

# Appendices

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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](http://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 CO<sub>2</sub>, 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 CO<sub>2</sub>, 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](http://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 Kumeayaay 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, Houser & 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  
Canadian Ramgharia Society  
Canadian Renewable Fuels Association  
Canadian Singh Sabha Gurdwara  
Canadian Society for Unconventional Gas  
Canadian Wind Energy Association  
Canfor Corporation  
Canwest Waste  
Capital Regional District  
Carbon Credit Corp.  
Carbon Planet Pty Ltd  
Carbonetworks  
Cariboo Horse Loggers Association  
Cascadia Biofuels  
Catalyst Paper Corporation  
Catholic Archdiocese of BC  
Catholic Justice and Social Service  
Canadian Center for Policy Alternatives -  
Climate Justice Project  
Center for Energy and Environmental  
Innovation  
Cement Association of Canada  
Center for Integral Economics  
Chamber of Shipping of BC  
Church of Jesus Christ of Latter Day Saints  
Cisco Systems Inc.  
City of Vancouver  
Climate Action Partnership  
Cloverdale Sikh Society  
CN Rail  
Coast Forest Loggers Association  
Collaborative for Advanced Landscape Planning  
Columbia Bible Institute  
Colwood City Hall  
Committee for Racial Justice  
Common Energy, UVic  
Community Economic Development Network  
Community Energy Association  
Conair Group Inc.  
Conference Board of Canada  
Congregation Beth Hamidrash  
Congregation Har El  
Congregation Or Shalom  
Congregationalist Wiccan Association of BC

ConocoPhillips Canada  
Copper Canyon Resources  
Cornell University, NY  
Council Of Forests Industries  
Council of the Haida Nation  
Creston Valley Wildlife Management  
CSA International  
Daimler AG  
Dali Lama Society  
Dart Marine Inc.  
David Suzuki Foundation  
Daybreak  
Deloitte & Touche LLP  
Department for Environment, Food and Rural  
Affairs, UK  
Devon Canada Corporation  
Dockside Green Development  
Domtar Pulp and Paper Company Inc  
Earth Charter Youth Initiative  
Eckankar Canada  
EcoEco - Ecology, Economy Community  
Ecotrust Canada Capital  
Edward Milne Secondary  
Eitzchaim Congregation  
Elevate Consulting  
Elk Valley Coal Corporation  
Emily Carr Institute  
Enbridge Inc.  
EnCana Corporation  
Energy Climate Action Roundtable  
Environment for Change  
Environmental Defence  
EPCOR Utilities Inc.  
Equity Research Associates  
European Union  
Finning Canada  
First Baptist Church  
First Nation Summit  
First Nations Agriculture Association  
First Nations Leadership Council  
Fleet Challenge Canada  
Forest Nursery Association of BC  
Forest Practices Board

Forest Products Association of Canada  
Forest Science Board  
Forest Stewardship Council  
Forestry Innovation Investment Ltd.  
Forestry Roundtable  
FortisBC  
FPInnovations  
Frances Kelsey Secondary  
Fraser Basin Council  
Free-Will Productions  
Friends of Northwest Weather & Avalanche  
Center  
Friends Society  
Fuji Hindu Temple  
Genome BC  
GeoExchange BC  
Graymont Ltd.  
Greater Victoria Public Library  
Greek Orthodox Community of East Vancouver  
Green Business Magazine  
Green Dragon's Den Event  
Greenpeace  
Gulf Log Salvage Co-Operative Association  
Gurdwara Khalsa Darbar  
Gurdwara Sahib York Centre Society,  
Gurdwara Shri Hargobind Sahib Sikh Society  
Guru Nanak Sikh Temple  
Gurwara Sahib Dasmesh Darbar  
Halcrow Consulting Inc  
Hare Krishna Temple  
Harris/Decima Research  
Heenan Blaikie LLP  
Helifor Canada Corp  
HeliJet Intl. Inc.  
Hollyhock Leadership Institute  
Homebuilders Assoc.  
Howe Sound Pulp and Paper  
Hupacasath First Nation (Port Alberni)  
Hydrogen and Fuel Cells Canada  
IISD (International Institute for Sustainable  
Development)  
Imperial Metals Corporation  
Independent Lumber Remanufacturers Assoc.  
of B.C.

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

Quarterly Provincial Forum with NGOs  
Raymond James Equity Research Canada  
Redcorp Ventures Ltd.  
Reel Green BC  
Resort Municipality of Whistler  
Richmond Intercultural Advisory  
Rimfire Minerals Corporation  
Rivendell Retreat Centre  
Roman Catholic Archdiocese of Vancouver  
Royal BC Museum  
Royal Roads University  
S.U.C.C.E.S.S.  
Salman Partners Inc.  
Salvation Army  
Sandor Derrick Consulting  
Sauder School of Business  
Schara Tzedek Congregation  
School of Community and Regional Planning  
Sealweld/GES (TL)  
Selkirk Metals Corporation  
Selkirk Secondary  
Shaarey Tefilah Synagogue  
Shell Canada Limited  
Shiv Mandir Temple  
Shree Mahalakshmi Temple  
Sierra Club BC  
Sierra Club Youth Coalition  
Sierra Systems Group Inc.  
Sikh Temple Sukhsagar  
Simon Fraser University  
Simon Fraser University  
SLR Consulting (Canada) Ltd.  
Soka Gakkai International Vancouver  
Southern Interior Local Government Association  
Spectra Energy Corp.  
Spectra Energy Transmission  
Spirit in the Workplace  
St. George Greek Orthodox Cathedral  
Surrey Board of Trade, Youth Leaders of Today  
Sustainable Forestry Initiative Inc.  
Sustainable Poultry Farming Group  
Tahltan Central Council  
Take the Lead BC

Taku River Tlingit FN  
Taseko Mines Limited  
Teck Cominco Limited  
Temple Shalom  
Teresen Gas  
Terrane Metals Corp.  
The Climate Group  
The Coca Cola Company  
Thomas Merton Society  
Thompson Creek Metals  
Thompson Rivers University  
Tibetan Buddhist Society  
Tides Canada Foundation  
Tin Lok Ng, Chinese community outreach  
Tolko Industries Ltd.  
TransCanada Pipelines  
Translink  
Trinity Western University  
Truck Loggers' Association  
Trucking Association  
Ts'kw'aylaxw  
Tzu Chi Society  
Union of BC Municipalities  
United Church of Canada  
United Flower Growers Cooperative Association  
UnityBlue Energy Insight Consulting  
University Campus Ministries  
University College of the Fraser Valley  
University of Calgary  
University of British Columbia  
University of Victoria  
University President's Council  
Upper Similkameen Indian Band  
Urban Development Institute  
UVic - Institute for Climate Change Solutions  
VanCity  
Vancouver Board of Trade  
Vancouver Community College  
Vancouver Foundation  
Vancouver Island Health Authority  
Vancouver Native Health Society  
Vancouver Olympic Committee  
Vancouver Order of Sufi Order International

Vancouver Port Authority  
Vancouver School of Theology  
Vedic Cultural Society of BC  
Vedic Hindu Society of B.C.  
Victoria Real Estate Board  
Victoria Transport Policy Institute  
Washington Forest Protection Association  
Wastewater Research Centre  
West Coast Dharma Society  
West Fraser Timber Co. Ltd  
Western Canada Wilderness Cttee  
Western Canadian Coal Corp.  
Western Dynasonics  
Western Keltic Mines Inc.  
WestPac LNG  
Westport Innovations Inc.  
Windmill Developments  
Wood Mackenzie  
Wood Pellet Association of Canada  
World Wildlife Fund Canada  
Youth for Environmental Stewardship BC  
Zawiyah Foundation  
Zen Centre of Vancouver  
Zoroastrian Society of B. C.

## 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:  
MKJA, MK Jaccard and Associates Inc.  
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Vancouver, BC V6C 1N5

Chris Bataille  
Jotham Peters  
Kevin Tu  
Innes Hood

#### 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.

## 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 Outlook<sup>1</sup>. The population forecast used here is based on the growth scenario reported by BCStats<sup>2</sup>, 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>.

**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.<sup>3</sup> 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.

<sup>3</sup> 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".

**Table 2: Reference case output forecast**

	UNITS	2005	LOW ENERGY PRICE			HIGH ENERGY PRICE		
			2010	2015	2020	2010	2015	2020
<b>Demand Sectors</b>								
Residential	thousands of households	1,676	1,862	2,037	2,206	1,862	2,037	2,206
Commercial	million m <sup>2</sup> 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 <sup>a</sup>	0.5	0.6	0.8	0.9	0.6	0.8	0.9
Industrial Minerals	million tonnes <sup>b</sup>	2.7	2.9	3.2	3.4	2.9	3.1	3.3
Metal Smelting	million tonnes <sup>c</sup>	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 <sup>d</sup>	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
<b>Supply Sectors</b>								
Electricity Generation	TWh	64	74	79	78	77	87	90
Petroleum Refining	million m <sup>3</sup>	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 <sup>3</sup> <sup>e</sup>	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: <sup>a</sup> chemical product output is the sum of chlor-alkali, sodium chlorate, hydrogen peroxide, ammonia, methanol, and petrochemical production.

<sup>b</sup> industrial mineral output is the sum of cement, lime, glass, and brick production

<sup>c</sup> metal smelting is the sum of aluminum, nickel, lead, copper and zinc smelting

<sup>d</sup> pulp and paper output is the sum of linerboard, newsprint, coated and uncoated paper, tissue and market pulp production

<sup>e</sup> 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.<sup>4</sup> Table 3 shows the fuel price forecasts used to develop the reference case forecasts in this report.

<sup>4</sup> 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.

**Table 3: Reference case price forecast**

UNITS	LOW ENERGY PRICE			HIGH ENERGY PRICE			
	2010	2015	2020	2010	2015	2020	
<b>World Energy Price</b>							
Crude Oil <sup>a</sup>	2005 \$US / barrel	50.00	50.00	50.00	85.00	85.00	85.00
Natural Gas <sup>b</sup>	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
<b>British Columbia</b>							
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: <sup>a</sup> West Texas Intermediate crude oil price at Cushing, Oklahoma

<sup>b</sup> 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.

### 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
<b>Demand Sectors</b>								
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
<b>Supply Sectors</b>								
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
<b>Total</b>	<b>PJ</b>	<b>1,482</b>	<b>1,593</b>	<b>1,715</b>	<b>1,781</b>	<b>1,567</b>	<b>1,689</b>	<b>1,755</b>

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.<sup>5</sup>

<sup>5</sup> 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.

**Table 5: Reference case natural gas consumption**

	UNITS	2005	LOW ENERGY PRICE			HIGH ENERGY PRICE		
			2010	2015	2020	2010	2015	2020
<b>Demand Sectors</b>								
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
<b>Supply Sectors</b>								
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
<b>Total</b>	<b>PJ</b>	<b>373</b>	<b>389</b>	<b>417</b>	<b>433</b>	<b>362</b>	<b>352</b>	<b>343</b>

**Table 6: Reference case refined petroleum product consumption**

	UNITS	2005	LOW ENERGY PRICE			HIGH ENERGY PRICE		
			2010	2015	2020	2010	2015	2020
<b>Demand Sectors</b>								
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
<b>Supply Sectors</b>								
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
<b>Total</b>	<b>PJ</b>	<b>415</b>	<b>451</b>	<b>491</b>	<b>524</b>	<b>430</b>	<b>449</b>	<b>471</b>

**Table 7: Reference case electricity consumption**

	UNITS	2005	LOW ENERGY PRICE			HIGH ENERGY PRICE		
			2010	2015	2020	2010	2015	2020
<b>Demand Sectors</b>								
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
<b>Supply Sectors</b>								
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
<b>Total</b>	<b>PJ</b>	<b>229</b>	<b>253</b>	<b>270</b>	<b>281</b>	<b>263</b>	<b>298</b>	<b>324</b>

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**

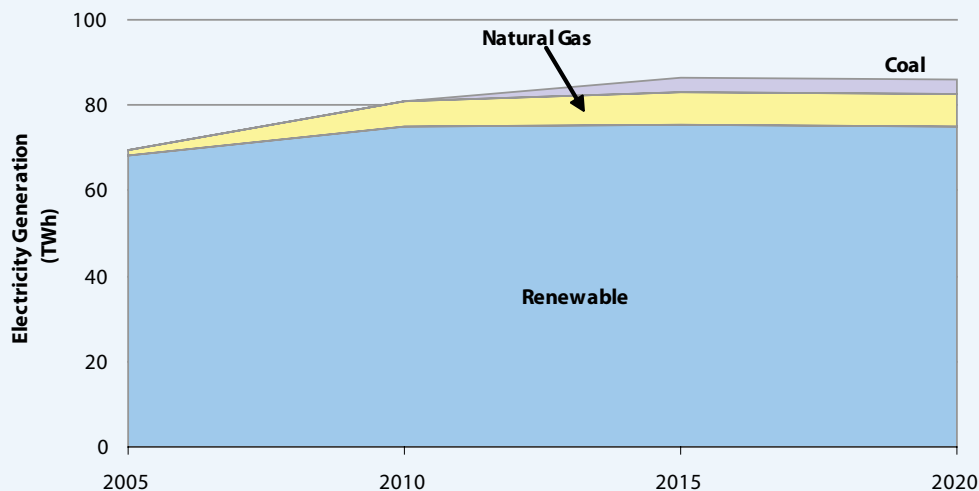
	UNITS	2005	LOW ENERGY PRICE (L-REF)			HIGH ENERGY PRICE (H-REF)		
			2010	2015	2020	2010	2015	2020
<b>Demand Sectors</b>								
Residential	Mt CO2e	4.4	4.1	4.3	4.8	3.8	3.3	3.4
Commercial	Mt CO2e	3.2	3.5	4.0	4.6	3.4	3.6	3.8
Transportation	Mt CO2e	25.6	28.4	30.7	32.9	27.0	27.8	29.2
Manufacturing Industry	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
<b>Supply Sectors</b>								
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
<b>Total</b>	<b>Mt CO2e</b>	<b>64.3</b>	<b>68.0</b>	<b>75.5</b>	<b>78.7</b>	<b>64.8</b>	<b>72.3</b>	<b>74.3</b>

## A Quantitative Analysis of British Columbia's Climate Action Plan

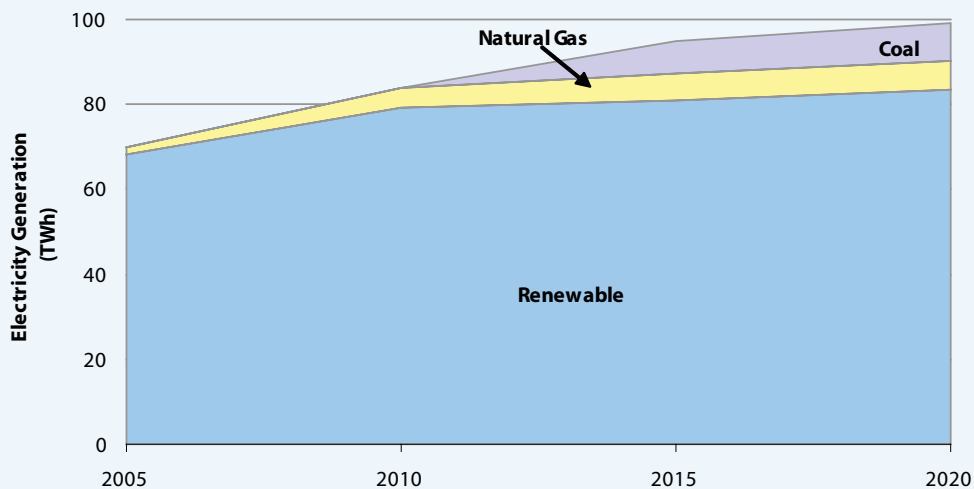
Table 8 shows that in the absence of new policies to control greenhouse gas emissions, emissions are expected to grow from current levels in both energy price scenarios. However, the growth in greenhouse gas emissions is more moderate in the high energy price scenario – emissions grow by 16% between 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**



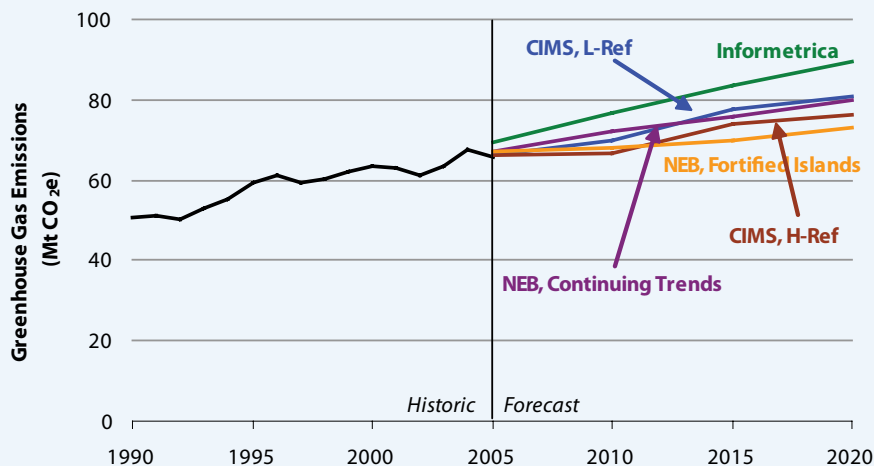
**Figure 2: Utility generation of electricity by fuel type in H-Ref**



**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 CO<sub>2</sub>e 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".

### 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.<sup>6</sup>
- 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.<sup>7</sup>
- 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).

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

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

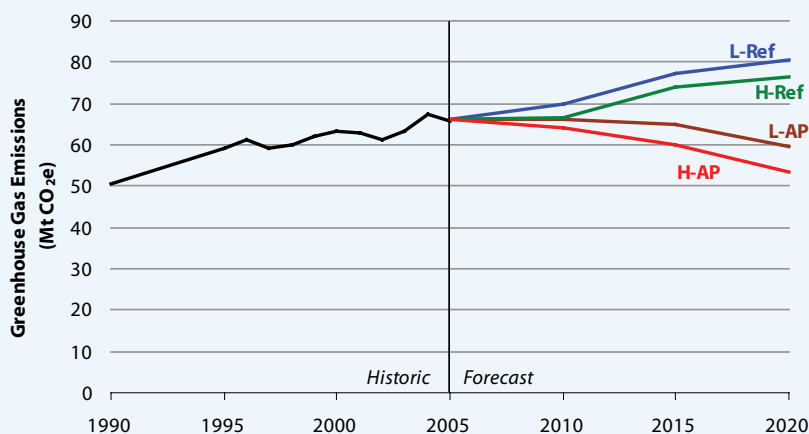
	2011-2015	2016-2020	2021-2025	2026-2030
Emissions Price	\$25	\$50	\$100	\$150

- 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 CO<sub>2</sub>e, and is scheduled to rise in \$5/tonne CO<sub>2</sub>e 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".

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 CO<sub>2</sub>e 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 CO<sub>2</sub>e)**

	UNITS	LOW ENERGY PRICE			HIGH ENERGY PRICE		
		2010	2015	2020	2010	2015	2020
<b>Demand Sectors</b>							
Residential	Mt CO <sub>2</sub> e	0.0	0.3	0.5	0.0	0.3	0.5
Commercial	Mt CO <sub>2</sub> e	0.0	0.2	0.9	0.0	0.1	0.7
Transportation	Mt CO <sub>2</sub> e	1.9	3.3	6.0	1.2	2.4	4.7
Manufacturing Industry	Mt CO <sub>2</sub> e	0.3	0.9	1.4	0.1	0.5	1.0
Waste and Agrosystems	Mt CO <sub>2</sub> e	0.0	1.7	2.1	0.0	1.7	2.1
<b>Supply Sectors</b>							
Electricity Generation	Mt CO <sub>2</sub> e	1.6	4.8	4.8	1.2	7.7	8.9
Petroleum Refining	Mt CO <sub>2</sub> e	0.2	0.4	0.6	0.1	0.3	0.5
Crude Oil	Mt CO <sub>2</sub> e	0.0	0.0	0.4	0.0	0.0	0.3
Natural Gas	Mt CO <sub>2</sub> e	0.0	0.5	3.5	0.1	0.5	3.5
Coal Mining	Mt CO <sub>2</sub> e	0.0	0.2	0.2	0.0	0.3	0.4
Ethanol	Mt CO <sub>2</sub> e	-0.3	-0.3	-0.5	-0.3	-0.3	-0.4
Biodiesel	Mt CO <sub>2</sub> e	-0.1	-0.1	-0.2	-0.1	-0.1	-0.2
Electricity Generation Offsets	Mt CO <sub>2</sub> e	0.0	0.0	0.5	0.0	0.0	0.5
<b>Total</b>	<b>Mt CO<sub>2</sub>e</b>	<b>3.7</b>	<b>11.8</b>	<b>19.9</b>	<b>2.4</b>	<b>13.4</b>	<b>21.9</b>

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).

**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

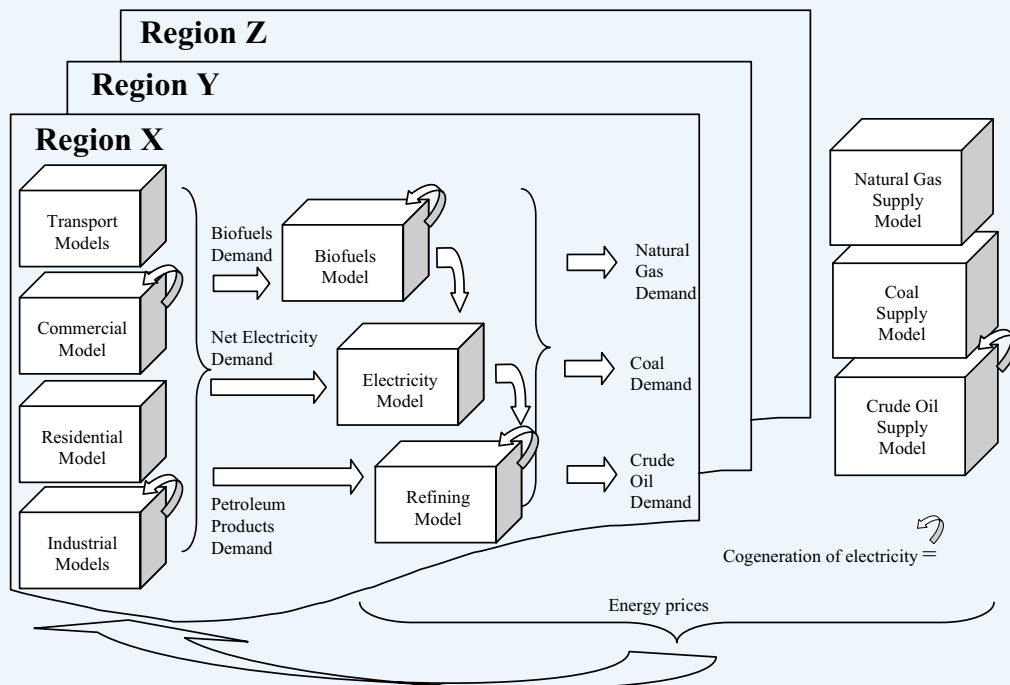
all of a market. Instead of basing its simulation of technology choices only on financial costs and social discount rates, CIMS applies a definition of LCC that differs from that of bottom-up analysis by including intangible costs that reflect consumer and business preferences and the implicit discount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

**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).<sup>8</sup> 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.

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

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.<sup>9</sup>

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.

<sup>9</sup> 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 options<sup>1</sup> 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 2011<sup>2</sup>;
- 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.

<sup>1</sup> 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.

<sup>2</sup> 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.<sup>3</sup>

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 Terms<sup>1</sup>).

**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 Terms<sup>2</sup>).

**Allowance:** “A government issued authorization to emit a certain amount. In greenhouse gas markets, an allowance is commonly denominated as one ton of CO<sub>2</sub>e 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: Glossary<sup>3</sup>).

**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: Glossary<sup>4</sup>). 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 Change<sup>5</sup>).

**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: Glossary<sup>6</sup>).

**Carbon Dioxide (CO<sub>2</sub>):** 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 Terms<sup>7</sup>).

**Carbon Dioxide Equivalent (CO<sub>2</sub>e):** “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](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/7e9ttsv1gVKeh7BFhgo/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](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](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: Glossary<sup>8</sup>).

**Carbon Intensity:** “The relative amount of carbon emitted per unit of energy or fuels consumed” (The Climate Trust<sup>9</sup>).

**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 Terms<sup>10</sup>).

**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: Glossary<sup>11</sup>).

**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: Glossary<sup>12</sup>).

**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: Glossary<sup>13</sup>).

**Deforestation:** “Conversion of forest to non-forest” (IPCC Third Assessment Report: Glossary of Terms<sup>14</sup>).

**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: Glossary<sup>15</sup>).

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/7e9ttsv1gVKekh7BFhqo/ghg-protocol-revised.pdf>

9 The Climate Trust. [http://www.climatetrust.org/solicitations\\_open\\_glossary.php](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](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](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](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](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: Glossary<sup>16</sup>).

**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: Glossary<sup>17</sup>).

**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: Glossary<sup>18</sup>).

**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 CO<sub>2</sub> 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 CO<sub>2</sub> 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: Glossary<sup>19</sup>).

**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: Glossary<sup>20</sup>).

**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 (SF<sub>6</sub>), 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 CO<sub>2</sub>. 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](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](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](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](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: Glossary<sup>21</sup>).

**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: Glossary<sup>22</sup>).

**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: Glossary<sup>23</sup>).

**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: Glossary<sup>24</sup>).

**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 Protocol<sup>25</sup>)

**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 acronyms<sup>26</sup>)

**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](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](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](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](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](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: Glossary<sup>27</sup>).

**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: Glossary<sup>28</sup>).

**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: Glossary<sup>29</sup>).

**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: Glossary<sup>30</sup>).

**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 Terms<sup>31</sup>).

**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: Glossary<sup>32</sup>).

**Source:** “Any process, activity, or mechanism that releases a greenhouse gas” into the atmosphere (IPCC Third Assessment Report: Glossary of Terms<sup>33</sup>).

**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: Glossary<sup>34</sup>).

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](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](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](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](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](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](http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF)