussion

Climate change is an issue that affects every one of us, and every one of us has a role in mitigating its impacts. To reduce per capita emissions to the degree necessary to meet the Province's greenhouse gas reductions targets, the Climate Action Team believes that British Columbians must be educated about the seriousness and urgency of the climate change issue and about the kinds of policies that are, and can be, developed.

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We recognize the complexities involved in motivating and achieving widespread behaviour change – and the limited success of past attempts to do so. However, there remains an urgent need to take action in this area.

The Province's LiveSmart program, launched in early 2008 with its first phase, the LiveSmart BC Energy Efficiency Incentive Program, is a good start and can be built upon. The information provided by the government on its livesmartbc.ca website must therefore be expanded and developed further.

The CAT also acknowledges the government's commitment to create one or more Citizen's Conservation Councils to assist British Columbians in making the changes necessary to shrink their carbon footprints. However, more public engagement and outreach is required. Therefore, the Climate Action Team is recommending that:

- 3. In collaboration with public and private partners, develop a comprehensive, multidimensional public engagement and outreach campaign that will: 1) educate British Columbians about the importance of climate change and the policies that are necessary to address this issue and 2) help British Columbians reduce their own greenhouse gas emissions in the most efficient way possible, and 3) make British Columbians aware of the incentives and savings available by taking action on climate change.**

This campaign must target more than British Columbians' household and transportation-related emissions. It must also recognize the many roles British Columbians play – as small business owners and operators, as public-sector employees, as members of various industrial sectors, communities and groups – and leverage existing opportunities for engagement.

A potential site of public engagement exists when citizens take driver's education courses and become licensed to drive in the province. In this process, the public could be educated about lower-emissions driving techniques and about the relative emissions of different personal vehicles and modes of transportation.

It is also imperative that efforts to engage with British Columbians create opportunities for two-way dialogue, allowing citizens to participate fully in creating the necessary solutions for low-carbon lifestyles. This is key to the success of any public engagement campaign. In fact, the team strongly believes in the need to create as many opportunities for dialogue and involvement in the creation of climate action solutions as possible.

The campaign must take fully into account our province's great geographic, social and cultural diversity, and should fully utilize both traditional and innovative communications media to effectively reach and resonate with all British Columbians.

As part of this campaign, First Nations should be engaged to draw on their traditional knowledge of the land and environment in support of climate action.

The team also recognizes the importance of educating British Columbia's youth about climate change, and recommends that climate issues be incorporated into curricula for grades K-12. Museums, libraries and online social marketing tools should also be used to involve youth in climate action.

Meeting British Columbia's Targets

TRANSPORTATION

CAT Recommendations:

4. *To further reduce emissions from all fossil fuel-based forms of transportation, increase the low-carbon fuel standard from 10 per cent to 15 per cent by 2020.*
5. *Introduce program and policy initiatives to improve the efficiency of heavy-duty vehicles, including niche-market regulation.*
6. *Remove barriers to improve the efficiency of port operations and explore such options as shifting traffic to off-peak hours, reducing the number of one-way truck movements, and optimizing the use of Prince Rupert and Vancouver Ports.*
7. *Enhance the role of rail in moving freight in B.C.*
8. *Work with the other partners in the Western Climate Initiative to include emissions from air travel in the new cap and trade system currently under development. Mandatory carbon credit payments at points of air travel to offset emissions associated with air travel could be considered should the proposed cap and trade system not be in place by January 2012.*

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Background: Key Government Actions to Date

- Introduced legislation to adopt tailpipe emission standards equivalent to California's. The standards, which are also being adopted in many U.S. states, are designed to encourage manufacturers to sell more fuel-efficient vehicles.
- Expanded the Scrap-It program, which provides incentives for British Columbians with older (pre-1995) vehicles to switch to cleaner alternatives.
- Provided provincial sales tax exemptions for hybrid and fuel-efficient vehicles, and invested in cleaner transit and school buses.
- Passed legislation designed to reduce the average carbon intensity of transportation fuels by at least 10 per cent by 2020.
- Provided ongoing support for hydrogen and fuel cell technology development.
- Introduced a \$14-billion Provincial Transit Plan designed to double transit ridership by 2020.
- Introduced carbon pricing on fossil fuels in the form of the revenue-neutral carbon tax.
- Started work on electrifying truck stops and ports, as part of a broader commitment to reduce idling provincewide.
- Provided support for anti-idling campaigns across the province.

The BC Transit Plan can be found at www.th.gov.bc.ca/Transit_Plan/index.html.

A Report from the B.C. Climate Action Team

Meeting British Columbia's Targets

Discussion

The transportation sector is the largest single source of greenhouse gas emissions in British Columbia, representing 36 per cent of the province's total GHGs. This figure underlines the critical importance of reducing emissions from this sector, which can be attributed to the following sources:

- Passenger Vehicles: 37 per cent
- Heavy Duty Vehicles (Freight): 24 per cent
- Off-Road: 20 per cent
- Marine: 10 per cent
- Air: 7 per cent
- Rail: 2 per cent

The Climate Action Team is encouraged by the comprehensive suite of policies already announced to address emissions from transportation. These include legislation to adopt California tailpipe standards, low-carbon fuel legislation, the new Provincial Transit Plan, port electrification, anti-idling and more. They also include the introduction of emission pricing through the B.C. carbon tax, which will provide further incentives to reduce the use of fossil fuels in all areas, including transportation.

These are important policies that will certainly have a significant impact on transportation emissions in British Columbia. However, while the policies B.C. has announced to date will work to slow and even halt the growth of emissions from transportation, the sector is expected to remain a leading cause of emissions for our province.

In addition, many of the actions that must be taken to reduce transportation-related emissions in the long term are related to community development initiatives and will take many years to realize emission reduction. Indeed, to significantly reduce transportation emissions, we must fundamentally re-shape the way our communities are built. This will take time, commitment, and imagination. (Recommendations related to community development are included in the Communities section of this report).

In this context, the Climate Action Team's recommendations for passenger vehicles, freight (including marine) and air travel are listed below.

PASSENGER VEHICLES

To date, most of the transportation-related GHG reduction policies announced by the government relate to personal transportation. The Climate Action Team is confident these policies will have an impact on personal transportation emissions. Therefore, we are recommending expansion of one key existing policy: the province's low-carbon fuel standard. Under legislation passed in 2008, fuel distributors will be required to measure the average global warming intensity of their products and reduce it over time.

Intensity is measured on a lifecycle or well-to-wheels approach. It takes into account all emission-creating activities related to the use and production of the fuel, including land-use changes that

Meeting British Columbia's Targets

result from biofuel production. B.C. is targeting at least a 10 per cent reduction in the average carbon intensity of transportation fuels by 2020.

Industry will determine how best to meet the standard. There are many possible paths for compliance, including biofuels, electricity, hybrid vehicles, flex-fuel vehicles and fuel cells. Carbon intensity can also be reduced at refineries, through actions that improve efficiency and reduce on-site greenhouse gas emissions. The lifecycle approach will encourage the development of biofuels with lower upstream emissions. These include ethanol from agricultural wastes, forest residues and perennial grasses. This initiative is supported by the Province's new Bioenergy Strategy and helps to encourage fuel switching to less greenhouse gas-intensive forms. The Climate Action Team's recommendation to government is:

4. To further reduce emissions from all fossil fuel-based forms of transportation, increase the low-carbon fuel standard from 10 per cent to 15 per cent by 2020.

The Climate Action Team is aware of the concerns surrounding the production of corn-based ethanol and the competing claims of energy and food on global land resources. For this reason, while the team recognizes the important role that a low-carbon fuel standard can play in meeting greenhouse gas reduction targets, it also recommends the development and use of cellulosic ethanol as a means of reaching this standard. Reliance on corn-based ethanol should be avoided.

GOODS MOVEMENT

The efficient movement of goods is important to B.C.'s economy. At the same time, however, freight traffic accounts for more than half of provincial transportation emissions. While the low-carbon fuel standard will contribute to lowering freight emissions, actions also need to be taken to improve the performance and use of heavy-duty trucks and also shift freight traffic to lower-emission modes.

Fuel is a significant cost for the trucking industry. There are a number of market-ready technologies that can effectively cut fuel costs and GHG emissions associated with the long-haul, oil and gas, and logging trucking industries, including cowling and other aerodynamic devices, auxiliary power units (APUs), cabin heaters, overnight engine heaters and other idle-reduction technologies. The provincial government could work with industry to encourage and support the adoption of these technologies.

The greater use of marine and rail transportation and the more efficient operation of B.C.'s major ports also offer the potential for significant reductions in greenhouse gas emissions from goods movement. For example, a large proportion of truck trips through Lower Mainland ports either enter or leave empty. Advances in information technology can be applied to better match vehicle requirements and supply. Congestion can also be reduced by expanding operating hours and shifting traffic to off-peak times. The Climate Action Team notes that B.C.'s marine ports are already taking steps to extend operations and recommends that the provincial government work with ports to ensure successful implementation.

A considerable amount of freight moves directly from ocean-going vessels to rail and then to destinations across North America. However, there may also be opportunities to increase the use of rail, possibly through the development of an inland container port.

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In order to achieve further greenhouse gas emissions from the freight transportation sector, the Climate Action Team recommends that the B.C. government:

5. **Introduce program and policy initiatives to improve the efficiency of heavy-duty vehicles, including niche-market regulation.¹⁰**
6. **Remove barriers to improve the efficiency of port operations, such as shifting traffic to off-peak hours, reducing the number of one-way truck movements, and optimizing the use of the Prince Rupert and Vancouver Ports.**
7. **Enhance the role of rail in moving freight in B.C.**

AIR TRAVEL AND SHIPPING

Emissions from air travel and shipping are expected to account for almost 50 per cent of passenger transportation emissions by 2020. This projection is due in part to expected reductions from other areas within the transportation sector, and to a lack of alternative fuel options for aircraft.

To reduce the environmental impact of air travel and shipping in British Columbia, the Climate Action Team recommends that:

8. **The B.C. government work with its partners in the Western Climate Initiative to include emissions from air travel and shipping in the new cap and trade system currently under development.**

Other partners in the Western Climate Initiative include the U.S. states of Washington, Oregon, California, Arizona, New Mexico, Utah and Montana, and the Canadian provinces of Manitoba, Ontario and Quebec. Should emissions from air travel and shipping not be included in this cap and trade system by 2012, the team recommends using a system of mandatory carbon offsets at point of air travel to ensure that these emissions are adequately priced and offset.

¹⁰ "Niche-market regulation" is a regulation that guarantees a small but growing "niche-market" for new technologies that are low emission but high cost. One example is the renewable portfolio standard, which provides a small but growing market share for renewable electricity generation like wind, solar, small hydro and geothermal. Twenty-six US states have a renewable portfolio standard. Another example is the California vehicle emission standard, which provides a small but growing market share for ultra-low- and zero-emission vehicles. Because other states have adopted the California vehicle standard, it now covers over 35 per cent of the U.S. market.

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BUILDINGS**CAT Recommendations:**

- 9. Update B.C.'s Green Building Code at least every three years to ensure B.C.'s code is a leader among North American energy codes.**
- 10. Work with local governments on a strategy to ensure a high level of compliance with energy codes through proper building code enforcement in all areas of the province.**
- 11. Introduce new regulations under B.C.'s Energy Efficiency Act to adopt leading North American and international standards. B.C. should also consider portfolio standard approaches to improve the energy performance of appliances and equipment.**
- 12. Require that, by 2016, all new publicly-funded buildings in the province have net-zero GHG emissions and that by 2020 all new houses and buildings have net-zero GHG emissions.**
- 13. By no later than 2012, require all houses and buildings to have a current energy efficiency rating or label when they are sold or transferred.**
- 14. Introduce an aggressive energy efficiency and renewable energy program for houses and buildings, combining incentive and regulatory approaches and co-ordinated across governments and utilities.**

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Background: Key Government Actions to Date

- Introduced new Green Building Code requirements to increase energy and water efficiency.
- Developed a new Energy-efficient Buildings Strategy that complements the BC Energy Plan.
- Introduced legislation requiring that all official community plans and regional growth strategies include greenhouse gas emission reduction targets, policies and actions.
- Began work on a plan to install solar roofs on 100,000 residential and commercial buildings by 2020.
- Introduced a range of new energy efficiency programs, including energy performance labeling for buildings and targets for energy-efficient lighting.

Information about greening the BC Building Code can be found at
www.housing.gov.bc.ca/building/green/

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Discussion

National inventory estimates suggest that space and water heating in our buildings contributes 12 per cent of the province's total GHG emissions.

However, this estimate does not account for all the emissions we may commonly associate with buildings. For example, buildings also consume a significant proportion of electricity for their operations. There are also emissions associated with the construction, maintenance, demolition, transportation and disposal of building materials.

Action needs to be taken in this sector not only to help meet the province's 2020 target, but also to put the province on a path to the green communities needed to reach the 2050 target. The Climate Action Team's recommendations for this sector are in two categories: new buildings and existing buildings.

NEW BUILDINGS

Houses and other buildings last for many years, so design and construction decisions made today will still be affecting energy use and emissions in 2020 and 2050. It is also far more economic to include energy efficiency in a new building than to renovate later.

B.C.'s new Green Building Code requires new houses to meet the EnerGuide 77 standard or equivalent, and requires large buildings to meet or exceed ASHRAE 90.1 (2004). ASHRAE 90.1 is an existing North American standard for energy efficiency in buildings that is updated on a regular cycle. The 2007 edition was recently published and ASHRAE is targeting a 30 per cent improvement for the 2010 version. ASHRAE is currently aiming for a net-zero energy building standard by 2020.

LEED also includes minimum energy efficiency requirements. Currently, LEED requires that the design energy consumption of the building be at least 25 per cent better than Canada's Model National Energy Code for Buildings, or 18 per cent better (on an energy cost basis) than ASHRAE 90.1 (1999).

Having a strong green building code in place will not only help us meet greenhouse gas reduction targets, but will also create a competitive advantage for the future of our architectural, engineering, and building industry.

Therefore, the Climate Action Team recommends that B.C.:

9. Update the Green Building Code at least every three years ensure B.C.'s code is a leader among North American energy codes.

The energy efficiency requirements for commercial and multi-storey residential new buildings should be at least equivalent to the requirements of LEED. Energy efficiency requirements for housing should be at least equivalent to EnerGuide 80 by 2010 and should exceed EnerGuide 90 by 2020.

The labeling requirement (Recommendation 13 below) will require that the energy performance of all new houses and buildings be verified by third parties. This will help ensure compliance with the Green Building Code as well as address local government capacity concerns by enabling the use of independent verifiers. In addition, the government should:

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- 10. Work with local governments on a strategy to ensure a high level of compliance with energy codes through proper building code enforcement in all areas of the province.**

APPLIANCES AND OTHER EQUIPMENT

Appliances and equipment use significant amounts of energy and contribute significant quantities of greenhouse gases. To reduce these emissions, the Climate Action Team recommends that the Province:

- 11. Introduce new regulations under B.C.'s Energy Efficiency Act to adopt leading North American and international standards. B.C. should also consider portfolio standard approaches to improve the energy performance of appliances and equipment.**

Appliance and equipment standards should meet Energy Star requirements and target products that contribute significantly to greenhouse gas emissions in buildings, especially space and water heating equipment. An energy efficiency portfolio standard would require appliance manufacturers to meet minimum energy standards for key product lines (e.g., refrigerators) and to sell increasingly efficient products over time.

NET-ZERO EMISSION HOMES AND BUILDINGS

A net-zero emissions building is characterized by significant reductions in fossil fuel use, with the remaining net energy needs met from community-based or on-site, renewable and waste energy resources. In order to get to net-zero emissions, new houses and buildings could either incorporate on-site, zero emission energy supplies or meet their energy needs from clean energy sources. This is preferred to a shift toward grid-supplied, baseboard electric heating, given electricity conservation targets.

The resource availability of renewable and waste energy resources will vary by region. In addition, the feasibility of achieving net-zero emissions may vary by building types, land-use patterns and other factors that are specific to individual communities.

Given the potential of the net-zero approach to reduce B.C.'s greenhouse gas emissions, the Climate Action Team recommends that the Province:

- 12. Require that, by 2016, all new publicly-funded building in the province should be required to have net-zero GHG emissions and that by 2020 all new houses and buildings in the province have net-zero GHG emissions.**

EXISTING BUILDINGS

Most of our current buildings will still be around in 2020 and 2050. Improvements to these buildings will help save money and can improve indoor air quality, thus adding health benefits in the process of reducing emissions. To support and help accelerate the move to more energy-efficient buildings, the Climate Action Team recommends that the Province:

- 13. By no later than 2012, all houses and buildings should be required to have a current energy-efficiency rating or label when they are sold or transferred.**

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Making energy performance information available will provide incentives for owners to upgrade energy efficiency, and provide buyers with the basis for informed choices.

Energy performance ratings for buildings will also enable a wide range of other policies, in the same way that efficiency ratings for appliances enabled programs like BC Hydro's Power Smart and the Environmental Protection Agency's Energy Star system.

To further support efficiency upgrades for existing homes and buildings, the Climate Action Team also recommends that government:

14. Introduce an aggressive energy efficiency and renewable energy program for houses and buildings, combining incentive and regulatory approaches and co-ordinated across governments and utilities.

Elements of this initiative could include:

- an expanded LiveSmart BC: Efficiency Incentive Program targeted to homes, apartment buildings and small businesses.
- align and expand utility demand side management programs with Energy Plan objectives and recent changes to the BC Utilities Commission Act to enable utilities to facilitate and fund enhanced incentive and finance programs for conservation.
- a new home program that supports voluntary adoption of new standards (e.g., EnerGuide 85) in advance of regulatory requirements, including one or more of local government incentives or requirements, variable utility hook-up fees, or direct financial rebates to builders.
- a high-performance program for commercial/multi-residential/institutional buildings that provides incentives closer to the cost of new energy production.
- new financing mechanisms for residential and commercial building retrofits, potentially including utility bill financing, revolving funds, and the use of local improvement charges.
- promotion of "improvement mortgages" for home buyers to access capital for energy efficiency improvements with long-term amortization periods, building upon CMHC mortgage insurance refunds for efficient homes.
- a requirement that major renovations of existing commercial and multi-storey residential buildings to meet energy efficiency standards (e.g., at least the LEED prerequisite).
- restructuring property tax assessments to remove disincentives (or provide credits) for energy efficiency and on-site or district renewable energy so that strategies such as solar do not add to the assessed values of homes for property taxes.
- funding for the inclusion of renewable energy technologies in buildings.

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ENERGY**CAT Recommendations:**

- 15. Build generation and capacity for clean and renewable electricity generation and create a surplus.**
- 16. Create a conservation culture to ensure energy efficiency.**
- 17. Introduce policies and regulations to promote electrification in new oil and gas developments.**
- 18. Accelerate carbon capture and storage deployment.**

Background: Key Government Actions to Date

- Introduced the new *BC Energy Plan: A Vision for Clean Energy Leadership*, which includes the following key climate action elements:
 - » the Province will be electricity self-sufficient by 2016
 - » all new electricity generation projects will have zero-net greenhouse gas emissions
 - » all routine flaring at oil and gas producing wells and production facilities will be eliminated by 2016 with an interim goal of reducing flaring by 50 per cent by 2011
 - » clean or renewable energy will continue to account for at least 90 per cent of total generation
 - » zero greenhouse gas emissions will be allowed from any coal thermal generation facilities
 - » BC Hydro will acquire 50 per cent of its incremental electricity needs through conservation by 2020.
- Introduced the Remote Community Clean Energy Program to support clean alternative energy and energy efficiency solutions.
- Provided support for alternative energy development in areas such as wind and tidal power.
- Launched the BC Bioenergy Strategy to encourage research and development in areas such as wood-waste cogeneration, biofuel production and wood pellet production.

The BC Energy Plan can be found at www.energyplan.gov.bc.ca/

Discussion

B.C.'s energy sector invests billions of dollars in the province every year and, in 2006, made over \$2 billion in payments to the government through royalties and other fees. Key segments of the sector include electricity generation and oil and gas supply, but the sector extends to refineries and coal mining as well. Alongside the sizeable economic benefits are sizeable greenhouse gas emissions: the energy sector accounts for about 20 per cent of B.C.'s total emissions.

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GREEN POWER

B.C. is already a major energy exporter, producing more than four times the natural gas it uses and exporting wood pellets to Europe to provide renewable energy. Despite abundant resources, this is not the case for electricity.

The Climate Action Team supports the aggressive conservation targets and demand management measures being undertaken by the power utilities, particularly the smart meter initiative in the province's Climate Action Plan. Beyond using electricity wisely in current applications, some of the best opportunities to reduce emissions involve using electricity in new applications, such as in electric vehicles and electrified oil and gas facilities, or exporting clean electricity to neighbouring jurisdictions at premium prices. To maximize these benefits, B.C. needs to develop and use its green electricity resources to the fullest extent, and add transmission infrastructure to integrate those resources, consistent with sustainability criteria. At the same time, it must take steps to further reduce emissions associated with the production of fossil fuels.

MARKET CONTEXT

BC Hydro operates within the Western Electricity Coordinating Council (WECC), the largest and most diverse area covered by the North American Electricity Reliability Council (NERC). The market area extends from Canada (including B.C. and Alberta) to Mexico and is characterized by significant north-south transmission inter-ties between British Columbia and the United States. These allow for the movement and trade of large volumes of electricity according to regional supply and demand.

Within this market there are many opportunities. For example, California is driving a growing market for renewable power with its legislated Renewables Portfolio Standard Program (RPS). It requires electricity retailers to purchase at least 20 per cent of supply from renewable resources by 2010.¹¹ The state government is actively considering increasing that requirement to 33 per cent by 2020. To meet the 2010 target, California needs to add 20,000 to 30,000 gigawatt hours (GWh) of new renewable electricity to its grid. To meet the potential 2020 target, the state would likely need to add an additional 40,000-50,000 GWh. The cap and trade system being designed with B.C.'s WCI partners will also create a market for renewable electricity.

RESOURCE POTENTIAL

B.C. is well positioned to take advantage of emerging opportunities in this sector and may be in a position to help other jurisdictions meet their demand for clean and renewable sources of energy. The province has a wealth of green power potential including hydro, biomass, wind, solar, and ocean resources that are yet to be developed. At the same time, it is anticipated that demand for clean hydroelectric and renewable power will continue to grow here at home as our economy grows and may accelerate in the future as our reliance on fossil fuels for transportation begins to diminish. Increased demand for clean electricity will certainly result as new technologies like plug-in hybrid vehicles come into the market, for example. Clean energy targets that exceed self-sufficiency by

¹¹ In 2004, 10 per cent of California's electricity generation came from renewable resources.

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2016 (2007 Energy Plan) would increase the certainty of achieving our emission-reduction goals and the resulting surplus could be exported.

As a result, the Climate Action Team recommends that British Columbia:

15. Build generation and transmission capacity for clean and renewable electricity generation and create a surplus.

This would likely involve identifying key green power transmission corridors to the best areas for green power development and prioritize these developments, including the development of needed transmission infrastructure. The Climate Action Team also suggests that the B.C. government extend and expand the existing Innovative Clean Energy Fund as a means of encouraging alternative clean energy technologies in the province.

Of course, it will also be important to continue to use demand side management techniques to help conserve energy and avoid waste. Programs like BC Hydro's Power Smart should therefore be continued and other such strategies developed. As a general direction for the future, the Climate Action Team recommends that the Province continue to implement strategies and programs that will:

16. Create a conservation culture to ensure energy efficiency.

There can be little doubt that electrification does present some significant opportunities for greenhouse gas reduction in our province. New oil and gas developments in particular lend themselves very well to electrification in the field, as well as in gathering and processing facilities. Larger new developments have the scope and scale to permit electricity distribution or transmission lines to be connected, eliminating the need for natural gas-driven compressors, pumps and equipment. The Climate Action Team therefore recommends that the Province:

17. Introduce policies and regulations to promote electrification in new oil and gas developments.

ENCOURAGING CARBON CAPTURE AND STORAGE

The final Climate Action Team recommendation for this sector involves the capture and storage of carbon. As noted previously, applying the carbon tax to formation gas emissions will create new incentives for producers to capture and store carbon emissions. Beyond creating a value chain for CO₂ in the province, however, including costly physical infrastructure requirements, several key policy determinations are needed to enable carbon capture and storage (CCS.) These include developing rules for accessing storage, and for assigning long-term liability for storage.

Closing these policy gaps as soon as possible is essential to the timely deployment of CCS in British Columbia. Therefore, the Climate Action Team recommends that the government help to:

18. Accelerate carbon capture and storage deployment.

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INDUSTRY

CAT Recommendation:

- 19. Create a cap and trade system that will place a hard cap on large industrial emitters (e.g., through partnerships such as the Western Climate Initiative) or expand the carbon tax to apply to all greenhouse gas emissions, including those from industrial processes by 2012. Ensure the method chosen is consistent with the province's 33 per cent reduction target.**

Background: Key Government Actions to Date

- Introduced the Greenhouse Gas Reduction (Cap and Trade) Act, which allows the province to regulate GHG emissions for various types of industry. The Province has also started work with partners in the Western Climate Initiative to develop a regional market-based cap and trade system.
- Began work with industry partners to encourage investment in leading edge technologies and processes to support environmentally sustainable growth and development.

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Discussion

The Climate Action Team recognizes the significance of the carbon tax and cap and trade system already announced by the B.C. government as a greenhouse gas reduction strategy for industry. Cap and trade systems are already in place and working in many jurisdictions around the world, and market-based emission reductions strategies such as cap and trade have been shown to help drive the lowest-cost emission reductions possible. Therefore, the Climate Action Team recommends that the government:

- 19. Create a cap and trade system that will place a hard cap on large industrial emitters (e.g., through partnerships such as the Western Climate Initiative) or expand the carbon tax to apply to all greenhouse gas emissions, including those from industrial processes by 2012. Ensure the method chosen is consistent with the province's 33 per cent reduction target.**

Beyond industrial emissions from burning fossil fuels, some industries have "process" emissions. These emissions result from the specific processes involved in producing goods such as cement and aluminum. They also include carbon dioxide released during natural gas processing. B.C.'s industrial process emissions, also called fixed process emissions, total approximately seven MT, or about 11 per cent of total greenhouse gas emissions.

Given that putting a price on greenhouse gas emissions is a foundational policy for mitigating climate change, the Climate Action Team recommends, as noted previously, that by 2012 the province should either expand the carbon tax to cover industrial process emissions or include these emissions as part of a cap and trade system.

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These process emissions are directly tied to the underlying industrial process, and are not affected by the industry's choice of fuel. For a given industrial process, the options for reducing emissions may be limited to carbon capture and storage, or implementing advanced or alternative processes.

Given the close link between process emissions and specific industrial technologies – technologies used by competing facilities around the world – the Climate Action Team recommended in the Energy section of this report that carbon capture and storage deployment be facilitated and accelerated.

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COMMUNITIES**CAT Recommendations:**

- 20. Ensure that rural and remote communities have continued access to energy efficiency and clean-energy programs and incentives, and access to training to support local green jobs.**
- 21. Create a regulatory regime that encourages compact, smart community development.**
- 22. Double the transportation mode share of cycling and walking by 2020.**
- 23. Take steps to ensure that federal and provincial infrastructure funding for communities is directly tied to demonstrated progress towards achieving complete, compact and energy-efficient communities.**

Background: Key Government Actions to Date

- Introduced legislation encouraging and supporting the development of compact communities to help reduce energy and servicing costs, increase opportunities for people to walk and cycle and work, and reduce greenhouse gas emissions.
- Provided assistance to local governments for energy-efficiency, sustainable land-use planning, community energy planning and greenhouse gas emission reduction initiatives.
- Developed Towns for Tomorrow, a program that supports communities with populations of 5,000 or less in meeting sustainability challenges.
- Launched the Green City Awards to recognize excellence in livability, climate action and innovation by local governments across B.C.

Discussion

In the context of climate action, communities play a key role in issues related to land use, density and urban form, and also in areas related to values, attitudes and behaviour change. Both of these are crucial to medium- and long-term GHG emission reduction. British Columbia will not be able to achieve its long-term (2050) goals by adding mitigation (and adaptation) measures to an essentially unsustainable underlying development path. Instead we need to change direction and adopt an inherently low emission development pathway. Only if this can be accomplished can we get to the extremely low emission reductions targets set for 2050.

Emissions will be very significantly affected by decisions we make about how we design our communities and organize human activities. Changes in land use, density and urban form that help

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reduce emissions are essential to any strategy that will change the development path, because they change the underlying drivers of emissions.

Denser urban developments, for example, require less energy to heat and cool, and require less transportation energy to move people around. These are not savings achieved by adding more efficient technology or behaviour change to pre-existing energy uses; they are inherently lower emission activities. When combined with the mitigation and adaptation measures that will help achieve the province's shorter-term emission goals, they offer the potential of achieving much lower emission futures.

The Province has already started to move in this direction, and has a wide range of strategies in place to support the development of greener communities. The Climate Action Team supports these initiatives and recommends they be built upon.

The other critical component of large-scale changes in emissions is behavioural change. Changes in how people think about and use energy are likely to be a necessary part of achieving our long-term climate goals, both with respect to changes in energy using behaviours themselves and also with regard to acceptance of the kinds of policy measures required to achieve other savings (e.g. the changes in land use or urban form discussed above).

While the major effect of these two areas of climate action will occur in the post-2020 period, it is essential that they be started now, since fundamental change in both underlying infrastructure and in human attitudes and behaviours have long lead times. We need to begin now to make the changes that will give rise to more sustainable development pathways in the future.

Most such work to-date has focused on specific mitigation (and adaptation) measures. Research done for the Intergovernmental Panel on Climate Change has shown an inherently low emission pathway is a sustainable development pathway. We therefore have the opportunity to develop routes to the future that will not only result in very significantly lower-emissions, but also contribute to other environmental, social and economic goals.

Paying attention to the underlying development path offers the potential for the kinds of transformative changes in emission-causing activities that will be required to achieve climate-change goals around the world. It also allows us to connect our climate-change goals to the larger sustainability agenda.

Since the focus of the CAT report is emission reduction to 2020, we have only begun to articulate the outlines of what might be involved in these longer-term issue areas. Much further work is needed.

In the meantime, to build on existing government initiatives that seek to encourage green communities, the Climate Action Team is recommending action in the following areas:

RURAL AND REMOTE COMMUNITIES

Rural and remote communities differ significantly from urban centres, however both areas can make significant contributions and benefit from taking action on climate change.

With the growing demand for greener solutions, B.C.'s rural communities have a wealth of opportunities to develop clean energy from renewable sources such as micro-hydro, biomass, geo-thermal

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and geo-exchange. (list of opportunities to be integrated) Investments in these areas can create more jobs – and more local, sustainable jobs – than traditional energy supply projects. Recognizing this fact, the Climate Action Team recommends that the Province:

- 20. Ensure that rural and remote communities have continued access to energy efficiency and clean energy programs and incentives, and access to training to support local green jobs.**

REGULATION

British Columbia's existing regulatory system can create disincentives and barriers to compact, smart community development. Unfortunately, far too often, development patterns result in urban sprawl that creates an unnecessary increase in transportation-related greenhouse gas emissions. Therefore, the Climate Action Team recommends that the Province:

- 21. Create a regulatory regime that encourages compact, integrated and smart community development.**

TOOLS TO PROMOTE GREEN DEVELOPMENT

Green Communities legislation introduced in 2008 requires local governments to include GHG reduction targets and strategies in their community plans and regional growth strategies by 2010/2011, and enables local governments to encourage green development through reduced development cost charges and other measures. Government should provide additional flexibility and tools to local governments to enable them to set and meet more aggressive GHG reduction targets. These could include:

- Enabling local governments to use local improvement charges and other innovative financing mechanisms to support energy efficiency and clean-energy projects, such as district energy systems;
- Removing regulatory and institutional barriers to district energy systems
- Enabling local governments to go beyond the provincial Green Building Code to include energy efficiency and clean-energy requirements to meet local objectives.

ALTERNATIVE TRANSPORTATION INFRASTRUCTURE

Alternatives to passenger vehicle travel include not just transit but walking and cycling. In fact, walking is the fastest growing mode of transportation in Vancouver. The Province has announced a \$14-billion plan to double transit ridership. Significant investments in cycling and pedestrian infrastructure are also needed. This is particularly the case in smaller communities outside the Lower Mainland. Therefore, the Climate Action Team recommends that B.C.:

- 22. Double the transportation mode share of cycling and walking by 2020.**

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INFRASTRUCTURE FUNDING

Federal and provincial governments provide hundreds of millions of dollars to support local government investments in infrastructure. The CAT recommends that government:

- 23. Take steps to ensure that federal and provincial infrastructure funding for communities is directly tied to demonstrated progress towards achieving complete, compact and energy-efficient communities.**

Progress should be measured against performance targets for sustainable community development that differentiate between larger centres and smaller, rural communities.

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AGRICULTURE

CAT Recommendations:

- 24. Identify and remove regulatory and institutional barriers to clean energy development in the agricultural industry.**
- 25. Work with industry to identify and implement mitigation and adaptation solutions that are tailored to British Columbia's environment and agricultural markets.**

Background: Key Government Actions to Date

- Hosted an Agriculture Climate Action forum in 2007 to identify key issues. This forum led to the development of an agricultural Climate Action Initiative project, which will include an agricultural climate change action plan.
- Began exploring, in partnership with industry, opportunities such as anaerobic digestion to both reduce GHGs and recapture energy from agricultural waste.

For more on agriculture policy, *The Agriculture Plan: Growing a Healthy Future for B.C. Families* can be found at www.al.gov.bc.ca/Agriculture_Plan.

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Discussion

The agriculture sector currently contributes approximately four per cent of B.C.'s greenhouse gas emissions. At the same time, it has considerable clean energy potential, particularly in light of the Province's new Bioenergy Strategy. As we move to a low-carbon economy, the sector is expected to become an important producer of carbon offsets. However, in the current environment, regulatory and institutional barriers can inhibit the adoption of economically feasible on-farm renewable electricity and non-food crop fuel production. Therefore the Climate Action Team recommends that the Province:

- 24. Identify and remove regulatory and institutional barriers to clean energy development in the agricultural industry.**

Agricultural management approaches to livestock, soils, and manure can mitigate GHG emissions. However, the agricultural industry in B.C. is extremely diverse and faces a wide range of challenges and opportunities that vary by region and industry sub-sector. The Climate Action Team recognizes the complexity of the agricultural sector in B.C. and therefore recommends that the Province:

- 25. Work with industry to identify and implement mitigation and adaptation solutions that are tailored to British Columbia's environment and agricultural markets.**

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WASTE

CAT Recommendation:

26. By 2020, B.C. ends its growing dependency on disposing municipal solid waste in landfills both here and the United States through a strategy that is based on requiring that the pollution prevention hierarchy (reduce, reuse, recycle, recover, residuals management) be considered in waste-management planning and requiring the management of waste as close to the source as possible.

Background: Key Government Actions to Date

- Introduced legislation to mandate recovery of methane gas from landfills.
- Supported regional districts in their ongoing efforts to redirect organic waste going to landfills.
- Enacted regulations requiring a range of industries to recycle their products rather than allowing them to end up in landfills.

Discussion

The B.C. government has already committed to significantly reduce emissions of methane from landfills. Steps also need to be taken to significantly reduce the amount of material deposited in landfills, through the diversion of organics, construction waste, and other materials. More needs to be done, not only to recognize the potential of waste as a resource, but also to reduce “wastefulness” in general. To support this shift, the Climate Action Team recommends that the Province:

26. By 2020, B.C. ends its growing dependency on disposing municipal solid waste in landfills both here and the United States through a strategy that is based on requiring that the pollution prevention hierarchy (reduce, reuse, recycle, recover, residuals management) be considered in waste-management planning and requiring the management of waste as close to the source as possible.

The strategy would include items such as:

- Organics diversion
- Extended producer responsibility
- Expanded composting
- Strict Waste-Energy standards for air quality and energy efficiency
- Residuals management.

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FOREST SECTOR

CAT Recommendation:

27. Include forests, land use, the forest-product sector, bioenergy and other renewable wood-derived bio-products in the government's climate action strategy. This should be done with the involvement of stakeholders in a full assessment of mitigation options in terms of greenhouse gas benefits, biodiversity values and other co-benefits.

Background: Key Government Actions to Date

- Introduced Forests for Tomorrow, an initiative designed to enhance management practices so that forest ecosystems are resilient to stress caused by climate change and other impacts of human activity.
- Started work to implement the Mountain Pine Beetle Action Plan, to ensure long-term economic sustainability for affected communities.
- Developed a new urban afforestation initiative, Trees for Tomorrow, that will see millions of trees planted in back yards, schoolyards, hospital grounds, civic parks, campuses, parking lots and other public spaces.
- Set a leading-edge target of "net-zero deforestation" to ensure that, whenever forest land is converted to other uses, non-forest land is planted elsewhere in B.C. to off-set the loss of forest area. This is unique in the world and represents an important commitment to protecting our forests.
- Introduced a Bioenergy Strategy to open up new opportunities in areas such as wood-waste cogeneration, biofuel production and wood pellet production.

Discussion

B.C.'s forests are a large, long-term store of carbon. Due primarily to natural disturbances, including wildfires and insect outbreaks, the annual net balance of greenhouse gas emissions and uptake fluctuates on a year-to-year basis. Although a net sink in most years since 1990, B.C.'s forests are currently a net carbon source and are projected to remain a source for some years, until the forests recover from the mountain pine beetle outbreak. In the peak outbreak years (2009 and 2010) the mountain pine beetle will have affected the forest carbon balance by 73 million tonnes of CO₂ per year by reducing carbon uptake through photosynthesis, and by increasing carbon release through the decomposition of dead trees.

Human activities also have a significant impact on forest carbon – and there are opportunities to improve the greenhouse gas balance of B.C.'s forests against the backdrop of natural disturbances.

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Permanent conversion of forested land to other uses (deforestation) releases carbon dioxide to the atmosphere and reduces the area of forest available to remove carbon in the future. The Government of B.C. has already announced a policy of zero-net deforestation, which will require new forests to be planted to compensate for unavoidable losses. Afforestation activities could also be increased beyond this level to more than compensate for deforestation, subject to the availability of suitable areas.

Sustainable forest management also provides opportunities to reduce emissions (sources) and to increase the uptake rates of carbon dioxide from the atmosphere (sinks) relative to a business-as-usual baseline. Many of these options will also provide co-benefits for future wood supply, habitat, and other forest values, but they may also involve trade-offs. The complexity of forest, forest sector, and other land-use mitigation options and their carbon benefits over time requires that further analyses be conducted. Mitigation opportunities can be aimed at reducing emissions (e.g. by reducing slash burning, redirect logging from old-growth forests to second growth, or salvage logging of beetle and fire-killed stands for lumber, other wood products or energy) or be aimed at increasing uptake (e.g. by establishing productive forests on not sufficiently stocked (NSR) lands, increased planting after insect or fires, to reduce the natural regeneration delay, enhancing tree growth through fertilization, tree improvement and other silviculture activities, or lengthening harvest rotations).

Forest management and afforestation activities have the potential to contribute towards climate mitigation objectives by 2020. Larger mitigation benefits are possible in the years between 2020 and 2050, from investment in activities with long-term benefits.

In addition to being a standing store of carbon, B.C.'s forests contribute to emission reductions in other important ways. Wood products can store carbon for decades, for example in buildings. And forests provide timber, fibre and energy to meet society's demands in ways that are generally much less emissions-intensive compared to alternatives such as steel, aluminum, plastics or concrete. While current international accounting guidelines do not reflect these contributions, it is possible that future rules may provide greater incentives to include mitigation activities involving carbon retention in wood products, and emission reductions through product substitution.

Finally, the use of forest biomass for energy has enabled the forest manufacturing sector in B.C. to significantly reduce its fossil GHG emissions. With 850 MW of biomass generation capacity, the B.C. industry is North America's single largest producer of biomass power. Maintaining and enhancing this capacity can support B.C.'s transition to a lower-carbon economy.

It is also vital to recognize the community values related to forestry. Quite aside from their role in storing carbon and supporting emission reductions, healthy diverse forests play a key role in the quality of life of many B.C. communities, providing aesthetic, recreational, tourism and educational opportunities, as well as contributing to healthy air- and watersheds. Although many of these values cannot be quantified, they must be considered in the implementation of forest-related climate action initiatives.

The importance of British Columbia's forests in society's migration toward a low-carbon global economy is pivotal. To ensure this value is fully recognized, well-advised actions must be taken in both built and natural environments to achieve visible and sustainable provincial emissions reductions

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by 2012, 2016 and 2020. This will require boundary-spanning innovations and cross-disciplinary approaches that involve earth sciences, applied sciences and social sciences.

This could range from new silviculture practices and species, to new carbon-sequestering wood products for the built environment, to efficient multi-purposing of existing industrial sites and facilities in remote rural and urban communities. Due to the complexity and unique potential this presents for British Columbians, the Climate Action Team recommends that the Province:

- 27. Include forests, land use, the forest-product sector, bioenergy and other renewable wood-derived bio-products in the government's climate action strategy. This should be done with the involvement of stakeholders in a full assessment of mitigation option in terms of greenhouse gas benefits, biodiversity values and other co-benefits.**

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CARBON-NEUTRAL GOVERNMENT**CAT Recommendations:**

28. Amend the Province's Core Policy and Procedures Manual to emphasize that, when determining the lowest price by a qualified bidder, the government take into account the full lifecycle cost of the goods or services being procured.

29. Remove capital funding restrictions that limit the ability of the public-sector to fund strategic energy retrofits that will achieve significant energy conservation, GHG reductions and operating cost savings.

Background: Key Government Actions to Date

- Enacted legislation requiring that all government operations – including provincial ministries and agencies, schools, colleges, universities, health authorities and Crown corporations – become carbon-neutral by 2010.
- Established the Pacific Carbon Trust, a new provincial Crown corporation that will offer carbon offsets that meet high standards of environmental integrity.
- Started developing a green purchasing policy.
- Entered a Public-sector Energy Conservation Agreement with BC Hydro to significantly increase energy conservation and expand the use of alternative energy options across the 6,500 public-sector buildings in the province.

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Discussion

As in other economic sectors, British Columbia has already taken significant steps towards a carbon-neutral government. Legislation introduced in 2007 requires all provincial public-sector organizations to report their baseline greenhouse gas emissions, reduce these emissions as much as possible, and offset any remaining emissions. All public-sector organizations will also be required to publicly report on their emissions levels, actions they have taken to reduce these levels, and their plans for continuing to minimize emissions. No other government in North America has made this commitment.

As part of its move to become carbon-neutral, the Province has also begun developing a green procurement policy to reduce the carbon footprint of the goods and services it buys from contractors and private sector suppliers. Given that the government spends a significant amount each year procuring goods and services, this represents an important opportunity to further reduce greenhouse gas emissions. Through its procurement policy, the B.C. government could influence the supply chain in the province in important ways, creating and developing the market for more sustain-

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able, less carbon-intense products and services. This in turn could create a wealth of low-carbon opportunity for British Columbian businesses.

The Climate Action Team recognizes that, in developing such a policy, the government faces a number of challenges, such as the need for technical expertise to verify vendors' statements about the ecological footprints of their goods and services. The Province is developing strategies to overcome these challenges. However, it is also currently restricted by the dictates of its own Core Policy and Procedures Manual. The manual states that, "In the case of Invitation to Tenders (ITTs) and Invitation to Quotes (ITQs), contracts must be awarded to the lowest-priced qualified bidder meeting the terms and conditions of the solicitation document."

While an initial upfront price may appear to be lower, current policy and practice do not provide for lifecycle cost assessments, including costs related to disposal and waste reduction. To address this, the Climate Action Team recommends that:

28. The Province move immediately to amend its Core Policy and Procedures Manual to emphasize that, when determining the lowest price by a qualified bidder, the government take into account the full lifecycle cost of the goods or services being procured.

This signal would support the business case for suppliers to invest in the capital and processes required in order to address both GHG emissions and the broader ecological footprint of the products they supply.

The Climate Action Team also sees potential to enhance public-sector greenhouse gas reduction by eliminating barriers to investments in retrofits for existing public buildings. Through implementation of the Public-sector Energy Conservation Agreement (PSECA), capital restrictions were identified that limit the effective investment in energy efficiency retrofit projects and achieving significant greenhouse (GHG) reductions, including:

- Capital thresholds of \$100,000 (per building) which preclude high-quality retrofit projects under the threshold; and
- Limited borrowing capability that restricts the nature of the retrofit projects to smaller projects with a quick payback, resulting in a lost opportunity to look at the complete building system. Once the initial retrofit is done it may not be economically feasible to pursue the full suite of opportunities at a later time.

There is an opportunity to leverage PSECA funding into larger projects that will reduce the costs associated with carbon-neutral government operations with little or no risk to British Columbia. The limited capital thresholds, capped borrowing capability, focus on shorter term payback and inability to leverage funding means that many larger retrofits with significant greenhouse gas reductions and energy savings will not occur.

To address this, the Climate Action Team recommends that the Province:

29. Remove capital funding restrictions that limit the ability of the public-sector to fund strategic energy retrofits that will achieve significant energy conservation, GHG reductions and operating-cost savings.

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INTERIM TARGETS***CAT Recommendations:***

- 30. By 2012, the growth in emissions must be reversed and emissions must begin to decline significantly, to between five and seven per cent below 2007 levels.**
- 31. By 2016, the decline in emissions needs to accelerate. In order to ensure that B.C.'s 2020 target can be reached, emissions should fall to between 15 and 18 per cent below 2007 levels by 2016.**

Background: Key Government Actions to Date

- Legislated a greenhouse gas reduction target of 33 per cent by 2020 (based on 2007 levels).

Discussion

As part of its mandate, the Climate Action Team was tasked with making recommendations on interim emissions targets for 2012 and 2016. The Greenhouse Gas Reduction Targets Act of November 2007 requires that the Province set these interim targets by the end of 2008.

The team notes that in order to meet the 2020 target, emissions will need to peak and quickly begin to decline from current levels. It is encouraging that B.C.'s emissions fell in 2005 and 2006, but this short-term trend must become permanent.

The team also notes that many of the policies in the Climate Action Plan and recommended by the team are designed to influence investments and purchases of new energy-using equipment (buildings, appliances, vehicles) and are phased in over time (like the revenue-neutral carbon tax). For example, emission standards for new vehicles will initially have a small impact, but by 2020 will have impacted most of the vehicles on the road. The cumulative effect of these policies means that emission reductions will be greater in 2020 than in the next few years.

The path of emissions between now and 2020 will depend on a number of factors, including:

- energy prices, and in particular world oil prices,
- economic activity, in B.C. and the global economy,
- the timing and impact of new B.C. policies and programs that impact GHG emissions, as well as Canadian federal policies and the design and implementation of the WCI cap and trade system,
- the timing of major new emission reduction investments, such as carbon capture and storage, and
- revisions to Canada's national inventory that may affect how B.C.'s emissions are measured and reported.

Meeting British Columbia's Targets

Some of these factors, for example, oil prices, are highly uncertain and could have a significant impact on future of emissions in B.C.

Taking into account these uncertainties, the Climate Action Team recommends that the B.C. government set targets for 2012 and 2016 in the following ranges to ensure B.C. is on a path to reach its 2020 target:

- 30. By 2012, the growth in emissions must be reversed and emissions must begin to decline significantly, to between five and seven per cent below 2007 levels.**
- 31. By 2016, the decline in emissions needs to accelerate. In order to ensure that B.C.'s 2020 target can be reached, emissions should fall to between 15 and 18 per cent below 2007 levels by 2016.**

To ensure that targets in these ranges are feasible and consistent with achieving the 2020 target, the team solicited the advice of MK Jaccard and Associates to help estimate the impact of the team's policy recommendations. This modeling took into account the policy measures outlined in the provincial Climate Action Plan – Phase One, as well as some of the key policies recommended in this report, including regulations, incentive programs, and a continued emphasis on emissions pricing. The analysis indicates that the suite of policy recommendations outlined in this Climate Action Team Report to Government, in combination with the Climate Action Plan, is consistent with achieving these interim targets as well as the 2020 target.

In recognition of the many uncertainties and risks associated with the actual path of emissions over the next few years, the team notes that the government may wish to carry out additional sensitivity analyses before refining the recommended range.

Meeting British Columbia's Targets

APPENDIX: CLIMATE ACTION TEAM MEMBERS**Members**

Cheryl Slusarchuk, Pres. Premier's Technology Council (Vancouver)
 Shawn Atleo, B.C. Regional Chief for Assembly of First Nations (West Vancouver)
 Donna Barnett, Mayor (District of 100 Mile House)
 Jeff Burghardt, Pres. Prince Rupert Grain Ltd. (Prince Rupert)
 Lyn Brown, VP, Catalyst Paper (Richmond)
 Randy McLeod, Pres. BP CanadaEnergy Co. (Calgary)
 Joe Van Belleghem, Partner, Three Point Properties (Victoria)
 Teresa Coady, Architect, Bunting Coady Architects (Vancouver)
 Ian Tostenson, Pres. B.C. Restaurant & Foodservices Assoc. (Vancouver)
 Andrew Weaver, School of Earth & Ocean Sciences, UVic (Victoria)
 John Robinson, Institute for Resources, Environment & Sustainability, UBC (Vancouver)
 Naomi Devine, Common Energy UVic (Victoria)
 Peter Robinson, CEO, David Suzuki Foundation (Vancouver)
 John Walker, President/CEO, FortisBC (Kelowna)
 Mossadiq Umedaly, Chairman, Xantrex Technology Inc. (Burnaby)

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EX-OFFICIO MEMBERS

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 Greg Flato, Cdn. Centre for Climate Modelling & Analysis, UVic (Victoria)
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A Report from the B.C. Climate Action Team