Re: Page B-46, Precipitator and Scrubber Installation Study, $272,200.

Q. What is the "new Federal Government Regulatory Framework for Air Emissions"?

A. The Regulatory Framework for Air Emissions (attached) is one of the main features of the Federal Governments proposed agenda to tackle climate change and clean up the air we breathe. The Regulatory Framework includes strong short-term regulatory targets to reduce air emissions from major industries.

Regulatory Framework for Air Emissions

Canada

For more information:

www.ecoaction.gc.ca

1 800 O-Canada

(1-800-622-6232, or TTY 1-800-926-9105)

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Executive Summary

Canada's New Government has launched a concrete and realistic agenda to protect the health of Canadians, to improve environmental quality, and to position Canada as a clean energy superpower. Canada has historically relied on a variety of non-compulsory measures to reduce air emissions. However, these have not proved sufficient to reduce the health and environmental risks across the country. Overall, Canada is lagging behind other countries. For example, according to an Organisation for Economic Co-operation and Development (OECD) study, Canada ranks near the bottom of all OECD countries in terms of per capita and total emissions of smog-causing pollutants. While Canada accounts for just 2% of global greenhouse gas emissions, its per capita emissions are among the highest in the world and continue to increase.

The proposed framework is comprehensive and includes mandatory and enforceable reductions in emissions of greenhouse gases and air pollutants that will deliver tangible benefits to the health of Canadians and their environment. It also engages all Canadians to take significant, measurable action at home, in Canada.

Climate change is a global issue of major concern for Canadians. It is crucial that Canada do its part to address its own contribution to global climate change. Air pollution is a significant threat to human health and the Canadian environment. In order to address the real concerns of Canadians suffering from the health effects of air pollution, and to clean up Canada's environment, the government must act to reduce emissions of air pollutants.

To address these challenges in a coordinated way will require nothing short of a complete transformation in the capital stock of energy producing and consuming businesses and households across Canada. While cooperation among all orders of government will be required, only the Government of Canada is uniquely situated to lead on this issue if we are to meet the challenge in a cost-effective manner that will ensure the continued competitiveness of the Canadian economy. The government's regulatory framework will provide a nationally-consistent level of protection for the health of Canadians and their environment.

Making significant progress on environmental issues is a key priority for this government. In the Speech from the Throne in October 2006, the government committed to "take measures to achieve tangible improvements in our environment, including reductions in pollution and greenhouse gas emissions."

The Clean Air Regulatory Agenda is the cornerstone of the government's broader efforts to address the challenges of climate change and air pollution. In October 2006, the government published a *Notice of Intent* to regulate air emissions, which provides the basis for the Clean Air Regulatory Agenda. It provides a regulatory framework for short-term industrial emission reduction targets, actions for transportation sources, actions on consumer and commercial products, and the regulatory framework for improvement of indoor air quality.

For the first time in Canada, there will be regulations setting mandatory and enforceable

reduction targets for emissions of greenhouse gases and air pollutants from all major industrial sources. Because industrial emissions of greenhouse gases and air pollutants each account for 50% of Canada's total emissions and share many common sources, the coordination of requirements will allow firms to make cost-effective decisions to maximize synergies in reducing their emissions. The industrial regulations will cover facilities in the following sectors:

- electricity generation produced by combustion;
- oil and gas;
- forest products;
- smelting and refining;
- iron and steel;
- some mining; and
- cement, lime, and chemicals.

Looking first at greenhouse gases, to put industry on the path to contribute to deep long-term reductions in greenhouse gas emissions, the government will put in place short-term emission reduction targets that will come into force in 2010.

For existing facilities, the emission-intensity reduction target for each sector is based on an improvement of 6% each year from 2007 to 2010. This yields an initial enforceable reduction of 18% from 2006 emission-intensity levels in 2010. Every year thereafter, a 2% continuous emission-intensity improvement will be required, resulting in an industrial emission-intensity reduction of 26% by 2015. Targets for new facilities will be established based on cleaner fuel standards. These targets will result in absolute reductions in emissions of greenhouse gases from industry as early as 2010 and no later than 2012, even if the economy grows as expected.

In order to provide flexibility and minimize the economic impact of the regulations, there will be several options for firms to meet their legal obligations. They can:

- reduce their own emissions through abatement actions;
- contribute to a technology fund, which would then act as a means of promoting the development, deployment, and diffusion of technologies that reduce emissions of greenhouse gases across industry;
- use emissions trading, including inter-firm trading, emission reduction credits from non-regulated activities, and certain credits from the Kyoto Protocol's Clean Development Mechanism; and
- use a one-time recognition of early action for firms that took verified action between 1992 and 2006 to reduce their greenhouse gas emissions.

These unprecedented measures will result in mandatory reductions in greenhouse gas emissions. For the first time since Canada signed the Kyoto Protocol, Canadian industry will be required to make a measurable contribution to the global effort to control greenhouse gas emissions.

Canada cannot, however, go overnight from a country whose total greenhouse gas emissions have progressively increased to one whose emissions are declining steadily.

The short-term industrial targets for greenhouse gases in this regulatory framework will stabilize and then start reducing overall emissions from industry.

The short-term targets are being supplemented by a series of targeted initiatives to support increased development of renewable energy, more efficient use of existing energy sources, and cleaner transportation.

Taken together, these regulatory and non-regulatory actions, coupled with ambitious new initiatives being taken by provincial and territorial governments, mean that Canada's greenhouse gas emissions from all sources are expected to begin to decline as early as 2010 and no later than 2012. Thereafter, absolute emissions continue to decline.

The government is committed to reducing Canada's total emissions of greenhouse gases, relative to 2006 levels, by 20% by 2020.

Turning now to air pollutants, the government stated in the *Notice of Intent* that it would set fixed targets that "are at least as rigorous as those in the U.S. or other environmental performance-leading countries". National emission caps will be set for each pollutant of concern. The national emission caps represent the following percentage reductions from 2006 levels: 40% for nitrogen oxides (NO_x), 55% for sulphur oxides (SO_x), 45% for volatile organic compounds (VOCs), and 20% for particulate matter (PM). Limits will also be set for other air pollutants such as mercury from electricity generation, and benzene emissions from the natural gas, and iron and steel sectors. The targets for air pollutants will come into force as early as 2012.

To develop these targets and to determine how the targets will be allocated among the covered sectors, the government undertook a benchmarking exercise. This involved assessing the environmental performance, the technology and operating practices, and the most stringent operating permits of existing regulatory regimes in Canada and other jurisdictions. For some sectors, these regulatory limits or emission performance levels were adapted to take into account characteristics specific to those sectors in Canada, including the financial situation of the sector, potential impacts on the economy, and the raw materials used relative to the benchmarked jurisdiction. The results of this benchmarking exercise and the date of coming into force will be validated through discussions with provinces and territories, each of the covered sectors, and labour, environmental and health groups over the next several months.

To provide flexibility in meeting their emission caps, there will be two options for firms to meet their legal obligations. They can:

- reduce their own emissions; or
- use emissions trading of SO_x and NO_x across Canada.

If, however, a firm is in an area where the quality of the air does not meet national air quality objectives that have been set in advance by the government, restrictions will be placed on the firm's use of credits from emissions trading.

As part of its ongoing work with the U.S. to address transboundary air pollution, the government will also expedite discussions with the United States on a cross-border SO_x and NO_x emissions trading system. Canada and the U.S. have also recently agreed to start negotiations for an annex to the Canada-United States Air Quality Agreement to reduce the transboundary flow of particulate matter.

In addition to setting industrial emission targets, the government will set national air quality objectives for particulate matter and ground-level ozone based on an assessment of the health and environmental effects associated with exposure to these air pollutants in the air we breathe in Canada.

Sector-specific regulations will be developed, with publication of the draft regulations in the *Canada Gazette, Part I*, starting in spring 2008.

With this regulatory framework, Canada will have one of the most stringent sets of regulated targets for greenhouse gases and air pollutants in the world.

The government has committed to review the regulations on industrial air emissions every five years in order to assess progress in reaching medium- and long-term emission reduction objectives. The first such review would take place in 2012.

Preliminary analysis indicates that implementation of the industrial regulatory framework will result in significant improvements in air quality, including decreases in smog levels and reductions in acid deposition. Substantial health benefits are also predicted, with total annual benefits in the year 2015 from the reduced risk of death and illness associated with these air quality improvements estimated to be $6.4 billion. This robust regulatory system will also promote technological investment

and innovation in Canada, yielding long-term economic benefits.

That said, strong regulation inevitably comes at a cost – and those costs will be borne, at least in part, by individual Canadians and their families. However, while these costs are real, they are also manageable. Preliminary analysis performed by Environment Canada indicates that the annual economic cost of meeting both the regulated greenhouse gas targets and the regulated air pollution targets should not exceed 0.5% of GDP in any given year up to 2020.

To move forward with industrial regulations, the government will meet over the next several months with provinces and territories, each industry sector, and other stakeholders to discuss key elements of the regulations. As part of the regulatory development process, a notice will be issued under Section 71 of the *Canadian Environmental Protection Act, 1999* (CEPA 1999). This notice will require those industry sectors that will be covered by the proposed regulations to report to the government the 2006 data that will be used to set the emission reduction targets.

The government also intends to work with provinces and territories to ensure consistency in the way in which regulations are applied by each order of government and will work to make the best use possible of equivalency agreements.

Along with its ambitious agenda to reduce industrial emissions, the government is taking action on emissions from transportation sources, emissions from consumer and commercial products, and indoor air quality.

Transportation is one of the largest sources of greenhouse gas and air pollutant emissions in Canada. As part of a broader transportation policy package, a mandatory fuel-efficiency standard, beginning with the 2011 model year, will be developed through a process that will involve input from all the stakeholders, and it will be published by the end of 2008. It will be designed for Canada to maximize our environmental and economic benefits and will be benchmarked against a stringent, dominant North American standard. To do so, the federal government intends to work in close collaboration with the U.S. government pursuing the concept of a Clean Auto Pact, towards establishing an environmentally ambitious North American regulatory standard for cars and light-duty trucks. For other transportation sources – rail, marine, aviation, and on-road and off-road vehicles and engines – new standards and regulations will be developed and implemented to reduce emissions of greenhouse gases and air pollutants.

The government commits to setting performance standards for all lighting that would phase out the use of inefficient incandescent light bulbs in common applications by 2012. It is also developing and will implement new energy performance standards for consumer and commercial products, such as dishwashers, refrigerators, air conditioners, and commercial boilers, while also taking action to reduce emissions of volatile organic compounds by minimizing the amount of solvents used in consumer and commercial products. These actions will result in significant reductions in air emissions from the products used daily by households and businesses across Canada.

Canadians spend 90% of their time indoors, where air quality can be compromised by such things as mould, improperly vented or poorly maintained furnaces, stoves or heaters, and building materials. For the first time ever, the government is developing a comprehensive regulatory agenda to improve indoor air quality and intends to develop a priority list of indoor contaminants that require government action. The government will then collect information on these contaminants in order to guide decisions on the development of guidelines and product regulations.

In consultation with Canadians, the government has developed a regulatory framework that

introduces an integrated approach to the implementation of mandatory reductions in emissions of greenhouse gases and air pollutants while preserving economic growth.

Through this regulatory framework, the government is implementing mandatory and enforceable measures for the major sources of air emissions: industry, transportation and consumer and commercial products. In addition to delivering significant reductions in emissions, the framework provides regulatory certainty with specific emission-reduction targets and timelines, flexible compliance mechanisms, and regular monitoring and review in order to provide a complete package that delivers a better overall outcome than previous plans.

Preface

Canada's New Government has launched an ambitious and realistic agenda to protect the health of Canadians, to improve environmental quality, and to position Canada as a clean energy superpower. The proposed framework is comprehensive and includes mandatory and enforceable reductions in emissions of greenhouse gases and air pollutants. It also engages all Canadians to take significant, measurable action at home, in Canada.

Climate change is a global issue of major concern to Canadians. Human activities continue to increase the concentration of greenhouse gases in the atmosphere, producing changes in the climate that are already apparent. These changes include altered wind and precipitation patterns and the increased incidence of extreme weather events, droughts, and forest fires. In addition, glacier melt and warmer oceans could lead to significant rises in sea levels. The changes could imperil the way of life of vulnerable communities around the world and here in Canada. The changes would also result in significant economic costs. It is crucial that Canada do its part to address its own contribution to global climate change.

Air pollution is a significant threat to human health and the Canadian environment. Each year, smog contributes to thousands of deaths. Other air pollution problems, such as acid deposition, threaten biodiversity, forests and fresh water ecosystems. In order to address the real concerns of Canadians suffering from the health effects of air pollution, and to clean up Canada's environment, the government must act to reduce emissions of air pollutants.

Addressing these challenges in a coordinated way will require nothing short of a complete transformation in the capital stock of energy-producing and consuming businesses and households across Canada. While cooperation among all orders of government will be required, the Government of Canada is uniquely situated to provide the leadership on this issue that will be required to meet the challenge in a cost-effective manner in order to ensure the continued competitiveness of the Canadian economy. This transformation will not be achieved through the sum of different and potentially conflicting provincial plans, or by setting up rules for industry that vary from one area of the country to another. The government's Clean Air Regulatory Agenda, along with other initiatives to reduce emissions of greenhouse gases and air pollutants, will provide a nationally-consistent approach.

In October 2006, the government published a *Notice of Intent*[1] to regulate air emissions, which provides the basis for the Clean Air Regulatory Agenda. This technical paper sets out in detail the architecture of the regulatory framework, including short-term industrial emission-reduction targets.

The Clean Air Regulatory Agenda is the cornerstone of the government's efforts to address the challenges of climate change and air pollution. With this regulatory framework, Canada will have one of the most stringent sets of regulated targets

1 *Notice of intent to develop and implement regulations and other measures to reduce air emissions*, Canada Gazette, Part I, October 21, 2006, Vol. 140, No. 42 at page 3351, available at www.ec.gc.ca/ceparegistry/documents/notices/g1-14042_n1.pdf.

for industrial emissions of greenhouse gases and air pollutants in the world.

These regulations will have real, tangible health and environmental benefits for Canadians, and these benefits, in turn, will have positive economic effects. A robust regulatory system will also promote technological investment and innovation in Canada, yielding long-term economic benefits from enhanced productivity, improved energy efficiency, greater competitiveness, and more opportunity to sell Canadian products and know-how abroad.

That said, strong regulation will inevitably come at a cost – and those costs will be borne, at least in part, by individual Canadians and their families. Consumer products, including cars and home appliances, could become more expensive. Electricity and fuel prices may rise. All Canadians must be prepared to bear this extra responsibility in order to get the job done.

In implementing the Clean Air Regulatory Agenda, the government will work with provincial and territorial governments, industry, environmental and health groups, scientists, municipalities, communities, and individual Canadians. These partnerships will ensure that all segments of Canadian society have the opportunities to reduce air emissions and achieve a cleaner, healthier Canada for current and future generations.

The government is also taking other action. In the last Speech from the Throne, the government committed to "take measures to achieve tangible improvements in our environment, including reductions in pollution and greenhouse gas emissions." Budget 2006 allocated $1.9 billion to initiatives that will help reduce greenhouse gas emissions and clean up the air Canadians breathe, including:

- a 15.5% tax credit on the purchase of monthly public transit passes to encourage individual Canadians and their families to leave their cars at home and take more environmentally-sustainable modes of transportation; and
- $1.3 billion for public transit capital investments.

In addition, in December 2006, the government announced two key environmental measures. The first was the new Chemicals Management Plan, which takes immediate action to regulate chemicals that are harmful to human health or the environment. Canada was the first country in the world to categorize 23,000 legacy chemical substances. This action has allowed the government to move forward to ensure that chemical substances are handled safely. The government has challenged industry to provide the government with information on how they are safely handling 200 high-priority chemical substances. The government has committed $300 million over four years to implement the Chemicals Management Plan.

The government also announced that it would require fuel producers and importers to have an average annual renewable content of at least five percent of the volume of gasoline that they produce or import by 2010. Upon successful demonstration of renewable diesel fuel use under the range of Canadian conditions, the government will require an average two percent renewable fuel content in diesel fuel and heating oil by no later than 2012. The government also announced funding of $365 million to bolster the development of biofuels and other bioproducts. These actions will significantly reduce air emissions from the fuel Canadians use to travel, to transport goods, and to heat their homes.

To complement the Clean Air Regulatory Agenda, the government will also reduce emissions of greenhouse gases and air pollutants through targeted incentives and programs for industry and consumers:

- ecoENERGY Initiatives: to help Canadians use energy and fuels more efficiently, boost renewable energy supplies, and develop cleaner energy technologies. These include programs to

offer support and information on retrofits to homeowners and small businesses and organizations; to encourage the construction and retrofit of more energy-efficient buildings and houses; and to accelerate energy-savings investments within Canada's industrial sector.
- ecoTRANSPORT Initiatives: to reduce the environmental impacts of transportation and secure Canada's future prosperity and competitiveness, by making the transportation system more sustainable, both economically and environmentally. They include measures to reduce emissions from urban passenger transportation; to reduce the health and environmental effects of freight transportation; to share information on fuel-efficient vehicles and their use; and to promote environmentally-friendly vehicle technologies.

In addition, the Minister of Natural Resources and Alberta's Minister of Energy have commissioned the Canada-Alberta ecoENERGY Carbon Capture and Storage Task Force. The Task Force is made up of CEOs from the oil, power and pipeline industries, as well as a member of the academic community. It has been tasked with examining the opportunities for the large-scale application of carbon capture and storage technology in Canada. Based on that examination, the Task Force will provide a comprehensive set of options describing how government and industry can work together to take advantage of those opportunities.

On March 19, 2007, the government further demonstrated its commitment to environmental action to provide health and environmental benefits for Canadians by allocating $4.5 billion in Budget 2007 for initiatives to reduce greenhouse gas emissions and air pollution, as well as for water conservation, and enforcement initiatives. These initiatives included the following:

- $1.5 billion in funding for the Climate Change Trust Fund, a new national fund that provides financial support for provincial and territorial government projects that will result in real reductions in greenhouse gas emissions and air pollutants;
- a rebalancing of the tax system to encourage investments by the oil sands and other sectors in clean and renewable energy while phasing out accelerated capital cost allowance for oil sands development;
- an extension to 2020 of existing tax incentives for clean energy production and an expansion of eligibility to cover wave and tidal energy, as well as additional solar energy and waste-to-energy technologies;
- performance-based rebates on vehicles according to their fuel efficiency and levies on vehicles that are fuel-inefficient;
- $36 million over the next two years to support programs to get older, higher-emitting vehicles off the road;
- $2 billion over seven years to support the production of renewable fuels, including $1.5 billion for operating incentives for producers of alternative, lower-emission fuels and $500 million to invest with the private sector in establishing large-scale facilities for the production of next-generation renewable fuels, such as the Iogen Corporation facility;
- extension of the public transit tax credit, announced in Budget 2006, to different types of transit passes;
- funding to protect Canada's natural heritage, including $225 million for conserving ecologically-sensitive lands and $110 million for protecting species at risk;
- $22 million over the next two years to strengthen environmental enforcement;
- $92 million over the next two years to improve the water Canadians drink, to clean polluted waters, to protect ecosystems, and to ensure the sustainability of Canada's fish resources; and
- over $200 million in funding for renewal of the Canadian Coast Guard fleet and to support fisheries science and research.

These other initiatives will deliver real results while industrial regulations are developed and will

promote the technological innovation required to support upcoming regulations. In addition, these initiatives, including the regulations, start Canada on the road to making real progress towards its Kyoto commitments to reduce greenhouse gas emissions.

The real reductions in emissions that will be driven by the regulations, coupled with the impacts of both the non-regulatory actions above and ambitious new initiatives being taken by provincial and territorial governments, mean that Canada's greenhouse gas emissions from all sources are expected to begin to decline as early as 2010 and no later than 2012. Thereafter, absolute emissions continue to decline.

The government is committed to reducing Canada's total emissions of greenhouse gases, relative to 2006 levels, by 20% by 2020 and by 60% to 70% by 2050.

The government supports the Kyoto process, and actions at home will be the basis for Canada's participation in future international cooperative efforts to address climate change.

Significant, long-term progress on greenhouse gases and air pollutants will be realized only through the development, commercialization, and deployment of new, cleaner energy and transportation technologies and through the active participation of all Canadians and all aspects of Canadian society.

The government recognizes the need to work with all consumers, industry, and the provinces and territories as we move forward to implement this aggressive plan. All Canadians will need to do their part to reduce greenhouse gases and air pollution to help protect their health and their environment. This paper lays out the government's plan to lead the way, both domestically and internationally.

I. The Clean Air Regulatory Agenda

On October 21, 2006, the government published a *Notice of Intent*, which proposed an integrated, nationally-consistent approach to the regulation of greenhouse gas and air pollutant emissions in order to protect the health and environment of Canadians. Because greenhouse gases and air pollutants share many common sources, the coordination of requirements will allow firms to make cost-effective decisions to maximize synergies in reducing their emissions.

The government signalled its determination to address greenhouse gases and air pollutants from key sources, and outlined a regulatory agenda for industrial sources, transportation, and consumer and commercial products; for more stringent energy efficiency standards; and for improved indoor air quality. The government is committed to reducing Canada's total emissions of greenhouse gases, relative to 2006 levels, by 20% by 2020 and by 60% to 70% by 2050.

Environmental protection is an area of shared jurisdiction between the federal government and the provinces and territories. The federal government has clear jurisdiction to regulate air emissions in order to protect the environment and the health of Canadians.

The government recognizes the importance of endeavouring, in co-operation with provinces, territories, and aboriginal peoples, to achieve the highest level of environmental quality for all Canadians. Provinces have taken important action to reduce air pollutant emissions in their own jurisdictions. However, national consistency is necessary to provide a minimum level of air quality for all Canadians, to ensure a level playing field, and to protect competitiveness for Canadian industry in different regions by avoiding a patchwork of different regulations being applied to the same industrial sectors. An integrated, nationally-consistent approach will enable firms to reduce their emissions in an efficient and cost-effective manner. The federal government has never regulated emissions of greenhouse gases or air pollutants across industries before.

For industrial sources, the October 2006 *Notice of Intent* indicated the government would introduce a framework for short-term targets and compliance options by spring 2007.

In the transportation sector, the Prime Minister reaffirmed in a speech on February 6, 2007, that, for the first time ever, Canada's New Government will regulate the fuel efficiency of motor vehicles, beginning with the 2011 model year. There is currently a Memorandum of Understanding between the auto industry and the government, with a target of 5.3 Mt of greenhouse gas emissions reductions by 2010. The government will build on this agreement to establish an ambitious regulated fuel-efficiency standard for the 2011 model year, benchmarked against a stringent, dominant North American standard.

The government is also developing and will implement regulations to reduce smog- and acid rain-forming emissions from vehicles, engines and fuels; and will take action to reduce air emissions from other modes of transportation, including rail, aviation, and marine.

For the consumer and commercial products sector, the government is developing regulations

that strengthen energy efficiency standards and labelling requirements for consumer and commercial products. The government is also developing, for the first time ever, a comprehensive regulatory agenda that will address indoor air quality.

The goal of these actions is to improve significantly and measurably the health of Canadians and the environment by reducing emissions of greenhouse gases and air pollutants.

Since the publication of the *Notice of Intent*, work has been ongoing on each of these priorities. Two draft regulations for the transportation sector have been published in the *Canada Gazette* to reduce smog-forming pollutants from vehicles and engines. Work has also commenced on a series of amendments to the *Energy Efficiency Regulations*.

As indicated in the *Notice of Intent*, an integrated approach to reducing emissions of greenhouse gases and air pollutants is being taken in order to maximize the benefits to the health of all Canadians and to the environment.

The next four sections present an overview of progress on the overall Clean Air Regulatory Agenda since the publication of the *Notice of Intent*. This includes overviews of:

- the regulatory framework for industrial sectors, including short-term targets, proposed compliance mechanisms, and an initial assessment of impacts of the framework on the health of Canadians, on the environment, and on the economy;
- regulatory and other actions for transportation sources;
- regulatory and other actions for consumer and commercial products; and
- the regulatory framework for improving indoor air quality.

II. Regulatory Framework for Industrial Air Emissions

A. Overview

In the *Notice of Intent*, the government committed to develop and implement an integrated, nationally-consistent approach to the regulation of industrial air emissions. In November and December 2006, extensive consultations were undertaken with the provinces and territories, industry, aboriginal groups, and health and environmental groups on elements of the proposed approach and the development of the regulatory framework. A companion document[2] was published to further elaborate and present elements and options for consultation. These consultations and the public comments received in response to the *Notice of Intent* have informed the development of the regulatory framework.

This section presents that regulatory framework. The regulations will mandate reductions in emissions of greenhouse gases and air pollutants from the following industrial sectors: electricity generation produced by combustion, oil and gas (including upstream oil and gas, downstream petroleum, oil sands, and natural gas pipelines), forest products (including pulp and paper and wood products), smelting and refining (including aluminum, alumina, and base metal smelting), iron and steel, iron ore pelletizing, potash, cement, lime, and chemicals production, including fertilizers.

For greenhouse gases, the framework sets a 2010 implementation date for emission-intensity reduction targets. For air pollutants, the framework sets fixed emission caps that will enter into force as soon as possible between 2012 and 2015.

In order to minimize costs to industry and the impact on the economy, the framework contains compliance mechanisms intended to provide industry with flexibility in meeting its regulatory obligations. The framework also requires rigorous monitoring and reporting in order to ensure compliance assessment and transparency.

The short-term targets are expressed as reductions from 2006 levels. To support the development and implementation of regulations, comprehensive and consistent baseline data for 2006 will be required from facilities in the regulated sectors. To this end, the government will require facilities in those sectors that will be covered by the regulations to report 2006 emissions and other relevant data under a notice issued under section 71 of the *Canadian Environmental Protection Act,1999* (CEPA 1999).[3]

Preliminary analysis of environmental modelling and assessment of the environmental and health benefits and economic costs of the industrial regulatory targets have been completed and are presented in this document. Further analysis is

2 *Improving the Health of Canadians and Their Environment through an Integrated, Nationally Consistent Approach to Reducing Industrial Air Emissions: A Companion Document to the Notice of Intent to Develop and Implement Regulations and Other Measures to Reduce Air Emissions*, November, 2006, available at www.ec.gc.ca/ceparegistry/documents/gene_info/NOI_DisPap/NOI_DisPap.cfm.

3 Section 71 of CEPA 1999 allows the Minister of the Environment to issue a notice requiring the provision of information for the purpose of assessing whether to control or the manner in which to control a substance. These data may be required of persons who possess or who may reasonably be expected to have access to the information.

ongoing, and continues to support discussion on the proposed framework.

The government will validate the benchmarked air pollutant targets over the next several months. The government will work with industry, provinces and territories, labour, and environmental and health groups during the validation process. The regulatory framework for air pollutants – that is, the targets, the compliance mechanisms, and the timeframe for the entry into force of the regulations – will be finalized by fall 2007, after the government has validated the benchmarked air pollutant targets.

While this validation process is underway, sector-specific regulations will be developed for the general provisions and those related to greenhouse gases, leading to publication of the draft regulations in the *Canada Gazette, Part I*, starting in spring 2008. The regulations will be revised to incorporate the air pollutant provisions a few months later, following normal regulatory procedures.

The government will monitor the evolving regulatory framework as the regulations are developed and implemented over the next two years and will make adjustments, as needed.

In addition, the government has committed to review the regulations on industrial air emissions every five years in order to assess progress in reaching medium- and long-term emission reduction objectives. The first such review would take place in 2012. The review would entail an assessment of the effectiveness of measures taken to reduce greenhouse gas emissions and air pollutants, and of advances in industrial technology (energy production, industrial processes, and pollution abatement) in order to determine the potential for further emissions reductions consistent with the goal of continuous improvement. The review would also examine the state of air quality and possible changes in the Canadian industrial sector mix, including regional changes, that could affect the goal of achieving tangible benefits for the health of Canadians and their environment.

B. Equivalency Agreements

The federal government will set stringent national standards and will work to reach equivalency agreements with those provinces that set provincial emissions standards that are at least as stringent as the federal standards. Equivalency agreements will allow provincial leadership, while ensuring a nationally-consistent level of health and environmental protection.

As the proposed federal regulations are developed, the government intends to work with provinces and territories to avoid as much as possible any duplication and to ensure consistency in the way in which regulations are applied.

Most provinces restrict the emissions of air pollutants. However, standards vary considerably across the country. Alberta has also recently released draft regulations to reduce industrial greenhouse gas emissions in its territory.

Since the federal government recognizes the important role played by the provinces and territories in air management, work will be undertaken with interested provinces and territories to make the best use possible of equivalency agreements.

When an equivalency agreement has been reached, the Governor in Council can suspend the application of the specified CEPA 1999 regulations in the signing province, so that only the equivalent provincial regime applies. The federal Minister of the Environment remains responsible for reporting annually to Parliament on the administration of the CEPA 1999 provisions that permit these equivalency agreements. CEPA 1999 authorizes the Minister to enter into an equivalency agreement with a province, territory, or aboriginal government if the Minister and the other jurisdiction's government demonstrate that there are provisions in force in that jurisdiction that:

a) meet or exceed the equivalent level of environmental protection mandated by federal regulations in force; and
b) include rights similar to those prescribed in sections 17 to 20 of CEPA 1999 (the right of citizens to request an investigation of alleged offences under the other jurisdiction's legislation).

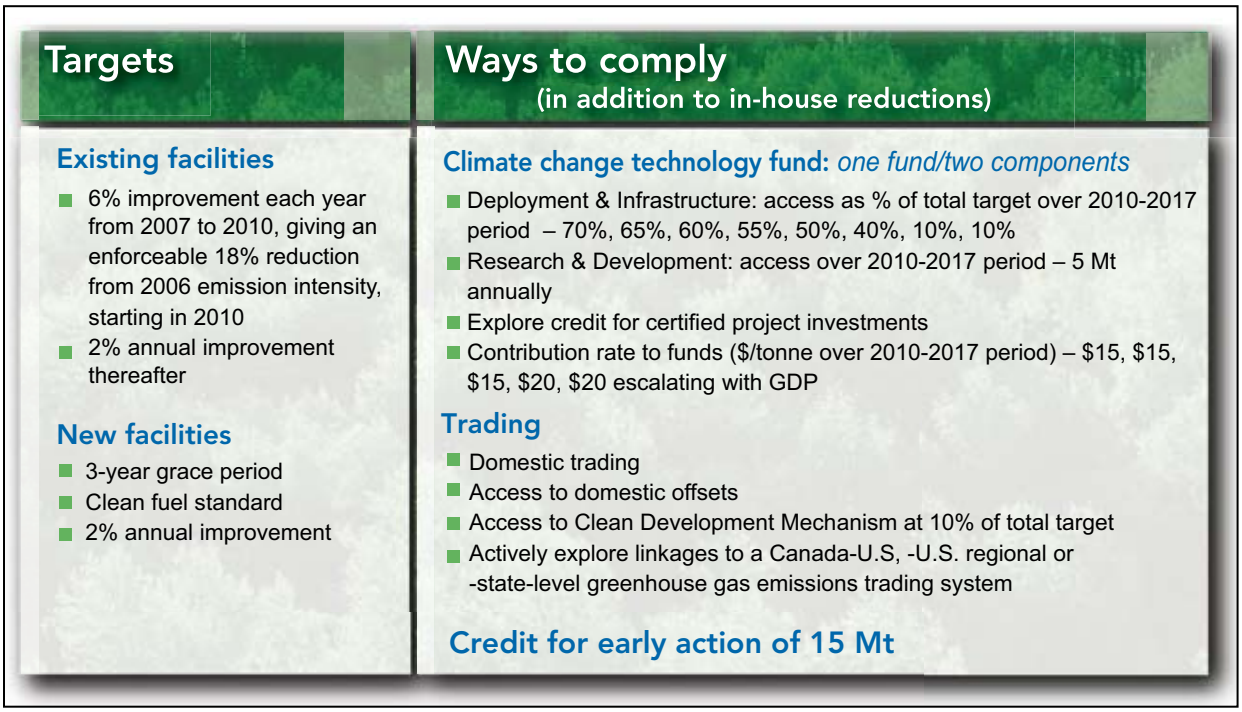
Provincial enforceable certificates of approval or permitting or licensing systems can be recognized as a basis for an equivalency agreement. Once an equivalency agreement is negotiated, the Governor in Council may make an order declaring that the provisions of the CEPA 1999 regulation that are the subject of the equivalency agreement do not apply in the jurisdiction of the particular province, territory or aboriginal government with which the agreement has been negotiated. The result is that the regulation (or portion of it) would "stand down", leaving the subject matter of the CEPA 1999 regulation to be governed by the laws of the province, territory, or aboriginal government with which the agreement was negotiated.

C. Regulatory Framework for Greenhouse Gas Emissions

C.1 Approach for determining sectoral emission reduction targets

Short-term emission-intensity targets

The government will put in place short-term emission-intensity reduction targets that will come into force in 2010. These targets will result in absolute reductions in emissions of greenhouse gases from industry as early as 2010 and no later than 2012, even if the economy grows as expected. The targets will also make a vital contribution to the government's commitment to reduce national absolute greenhouse gas emissions by 20% from 2006 levels by 2020.



Source: Environment Canada.

The government is introducing the toughest action on greenhouse gases ever proposed by a Canadian government. The government's emission-intensity targets are 6 percentage points more stringent, at 18%, than the emission-intensity targets proposed on July 16, 2005, at 12%. Unlike the 2005 proposal, this plan also requires annual improvements in emission intensity of 2%, meaning that, by 2015, a 26% emission-intensity improvement will be required under this plan.

Short-term mandatory reductions in greenhouse gas emissions by sector are defined in terms of reductions in emission intensity from their emission intensity in 2006, the base year. That is, greenhouse gas emissions per unit of production are capped. The regulatory release limit for individual facilities within a given sector that will be needed to achieve this overall percentage reduction will be determined as part of the process to develop the detailed regulations.

The emission-intensity approach ties targets to production. This means that firms will not be able to claim emission reduction credits by shutting down production for economic reasons or obtain credits for moving production out of Canada. Rather, credits can only be earned through cleaner production. More importantly, these rigorous targets will yield absolute reductions even as the economy grows. As the World Resources Institute noted in a 2006 report, "[f]or environmental performance, what matters overall is that targets are set at reasonably stringent levels and subsequently are met. This may be achieved with absolute or intensity targets."[4]

Approach to setting targets for existing facilities

The approach to determining the emission-intensity targets for each sector is based on an improvement of 6% each year from 2007 to 2010.

What is carbon dioxide equivalence?

For comparison purposes, greenhouse gas emissions are reported in units of carbon dioxide equivalent (CO_2e). Each greenhouse gas has a unique average atmospheric lifetime and heat-trapping potential. Greenhouse gas emissions are often calculated in terms of how much carbon dioxide (CO_2) would be required to produce a similar warming effect. This is called the **carbon dioxide equivalent** value and is calculated by multiplying the amount of the gas by its associated **global warming potential (GWP)**. For example, the GWP for methane is 21, so each tonne of methane that is emitted is considered to have a cumulative warming effect over the next 100 years equivalent to 21 tonnes of CO_2.

GWP is based on a number of factors, including the heat-absorbing ability (known as radiative efficiency) of each gas relative to that of carbon dioxide, as well as the amount of each gas removed from the atmosphere over a given number of years (known as the decay rate) relative to that of carbon dioxide.

Under the Kyoto Protocol, the Conference of the Parties decided that the values of GWP calculated for the Intergovernmental Panel on Climate Change's (IPPC) Second Assessment Report were to be used to convert the various greenhouse gas emissions into comparable CO_2 equivalents when the overall sources and sinks for the period 2008-2012 are being computed. For consistency, these GWP values will be used, even though the GWP values for some of the gases have subsequently been revised.

Gas	Chemical formula	100-year Global Warming Potential
Carbon dioxide	CO_2	1
Methane	CH_4	21
Nitrous oxide	N_2O	310
Hydrofluorocarbons (HFCs)	$C_nH_xF_{(2n+2-x)}$ $0<n<6$	140 - 11 700
Sulphur hexafluoride	SF_6	23 900
Perfluorocarbons (PFCs)	C_nF_{2n+2} $(0<n<7)$ and C_4F_8	6 500 - 9 200

Adapted from: IPCC, Climate Change 1995, *The Science of Climate Change: Summary for Policymakers and Technical Summary of the Working Group I Report*, 1995, page 22.

4 World Resources Institute, *Target: Intensity, An Analysis of Greenhouse Gas Intensity Targets*, Washington, D.C., 2006, p. 16, available at pdf.wri.org/target_intensity.pdf.

This yields an initial required reduction of 18% from 2006 levels in 2010, the year the proposed greenhouse gas regulations would come into force. Every year thereafter, a 2% continuous improvement in emission intensity will be required. By 2015, therefore, a reduction in the emission intensity of 26% from 2006 levels would be mandated. This basic approach will be applied to existing facilities in each sector.

The 18% emission-intensity reduction calculation applies only to combustion and non-fixed process emissions. Regulatory release limits per unit of output for existing facilities would reflect this. Pre-defined fixed process emissions would have a 0% reduction in emission intensity from 2006 levels in 2010. Fixed process emissions are emissions that are tied to production and for which there is no alternative technology that will reduce them. The only way to reduce these emissions is to reduce production. Processes that are currently considered fixed may not be considered fixed in the future if technologies or processes are developed that could reduce or capture and store the emissions.

At the sector level, the share of fixed process emissions in total emissions varies. For each sector, the basic approach will be an 18% reduction from 2006 levels in 2010 with continuous improvement in emission intensity thereafter. Fixed process emissions will have to be determined on the basis of the characteristics of firms and sectors.

Approach to setting targets for new facilities

New facilities will be granted a three-year grace period before they have to meet an emission-intensity reduction target in order to provide sufficient time for the facilities to reach normal operating levels. After the third year, the initial greenhouse gas emission-intensity target will be based on cleaner fuel standards. New facilities will also be required to improve their emission intensity each year by 2%, as with existing facilities. New facilities are defined as those whose first year of operation is 2004 or later.

What are fixed process emissions?

An example of fixed process emissions

Calcination in cement and lime production: Limestone, a raw material used to produce cement and lime, contains some carbon. When limestone is heated to extract the ingredients needed to produce cement and lime (a process known as *calcination*), carbon dioxide is formed and released into the atmosphere. There are no known techniques or practices to avoid the release of carbon dioxide when limestone is calcined.

An example of non-fixed process emissions

Anode effect in aluminum production: Anode effects are brief periods of instability and disequilibrium in the aluminum smelting process. These effects result in a chemical reaction that releases perfluorocarbons (PFCs), which are potent greenhouse gases. Anode effects can be controlled through modifications in the smelting process. Newer facilities have, in general, fewer emissions from anode effects, so this type of emission is not considered to be from a fixed process.

The three-year grace period means that no improvements are expected in the first three years of operation and no target will apply during those years. Targets begin to apply in the fourth year of operation, even if that year is before 2010. For example, a facility that began operation in 2005 will begin to accrue a target in 2008, based on its emission-intensity performance in 2007 and the application of a cleaner fuel standard.

A flexible approach to implementation will be taken in those special cases where the equipment used in a plant facilitates carbon capture and storage or another technology offering significant and imminent potential for emission reductions.

The approach described above is the one that will be applicable across the full range of industrial sectors. Specific sectoral issues will be considered in developing the regulations, but all resulting emission reductions must be equivalent to those resulting from the general approach.

The continuous improvement of 2% in a sector's emission intensity would be applied through 2020. As noted above, there will be a review of the

regulatory framework, including targets, every five years. The first review would take place in 2012.

C.2 Compliance mechanisms

Firms will have several options to meet their legal obligations under the proposed greenhouse gas regulations. Ideally, firms will reduce their own emissions through abatement actions, such as energy efficiency measures, improved energy management systems, or deployment of carbon capture and storage or other emission-reducing technologies.

There will be limited access to other compliance mechanisms. First, firms could meet their compliance obligations through contributions to a technology fund. Second, they will have access to emissions trading, including inter-firm trading, emission-reduction credits from non-regulated activities, and qualified credits from the Kyoto Protocol's Clean Development Mechanism. Also, there will be a one-time recognition of early action for firms that took verified action between 1992 and 2006 to reduce their greenhouse gas emissions. Finally, linkages to North American emissions trading systems will be actively pursued. Over time, as the international carbon market becomes more fully developed and robust, and as emissions monitoring, verification, and reporting systems evolve further, the government will consider further international linkages.

Contributions to a climate change technology fund

Technological advancement and innovation are critical to achieving significant, long-term reductions in greenhouse gas emissions. New technologies, both under development and ready for deployment, provide a means to transform Canada's industrial production and thereby significantly reduce emissions.

Firms would be able to meet part of their regulatory obligations to reduce greenhouse gases by contributing to a technology fund. This fund would provide more than just a compliance mechanism for industry. It would act as an important means of promoting the development, deployment, and diffusion of technologies that reduce emissions of greenhouse gases across industry.

A third-party entity would be created to administer the fund. This would be an independent, not-for-profit entity administered by a board of directors composed of individuals originating from industry, federal and provincial governments, and other stakeholders. It would operate under a federal mandate.

Over the coming months, the process for determining the allocation of funding to projects and the legislative authority, governance, and administration of the fund will be further developed.

The design of the fund will respect two basic principles: no inter-regional transfer of wealth and no government control.

Before finalizing the structure of the fund, the government will work with provinces and territories, as well as sectors, to determine the appropriate disbursements of the funds, taking into consideration the development and deployment of technologies that would be used by sectors with facilities across the country and provincial initiatives that support the development of technology to reduce greenhouse gas emissions, and potentially, air pollutants as well.

Other funds that meet all necessary requirements could be certified to qualify as part of the regulatory framework. In particular, provincial funds that are consistent with the federal fund could be recognized as equivalent.

The fund would be used principally to fund investments that have a high likelihood of yielding greenhouse gas emission reductions in the near term. The primary focus would be on funding technology deployment and related infrastructure projects.

Carbon capture and storage is one of the most promising technologies for reducing greenhouse gas emissions associated with a broad array of industrial activities. The fund could support critical infrastructure for carbon capture and storage, including a pipeline in Alberta for CO_2 transport. This could complement activities and priorities being defined through the Canada-Alberta ecoENERGY Carbon Capture and Storage Task Force.

The fund could also support an east-west electricity grid linking markets from Manitoba to Newfoundland.

As a way of meeting part of their regulatory obligations, firms could contribute to the fund at a rate of $15 per tonne of carbon dioxide equivalent from 2010 to 2012 and $20 per tonne in 2013. Thereafter, the rate would escalate yearly at the rate of growth of nominal GDP. This rate structure would be reviewed every five years as part of the general review of the regulatory system.

Contributions to the deployment and infrastructure component would be limited to 70% of the total regulatory obligation in 2010, falling to 65% in 2011, 60% in 2012, 55% in 2013, 50% in 2014, 40% in 2015, 10% in 2016, and 10% in 2017. The contribution limit will fall to 0% by 2018.

The government will also explore:

- The option of providing credits to individual companies for government pre-certified investments in specific projects. This option could allow a company that invests in a transformative technology that would incrementally reduce future emissions to receive credits from the government for that investment. These credits could be used towards its regulatory obligations. Criteria for such investments would be determined in advance by government in consultation with industry and other experts; and
- Imposing a mandatory requirement for investments to be made in specific infrastructure projects.

A smaller component of the fund, limited to an additional 5 Mt per year from 2010 to 2017, would help finance research and development projects aimed at supporting the creation of transformative technologies that are expected to achieve emission reductions in the medium to longer term.

Emissions trading

Emissions trading will be an important component of the government's market-driven approach to reducing emissions of greenhouse gases. Well-designed emissions trading systems can reduce overall costs associated with regulatory compliance by allowing firms with high costs of emissions abatement to fund lower-cost emission-reduction projects at other firms. In addition, emissions trading systems create an economic incentive for companies to do better than their regulated targets and bring innovation to bear on the challenge of climate change.

The emissions trading system that will be part of the regulatory framework for greenhouse gases will have a number of components. Inter-firm trading, through which regulated firms may buy and sell emission credits among themselves, will be the central component. A domestic offset system will allow regulated firms to invest in verified emission reductions outside the regulated system. There will be no limit on firms' access to domestic emissions trading and offsets.

In addition, Canadian firms will have limited access to certain types of credits from the Kyoto Protocol's Clean Development Mechanism for compliance with the regulations.

Potential linkages with regulatory-based trading systems in the United States will be actively pursued. In particular, the government will examine the feasibility of linking with emissions trading systems such as the Western Regional Climate Action Initiative and the Regional Greenhouse Gas Initiative, as well as other systems, as they become established. Over time, as national and regional carbon markets become more mature and the

markets become more global in nature, with robust emission reduction verification systems, Canadian firms will have increased access to international trading markets for purposes of compliance with Canadian regulations. Canadian firms will not, however, be allowed to use "hot air" credits, which do not represent real emission reductions, for compliance with Canadian regulations.

Recognizing the opportunity offered by emissions trading, Canada's exchanges have been positioning themselves to launch trading when the regulatory framework is finalized.

The Government of Canada will not purchase credits or otherwise participate in the carbon market.

Inter-firm trading

The central component of the emissions trading system for greenhouse gases will be a baseline-and-credit system. For each firm, the baseline will be its emission-intensity target. Firms whose actual emission intensity in a given year is below their target will receive tradable credits equal to the difference between their target and their actual emission intensity, multiplied by their production in that year. These credits could be banked for use in future compliance years or sold to other parties through an emissions trading market established by the private sector.

Offset system

The emissions trading system would also include domestic offset credits. Offsets are emission reductions that take place outside the domain of regulated activities.

Offset credits, which regulated firms could use towards their regulatory obligations, would be issued for verified reductions in greenhouse gas emissions that were incremental to what would have happened without the regulatory system or other government programs.

An offset credit would represent one tonne of verified greenhouse gas reduction or removal achieved by a given project, measured in carbon dioxide equivalent. The credit would be recognized in the regulations as tradable and could be used to meet the obligations of regulated facilities.

Offset credits would be issued for those activities where emission reductions could be accurately quantified and verified at a reasonable cost. Examples of possible offset project types include the capture of methane from landfill gas that is then used to generate electricity, energy-efficiency projects, and projects that store carbon in agricultural land. To lower the cost of participation, pre-approved quantification approaches would be provided and the aggregation of small projects would be encouraged.

The framework for the offset system would be built on the experience gained in three Canadian pilot initiatives and on project-based crediting systems in other countries. In addition, considerable work on the development of a framework has taken

Baseline-and-credit emissions trading system

In a baseline-and-credit emissions trading system, a baseline is set. In this case, the baseline would be the emission-intensity target. Facilities that reduced emissions below their target would be allocated tradable credits that they could either bank for a future compliance obligation or sell to another facility. Facilities that emitted above their target would have to buy credits from other facilities or use their own banked credits to meet their regulatory obligation.

For example, suppose the emission-intensity target is 5.0 kt CO_2e for every tonne of widgets produced. Suppose Facility A had an emission intensity of 4.5 kt/tonne and produced 1000 tonnes of widgets during the year. Then it would receive tradable credits from the government equal to the difference between the target (5.0) and its actual emission intensity (4.5) times its production in that year (1000). Or (5.0-4.5) x 1000 = 500 credits received.

Suppose Facility B had an emission intensity of 5.3 kt/tonne and produced 1200 tonnes of widgets. It would be required to remit to the government credits equal to the difference between its actual emission intensity (5.3) and the target times its production (1200), or (5.3-5.0) x 1200 = 360 credits owed. It could buy these credits from another facility or use credits that it had banked from a previous compliance period.

place in Canada, with the provinces and the private sector playing leading roles. Canada's private sector would play a major role in the offset system including verifying emission reductions achieved from eligible offset projects and providing infrastructure and services required for the trading of the credits.

The offset system would start prior to the entry into force of the regulations in order to provide adequate time for projects to generate emission reductions. Credits would be issued for these verified emission reductions. These credits could be sold to regulated entities to use for compliance purposes.

Clean Development Mechanism and other international linkages

Generally speaking, an emissions trading system with a broader scope will provide more opportunities for cost-effective emissions reductions. Over the past five years, a number of sub-national, national, and regional greenhouse gas emissions trading markets have been implemented or proposed for implementation in the near future. The most comprehensive of these is the European Union's Emissions Trading Scheme (EU ETS), which began with a pilot phase in 2005 and is moving to a more complete system starting in 2008. The experience of the EU ETS has provided valuable insights in developing Canada's regulatory system for greenhouse gases, and the government intends to continue discussions with the European Union on what Canada can learn from the European Union's experience with emissions trading.

Notwithstanding these developments, the international carbon market is still fragmented and in its infancy. As the global market develops and matures, there will be additional opportunities for Canadian firms to participate.

The government intends to start modestly, by allowing Canadian firms limited access to certain types of credits from the Kyoto Protocol's Clean Development Mechanism for the purpose of meeting their regulatory obligations.[5] The government will determine which types of Clean Development Mechanism credits should be eligible for regulatory compliance in Canada.

Access to Clean Development Mechanism credits for compliance purposes under the regulations would be limited to 10% of each firm's total target.

A number of U.S. states are currently considering implementing regulatory regimes with emissions trading to reduce emissions of greenhouse gases. The Western Regional Climate Action Initiative intends to establish an emissions trading system for greenhouse gas emissions from industry in five western U.S. states. Starting in 2009, the Regional Greenhouse Gas Initiative will implement a regional emissions trading system in nine northeast and mid-Atlantic states that covers carbon dioxide emissions from power plants in the region. Several other greenhouse gas emissions trading initiatives have been proposed at the state and federal levels in the United States.

Canada will actively work with U.S. partners to explore opportunities for linking Canada's emissions trading system with regulatory-based emissions trading systems at the regional and state level, and with any that may be established at the federal level. Canada will also actively explore cooperation on emissions trading with Mexico.

The government will monitor the development of the international carbon market. As this market becomes more fully developed and robust, and emissions monitoring, verification, and reporting systems evolve further, the government will consider further linkages that could allow a broader range of international credits to become eligible for compliance with Canada's regulatory system. An essential condition is that any international credits used towards compliance with Canadian regulations represent real, verified emission reductions.

5 These credits are called "Certified Emission Reduction units" or CERs.

Credit for early action

Firms in a number of sectors have made efforts over the last decade to reduce emissions. There would be a one-time allocation of credits to those firms covered by the proposed regulations that took verified action to reduce their greenhouse gas emissions between 1992 and 2006. A maximum of 15 Mt would be allocated, with no more than 5 Mt to be used in any one year.

Firms would be invited to make a one-time application where they would submit evidence of changes in processes or facility improvements they undertook that resulted in incremental greenhouse gas emission reductions in the specified timeframe. There would be eligibility criteria to determine which emission reduction activities would be considered, and evidence of emission reductions would be audited.

Once all applications were received, the reserve would be allocated to all qualifying applicants on a pro rata basis. The maximum allocation for emission reductions would be one credit for one tonne of carbon dioxide equivalent reduction. If the total tonnage of emission reductions applied for were to exceed 15 Mt, the credits would be distributed to individual firms in proportion to their contribution to the total emission reduction achieved.

Market liquidity

The availability of these different compliance mechanisms will provide industry with the access to emission reduction opportunities that they need to meet their regulatory obligations at a reasonable cost and will support the development of a functioning emissions trading market system. That said, the government recognizes that there may be concern about the level of market liquidity in the trading system, both at the start of the system and over time. The government will carefully monitor the evolution of the emissions trading system and other aspects of the compliance mechanisms in order to determine any modifications that might be required.

D. Regulatory Framework for Air Pollutant Emissions

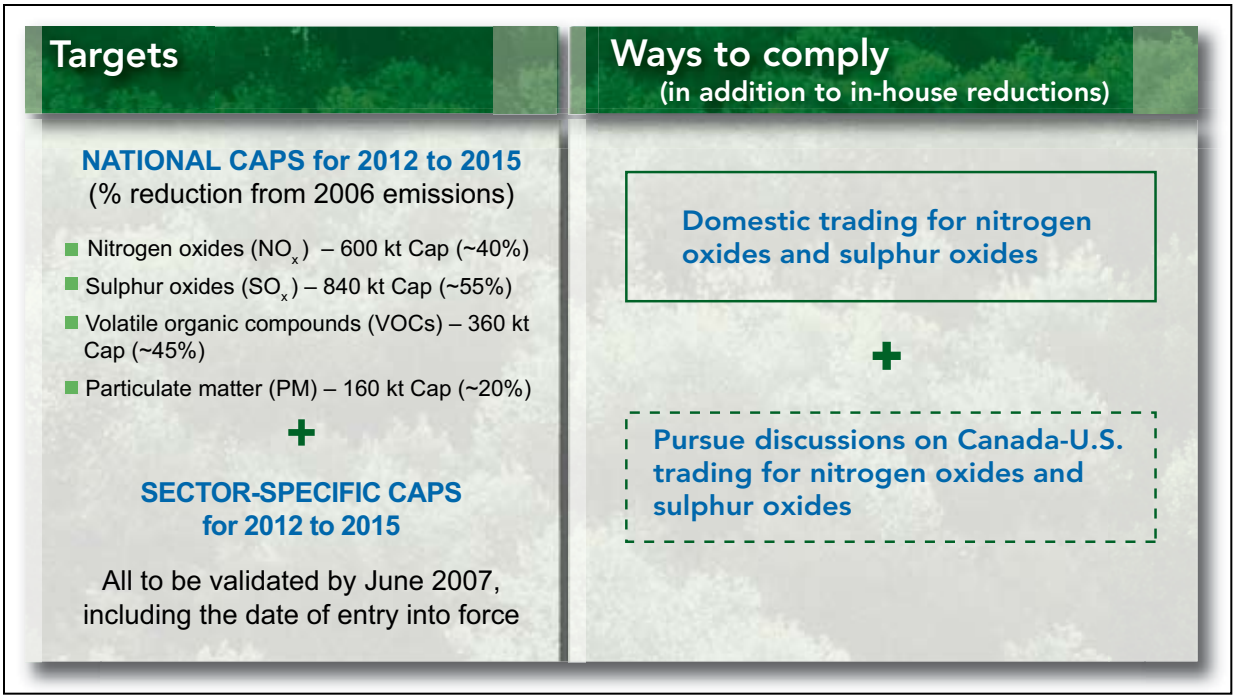
D.1 Approach for determining sectoral emission reduction targets

Fixed sectoral emission caps

The emission reduction targets for a given air pollutant will specify a maximum level of that pollutant that can be emitted from a given sector in a given year. These targets will represent national reductions from 2006 emission levels for each pollutant.

Fixed emission caps will be set for the following air pollutants: nitrogen oxides (NO_x), sulphur oxides (SO_x), volatile organic compounds (VOCs), and particulate matter (PM). Fixed emission caps for certain other air pollutants from specific sectors, such as benzene from natural gas production and processing, refineries, and iron and steel, and mercury from electricity generation and base metal smelting, will also be set. As more information becomes available and regulatory development is undertaken, the government will consider whether the regulations for specific sectors should include targets for other air pollutants not already identified (for example, benzene from oil sands).

Sectoral emission caps will be set for each air pollutant of concern in a given sector. Whether a cap is set for a specific pollutant in a given sector will depend on whether the pollutant is emitted in significant quantities from facilities in that sector. In some cases, caps will not be proposed for an air pollutant in a sector if measures to reduce another air pollutant will significantly reduce emissions of the first. How the sectoral caps will be allocated among facilities will be determined during the process of developing the detailed regulations.



Source: Environment Canada.

The targets will come into effect as early as possible between 2012 and 2015 to give industry time to make the necessary investments in plant and equipment or processes.

The government will validate the benchmarked air pollutant targets over the next several months. The government will work with industry, provinces and territories, labour, and environmental and health groups during the validation process.

Regulatory, technology, and emission performance benchmarking

Benchmarking

In the *Notice of Intent,* the government made a commitment to develop emission targets that "are at least as rigorous as those in the U.S. or other environmental performance-leading countries". To achieve this end, a benchmarking exercise was undertaken.

The exercise began by researching existing regulatory regimes; environmental performance; technology and operating practices; and the most stringent provincial operating permits in Canadian jurisdictions and other countries, such as the United States, Finland, Sweden, and Germany.

It also included taking into consideration factors underlying those regulatory regimes, such as the size and composition of the sectors; the concentration of facilities across the jurisdiction; and the availability and quality of feedstocks and other raw materials. From this exercise, environmentally-leading requirements were benchmarked by sector and by pollutant.

Concurrently, information was gathered on Canadian sectors. Where regulatory limits exist in other jurisdictions – for example, the pulp and paper and electricity sectors – actual Canadian regulatory limits and performance were compared with the regulated limits from leading jurisdictions.

In some sectors, regulatory limits are typically set through provincial certificates of approval or operating permits or licences for individual

facilities, which can have processes and/or products that vary significantly from one facility to another – for example, petroleum refineries or chemical production facilities. In these sectors, the actual emission performance of Canadian facilities was compared with the reported or required performance in different jurisdictions, both in Canada and internationally. This involved deriving emission-intensity values and comparing the performance of similar Canadian and foreign facilities.

For other sectors – for example, aluminum smelting and iron and steel – emission performance both in Canada and abroad, as well as regulatory limits in other jurisdictions, was reviewed. In other cases, such as conventional upstream oil and gas, the approach was to benchmark against other facilities in the sector as a whole.

Finally, for the oil sands sector, which is unique to Canada, there are no comparable regulated sectoral emissions limits in other countries that would enable a comparison with other jurisdictions. In this case, sectoral targets were established using a multi-step approach. This included an evaluation of performance for similar activities, equipment, and processes at similar sources of emissions in other jurisdictions, such as heavy oil refineries; an examination of the potential for reductions using selected emission control technologies; and a comparison of emission-intensity performance of individual oil sands facilities within Canada.

Pre-existing analysis

In some sectors, analyses carried out in recent years were also taken into account when carrying out the benchmarking exercise. Work done jointly by government and industry was already under way to determine how to adapt benchmarked standards to Canadian circumstances in the pulp and paper sector through the Pulp and Paper Air Quality Forum, in the refining sector through the Canadian Council of Ministers of the Environment (CCME) National Framework for Petroleum Refinery Emission Reductions,[6] and in the base metal smelting sector through the Base Metal Smelting Pollution Prevention Plan.[7]

The objective of the Pulp and Paper Air Quality Forum was to design a ten-year overall multi-faceted air emissions management regime for the pulp and paper industry that would include short-term air pollutant targets at a level that would ensure consistent requirements for all facilities. These proposed air pollutant targets were derived from benchmarking analyses that compared world-leading international industry performance and the most stringent provincial limits. The approach of the Pulp and Paper Air Quality Forum ensures that a consistent level of available control technology exists among similar facilities and is in application elsewhere and that the overall economic impact of achieving these limits remains realistic. It also facilitates the establishment of equivalency agreements with provinces and territories.

The complexity of the existing regulatory system for petroleum refineries makes it difficult to define a single regulatory emission standard within Canada and other jurisdictions. For this sector, the approach used to determine the cap on emissions was based on the methodology developed through the CCME refinery framework, which was released on May 25, 2005. This framework established an approach to setting facility-level annual caps for a range of air pollutants based on benchmarking Canadian emission performance to comparable performance in the United States. Benchmarking was updated to reflect changes to the U.S. requirements.

6 Canadian Council of Ministers of the Environment, *National Framework for Petroleum Refinery Emission Reductions*, May 2005, available at www.ccme.ca/ourwork/air.html?category_id=69#246.

7 *Notice requiring the preparation and implementation of pollution prevention plans in respect of specified toxic substances released from base metals smelters and refineries and zinc plants,* Canada Gazette, Part I, April 29, 2006, Vol. 140, No. 17 at page 877, available at www.ec.gc.ca/ceparegistry/documents/notices/g1-14017_n2.pdf.

A notice requiring the preparation of pollution prevention plans for base metal smelters and refineries and zinc plants was published in the *Canada Gazette, Part I*, on April 29, 2006. This Notice was the result of extensive work involving stakeholder consultations and five years of analyses of existing standards, performance, and sulphur capture efficiency of smelters around the world. The targets identified for consideration in the pollution prevention plans would be the basis of air pollutant caps for the base metal smelting sector.

Adjusting for Canada

In some sectors, regulatory limits or emission performance levels from leading jurisdictions were adapted to take into account characteristics specific to those sectors in Canada. Characteristics taken into account varied from sector to sector and included the financial situation of the sector; potential impacts on the economy; and the quality of feedstocks and other raw materials relative to the benchmarked jurisdiction.

The technical feasibility of meeting the most rigorous limits was also considered in establishing emission reduction target options. In some sectors, technically feasible options were evaluated to determine expected reductions in emissions and their cost in dollars per tonne.

Calculating national air pollutant caps

National emission caps were established by adding together the sectoral emission caps for each pollutant of concern, taking into account an allocation for growth of each sector by 2015.

D.2 Compliance mechanisms

There would be a domestic cap-and-trade emissions trading system for SO_x and NO_x only. The method of allocating credits under the system, including the method by which new facilities would be accommodated within the overall cap, would be determined during the regulatory development process.

Benchmarking the electricity generation sector

There are two key considerations in setting benchmarks for the electricity generation sector. First, much of the transboundary air pollution that affects Canada's air quality comes from electricity generating plants in the United States. Second, the United States has new emission reduction targets that will further reduce air pollution from this sector between 2010 and 2018. Initial targets for nitrogen oxides (NO_x) will come into force in 2009, while the targets for sulphur dioxide (SO_2) will come into force in 2010. As well, more stringent targets for both pollutants will come into force in 2015. Canada and the United States currently have an emission reduction agreement in place. Implementing targets for Canadian facilities that are as stringent as those in the United States is a minimum objective if Canada is to enter into other emission reduction agreements with the United States. Setting Canadian requirements similar to those of the U.S. legislation, the Clean Air Interstate Rule (CAIR),* would make it easier to negotiate a cross-border emission cap-and-trade agreement with the United States. This would benefit Canadian electricity generators by increasing the size of the trading market.

The CAIR rule consists of reduction targets for emissions of sulphur dioxide and nitrogen oxides, as well as a cap-and-trade system that applies to all new and existing fossil fuel-fired electricity generators that have a capacity of greater than 25 megawatts.

It is not necessary for the Canadian requirements to be identical to those in the United States, but the main elements, including required emission reductions and rigour of monitoring, should be sufficiently comparable to permit the successful negotiation of a cross-border trading system.

* U.S. Environmental Protection Agency information on CAIR is available at www.epa.gov/airmarkets/progsregs/cair/index.html.

There would be separate credits and compliance assessments for SO_x emissions and for NO_x emissions. Firms would be required to submit credits each year equal to the emissions from their facilities for that year.

If a firm is in an area where the quality of the air does not meet national air quality objectives that have been set in advance by the government, restrictions will be placed on the use of credits from outside that area.

Cap-and-trade system

Under a cap-and-trade emissions trading system, a cap on total emissions from all facilities covered under the system is established. Credits equal to the cap are allocated to the facilities based on past emissions or by means of an auction. Each facility's allocation represents its individual emissions target. Facilities that emit above their individual limit have to buy surplus credits from another facility or use their own banked credits from a previous compliance period to meet their regulatory obligations. At the end of the compliance period, facilities must remit to the government sufficient credits equal to their actual emissions.

For example, suppose Facility A has been allocated 100 credits for its nitrogen oxide (NO_x) emissions. Suppose Facility B has been allocated 120 credits. Each credit represents one tonne of NO_x.

At the end of the year, Facility A has actually emitted 108 tonnes of NO_x. In order to be in compliance with its emissions target of 100 tonnes, Facility A is required to remit to the government 108 credits. It will remit its 100 initial credits and must either buy an additional 8 credits from the market or use 8 credits from any banked credits it might have.

Facility B actually emitted 116 tonnes of NO_x. It will be required to remit to the government 116 credits from its allocation of 120 credits. It can either sell the remaining 4 credits to another facility or bank them for use in a future compliance period.

The feasibility of the use of offsets in combination with the cap-and-trade emissions trading systems for SO_x and NO_x will also be assessed.

The United States and Canada share cross-border airsheds and therefore have a shared responsibility for and interest in reducing air pollutants from all sources that contribute to air pollution. Addressing air pollution on only one side of the border does not make environmental or economic sense. The Canada-United States Air Quality Agreement was signed in 1991 to address transboundary acid rain. An annex to the agreement was added in 2000 to address ground-level ozone, a key component of smog. Under the agreement, Canada and the U.S. must reduce domestic emissions that flow into the other country and contribute to acid rain or ozone.

Canada and the U.S. recently agreed to start negotiations for an annex to the agreement to reduce the transboundary flow of particulate matter. Recent scientific analysis has shown that joint strategies are needed to address these pollutants. The annex will result in reductions in particulate matter as well as many of the chemicals that contribute to other air quality issues of concern, such as acid rain, regional haze, and visibility in the communities along the Canada-U.S. border.

Serious action by Canada to reduce its own emissions will make it easier to work jointly with the U.S. to reduce overall emissions. As part of its ongoing work with the U.S. to address transboundary air pollution, the government will expedite discussions with the U.S. on a cross-border SO_x and NO_x emissions trading system. Having caps in Canada and the U.S. of similar stringency would facilitate the development of cross-border trading. Such trading could provide additional flexibility for regulated sources by allowing the most cost-effective emission reductions to be made. A joint Canada-U.S. study, published in July, 2005,[8] demonstrated the feasibility of cross-border trading of SO_2 and NO_x for the electricity sector.

E. Compliance, Penalties, and Enforcement

CEPA 1999 has a number of compliance and penalty provisions. Failure by regulated entities to meet any of the requirements set out by CEPA 1999 or regulations made under it is an offence.

Enforcement officers verify compliance with the Act and its regulations. If a violation is confirmed, action is taken using one or more of the enforcement tools available under CEPA 1999,

8 *Canada-United States Emissions Cap and Trading Feasibility Study* available at www.ec.gc.ca/cleanair-airpur/Can-US_Emission_Trading_Feasibility_Study-WS105E2511-1_En.htm.

such as warnings, directions, tickets, orders of various types (including environmental protection compliance orders), injunction, or prosecution. Action taken in response to any failure to comply with regulatory requirements will be predictable and will correspond to the seriousness of the non-compliance.

When prosecution is undertaken, such offences may be prosecuted by either summary conviction or indictment. CEPA 1999 includes maximum fines of up to $1 million a day for each day an offence continues, imprisonment for up to three years, or both. Corporate directors and officers have a specific duty to take reasonable care to ensure that corporations comply with the Act, its regulations, and any orders of requirements issued by enforcement officers.

F. Air Quality Objectives

Health risks to Canadians from air pollution are associated with direct exposure to ambient levels of particulate matter and ozone,[9] the main components of smog. The relationships between actual emissions, the levels of smog, and their effects on human health are complex, however. In addition, health science indicates that even at very low levels in the air, these pollutants have effects on human health. They also have negative impacts on the environment.

The government will set air quality objectives for particulate matter and ozone that will specify a target concentration for ambient air, based on an assessment of the health and environmental effects associated with exposure to these air pollutants in Canada. A decision on air quality objectives will be made after an analysis of benefits and risks over a range of concentrations in the air we breathe has been made.

9 For ease of reading, in this section and the next, the term “ozone” is used to refer to ground-level ozone and $PM_{2.5}$ is used to refer to particulate matter of less than 2.5 microns in size.

G. Anticipated Benefits and Impacts of Regulating Industry

G.1 Overview

This section provides the results of analysis and modelling to determine the health and environmental benefits and the economic impacts of the proposed regulations to reduce industrial air emissions. It directly addresses questions of central importance to Canadians.

- How will these actions improve the health of Canadians and the health of our environment?
- How will these actions affect Canadians and the Canadian economy?

The impacts of the proposed regulations were systematically traced through several models. All parts of the analysis start with an estimate of what would happen in the absence of the proposed regulations – the “business-as-usual” case. The proposed regulatory system and emission targets are then introduced in the model and assessed in terms of estimated reductions in emissions and changes in economic activity. Reductions in emissions are also translated, generally, into improvements in key air quality parameters. These improvements, in turn, have associated health and environmental benefits.

The modelling work to date has been complex, but provides reasonable, albeit preliminary, general results. Work to generate more refined estimates of the impacts is ongoing.

The economic impacts reflect an integrated assessment of the industrial greenhouse gas and air pollutant regulations. On the benefits side, the modelled impacts reflect improvements in air quality resulting from reduced air pollutant emissions only. It is clearly recognized, however, that climate change has wide-ranging global economic, environmental, and social impacts,

with significant associated costs. These costs are not included in this analysis, but are an important consideration in the assessment of the cost-benefit impacts of the regulations.

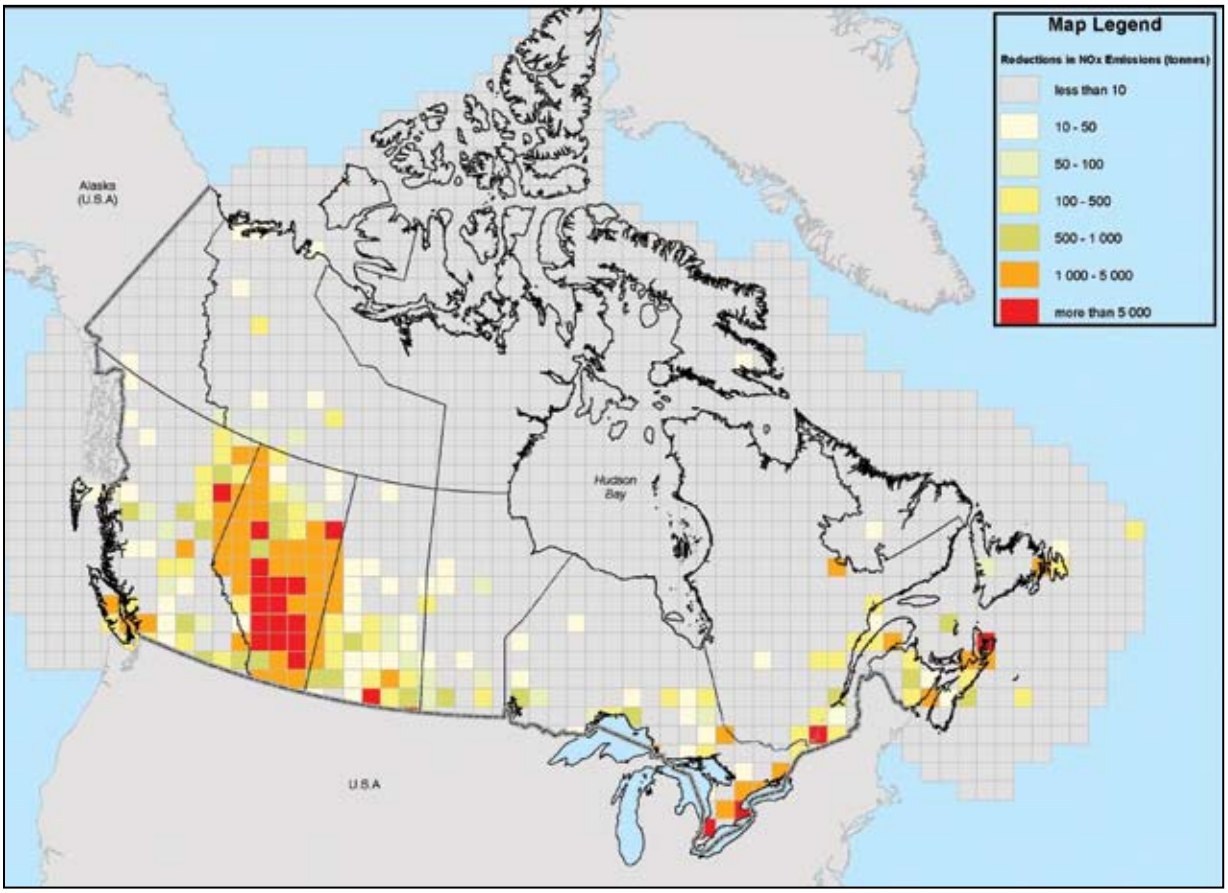
G.2 Predicted changes in ambient air quality and acid deposition

What happens to air pollutants released to the atmosphere from human-related activities as well as natural emissions is simulated by Environment Canada's regional air quality modelling system, AURAMS. It describes the physical processes, such as transport, mixing, and deposition of the air pollutants, and the chemical transformations that air pollutants undergo in the atmosphere.

The model provides the concentrations and geographic distributions of primary air pollutants (those directly emitted to the atmosphere) and of secondary air pollutants (those formed chemically in the atmosphere from reactions involving primary pollutants) to which humans and ecosystems are exposed. The effects on human health and the environment from exposure to these air pollutants are then estimated by impact models. The results below are based on this modelling.

Figure G.1 provides an indication of the reductions in NO_x emissions that are expected from the proposed regulatory system and targets, assuming they are all in place by 2015. Reductions in emissions are expected in the major urban centres and throughout the western provinces.

Figure G.1 Expected reductions in NO_x emissions in 2015



Source: Environment Canada.

Air quality

The predicted improvements in air quality resulting from the proposed reductions in air pollutant emissions are illustrated as percent reductions in annual levels of particulate matter ($PM_{2.5}$) and in summertime ozone levels, assuming the regulations are implemented by the year 2015. Improvements in ozone levels are shown only for the summer as the formation of ozone increases with the amount of sunlight and, as a result, ozone is not an issue in the winter months. In addition, in order to highlight the impact of the proposed regulations on Canadian air quality, transboundary emissions of air pollutants from the United States were assumed to be constant in the model.

As shown in Figure G.2, preliminary results indicate that full implementation of the industrial regulations would decrease ozone levels by approximately 5% to 15% in a large portion of Alberta, Saskatchewan, Manitoba, and in localized areas in British Columbia, Ontario, Quebec, and the Maritimes, and by 1% to 5% in the rest of the country. Decreases in levels of ozone are also seen in neighbouring U.S. states.

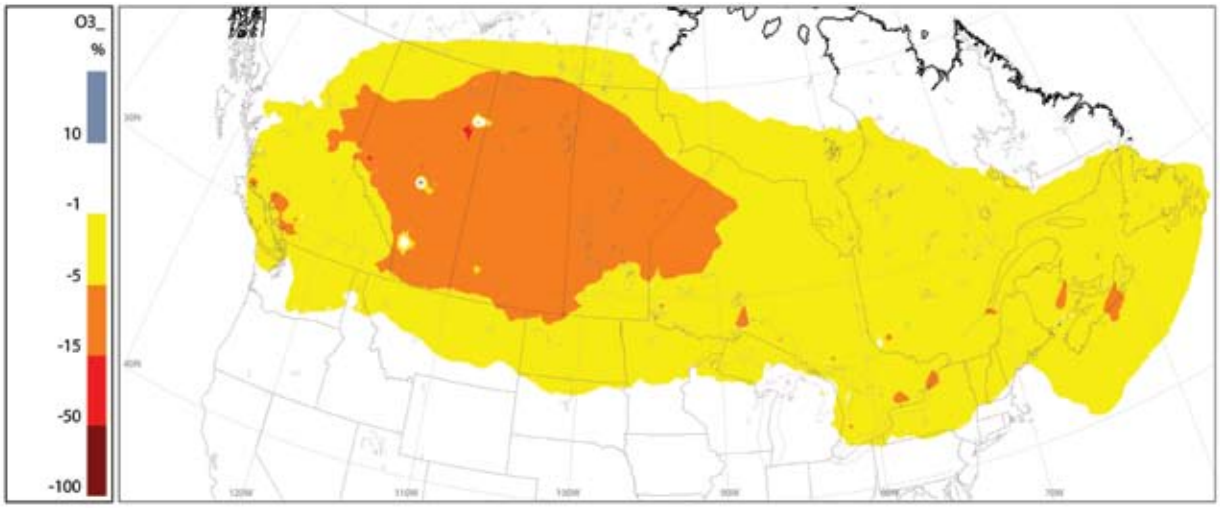
As shown in Figure G.3, preliminary results predict annual reductions in $PM_{2.5}$ of between 5% and 50% across a large portion of the country, with large reductions (15%-50%) in $PM_{2.5}$ across the Prairie provinces, and reductions of 5% to 15% for southern Ontario.

Improvements in both ozone and $PM_{2.5}$ levels are largest in western Canada, where marked reductions in emissions would result from the proposed regulations. Improvements in eastern Canada, although smaller in magnitude due to the large influence of long-range transport of air pollutants, provide benefits for the large populated areas that are more often affected by smog events.

Acid deposition

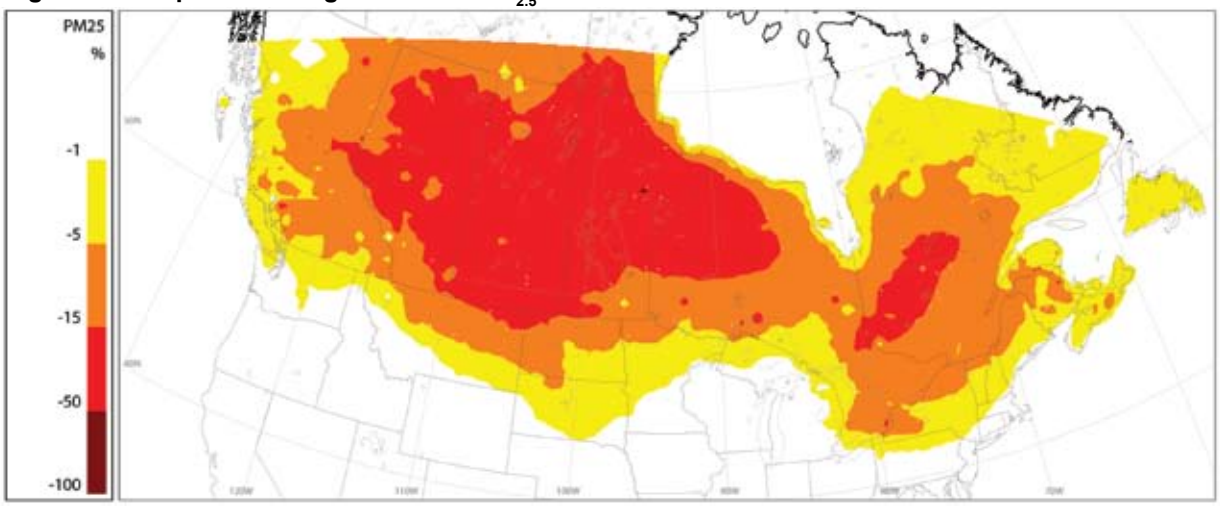
In addition to improvements in ambient levels of both $PM_{2.5}$ and ozone, Figure G.4 shows that reductions in acid deposition are predicted, particularly in areas where there are significant reductions in NO_x and SO_x emissions. This will result in a reduction in the size of the area receiving acid deposition levels that are in excess of what the environment, such as lakes or soils, can withstand without being adversely affected.

Figure G.2 Expected change in summertime (June, July, and August) ozone levels in 2015



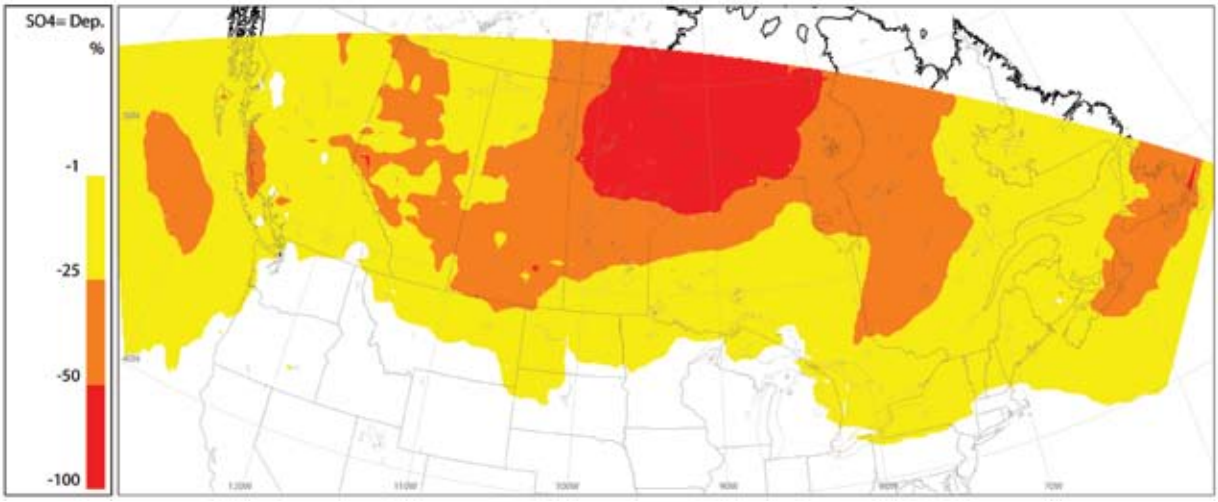
Source: Meteorological Service of Canada, Environment Canada.

Figure G.3 Expected change in annual $PM_{2.5}$ levels in 2015



Source: Meteorological Service of Canada, Environment Canada.

Figure G.4 Expected change in wet sulphate (SO_4^{2-}) deposition in 2015



Source: Meteorological Service of Canada, Environment Canada.

G.3 Health benefits

Health Canada's Air Quality Benefits Assessment Tool[10] was used to estimate the human health benefits expected from changes in Canada's ambient air quality due to the proposed regulatory actions. It uses information on air quality, health effects of air pollutants, and the value of avoiding specific effects to calculate both the number of effects and the approximate value of these to Canadians.

Substantial health benefits are predicted from the proposed regulations since it is estimated they will achieve reductions in summertime ozone levels (about a 3% reduction) and a decrease in particulate matter (about 8%) in the year 2015. These two air pollutants are the major components of smog.

10 The Air Quality Benefits Assessment Tool (AQBAT) was publicly released in 2006. Its damage function methodology has been used for previous assessments in Canada; has undergone extensive peer review; and is consistent with methods used elsewhere (for example, by the U.S. Environmental Protection Agency).

The total annual benefits in the year 2015 from the reduced risk of death and illness associated with these air quality improvements are estimated to be $6.4 billion.

The health benefits include reductions in premature mortality and various types of health effects (Table G.1). Most of the benefits are associated with the reduced risk of premature death, because of the large value placed on reduced mortality. Reductions in particulate matter account for the greatest share of the benefits because of the much greater effects on human health of long-term exposure to particulate matter relative to ozone. The total health impact is probably underestimated because only two air pollutants were considered and only some health outcomes could be quantified because of a lack of information on all outcomes.

As illustrated in Figure G.5, benefits are expected to vary across the country.

Table G.1 Estimated reduced health impacts, 2015

	Mean	95% Confidence Interval	
		Lower	Upper
Premature Deaths	1 200	740	1 700
Chronic Bronchitis Cases	920	-	1 800
Hospital Admissions	260	160	360
Emergency Visits	1 000	540	1 500
Child Acute Bronchitis Episodes	5 600	-	12 000
Asthma Days	170 000	67 000	270 000
Restricted Activity Days	1 000 000	600 000	1 400 00
Minor Restricted Activity Days	210 000	-	910 000
Minor Sympton Days	3 400 000	870 000	6 000 000

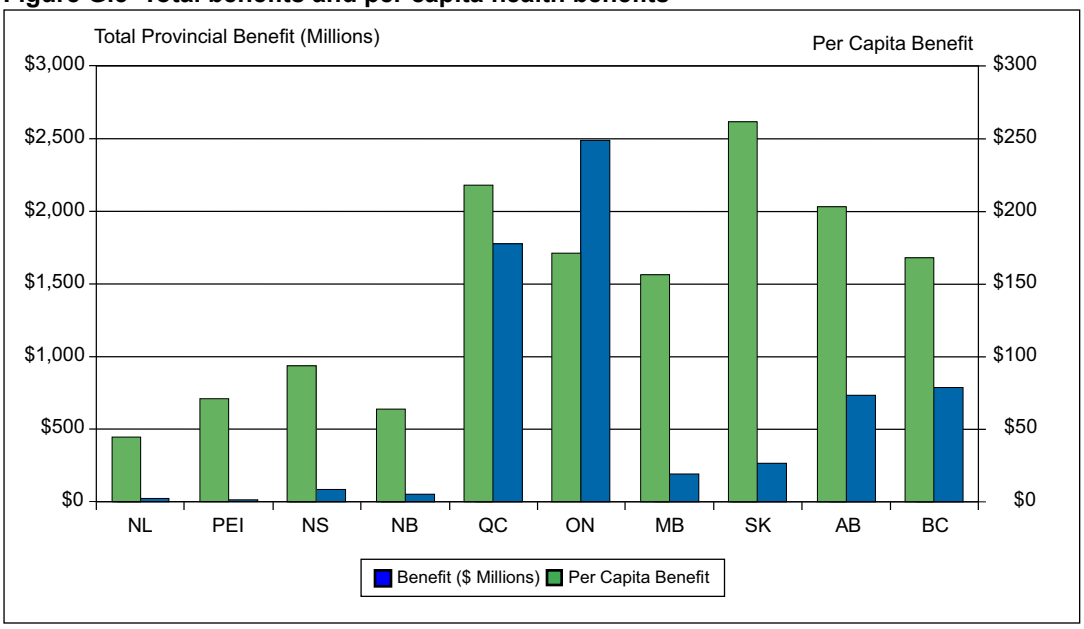
Source: Health Canada.

G.4 Environmental benefits

Reductions in the emissions of harmful air pollutants and greenhouse gases would have many benefits for society, including improved environmental conditions that would provide direct benefits for Canadian ecosystems. In addition, reductions can also raise the economic productivity of specific sectors and increase the well-being of Canadians.

Some direct estimates were made of the environmental benefits from the proposed

Figure G.5 Total benefits and per capita health benefits



Source: Health Canada.

regulations. For example, ozone can hamper photosynthesis and increases the vulnerability of plants to pests and other stressors. The proposed regulations are predicted to reduce ozone levels and the associated stress to agricultural plants, resulting in an increase in production of $123 million for key agricultural crops in Canada. The total benefits to agriculture could be much higher, because the crops modelled only account for roughly 60% of the value of all crops and the impacts of soil acidification are not included.

Estimating costs of environmental damage is a relatively new area of research and is complex. Further work will be undertaken to estimate and place a value on the broader range of anticipated environmental impacts of the industrial air emission regulations. This work will build on the results of numerous studies that have estimated various costs of air pollution. For example:

- Acidification of lakes and rivers in eastern and central Canada has been estimated to result in annual economic losses of about $500 million from reduced recreational fishing. Acidification depletes fish stocks in Canada's inland commercial fisheries, an industry worth over $70 million per year.
- Loss of nutrients due to leaching from acid rain affects forest productivity. Some estimates put annual timber losses at $197 million from reduced forest growth and $89 million from damage to the maple syrup industry in eastern Canada.
- Acid rain in the most highly polluted areas in eastern Canada accelerates structural corrosion of costly transmission towers, imposing annual repair costs of $1,000-$2,000 per tower and reducing tower lifespan by almost 30 years.

For greenhouse gases, reductions by Canada alone will not significantly address global climate change. Nevertheless, Canada needs to do its share to control global greenhouse gas emissions in order to help address both the global effects and the more local threats to key sectors, resources, and infrastructure associated with climate change. These threats could include:

- increased drought and temperatures, with particularly severe consequences for the North and West;
- decreased hydro-electricity generation and transportation capacity from reduced water levels in the Great Lakes and elsewhere; and
- increased frequency of extreme weather events.

G.5 Anticipated economic impacts

The previous section noted that the benefits associated with improved human and environmental health arising from the proposed regulations are on the order of $6.4 billion annually. These benefits need to be weighed against the possible economic costs that can be attributed to the regulatory regime in order to assess the overall impact on the Canadian economy and quality of life.

The economic costs of regulation are often difficult to measure, as they will depend on the reactions of a number of economic actors beyond the specific sectors directly affected. In the case of the proposed regulatory package, this would require not only that the direct impacts on production costs arising from industry compliance with emissions regulations be estimated, but also that the indirect impact of those costs on future investment decisions, demand and supply, and related consequences for other businesses and consumers be tracked. There are many points of uncertainty throughout this chain of actions and reactions.

Preliminary analysis performed by Environment Canada indicates that these costs will be small relative to total GDP, but not inconsequential.

From an aggregate perspective, the annual economic cost of meeting both the regulated greenhouse gas targets and the regulated air pollution targets should not exceed 0.5% of GDP in any given year up to 2020. The size of national economic costs anticipated under the regulations,

combined with the inherent margin of error that must be applied to macroeconomic model results, makes it difficult to assess with any degree of certainty the impacts of the regulatory initiative at a provincial or sectoral level. However, the following general observations can be made:

- There will likely be some year-to-year variation in national and provincial GDP impacts, reflecting changes in industry investments, with a possibility of small positive GDP impacts in the early years as regulated industries accelerate investments in more energy-efficient, less polluting capital and technologies in response to the regulations.
- Provincial economies with a strong oil and gas sector are expected to continue to see a largely uninterrupted volume of natural gas and oil production and exports, as global demand and strong world prices are expected to allow oil and gas producers, and gas pipelines, to absorb the relatively small incremental costs of production arising from the regulatory package. For major parts of the oil and gas sector, existing analysis also indicates a high potential for them to meet much of the required reduction in greenhouse gas emissions through cost-effective options for carbon capture and storage.
- Machinery and construction industries, and those sectors such as iron and steel that supply many related inputs, are expected to benefit overall as demand for their products rises because of new capital investments motivated in other sectors under the regulations.
- Energy utilities (electricity and natural gas) will likely be mildly affected, as they will be able to pass through many cost increases to their customers. Some other major sectors, such as manufacturing, may experience a small rise in the costs of production associated with the pass-through of increased energy prices by utilities.

While higher overall energy prices could result from the regulations, the extent to which prices will increase depends on a number of variables, including provincial regulatory policies, differences in capital turnover cycles between provinces' electricity generation units, and take-up of renewable energy incentives under recent federal and provincial programs. A noticeable increase in electricity prices is nevertheless possible. This increase could, in turn, result in some minor downward adjustments across most sectors of the economy over the long term (for example, around 2015 and later).

G.6 Cost and benefit conclusions

The proposed industrial regulations present Canadians with concrete action on key environmental challenges and meet their expectations for responsible and effective government measures to secure a cleaner and healthier environment for themselves and their children.

The economic costs associated with this initiative are real, but manageable. The benefits of this agenda are equally real, but in many respects, incalculable – cleaner communities and natural spaces, healthier children, fewer premature deaths, more sustainable natural resources, and, for the first time since signing the Kyoto Protocol, meaningful contributions by Canada to the global effort to control greenhouse gas emissions. The $6.4 billion a year in health benefits that will accrue under this initiative is significant on its own, but represents only a portion of the health and environmental gains that Canadians will receive.

The costs and benefits analysis demonstrates that the proposed regulatory package presents a responsible path forward. It will enable Canada to address climate change and air pollution without putting Canada's quality of life and economy at risk. It is equitable across regions and economic sectors. It respects the "polluter pays" principle. It puts in place, for the first time in Canada, a regulatory policy regime that can be fine-tuned to meet climate change and air quality objectives as we move forward. Most importantly, it

provides Canadian business and citizens with the economic signals required to take into account the environmental consequences of daily decisions, whether it be choosing more energy-efficient appliances, or the construction of a new plant that uses renewable energy instead of fossil fuels.

Canadians have long demanded that their governments provide the leadership and tools necessary to enable them to better manage climate change and air quality as responsible citizens. Canada's New Government is responding to this and moving forward with a comprehensive plan.

H. Next Steps

The regulatory framework for air pollutants, including the timeframe for the entry into force of the regulations, will be finalized by fall 2007, after the government has validated the benchmarked air pollutant targets. Sector-specific regulations will be developed, leading to publication of the draft regulations in the *Canada Gazette, Part I*, starting in spring 2008 for the general provisions and those related to greenhouse gases. The regulations will be revised to incorporate the air pollutant provisions a few months later, following normal regulatory procedures.

The government intends to undertake a series of consultations over the coming months. The government will meet over the next several months with provinces and territories, each industry sector, labour, and environmental and health groups to discuss the implementation of the target structure for greenhouse gases and to validate the proposed air pollutant targets that have been determined through the benchmarking analysis, including the timeframe for their entry into force. In addition, the discussions will address the scope of the offset system, the administration of the technology fund, and the criteria for the credit for early action.

The government will work with each sector on the implementation of sector-specific regulations, including greenhouse gas provisions.

As part of the regulatory development process, a notice will be issued under Section 71 of CEPA 1999 to require industry sectors that will be covered by the proposed regulations to report to the government the 2006 data that will be used to set the emission reduction targets.

III. Actions for Transportation Sources

A. Emissions from the Sector

Transportation is one of the largest sources of greenhouse gas and air pollutant emissions in Canada. The growth in population and the growth in travel by individual Canadians are leading to higher levels of passenger transportation activity, particularly in road and air travel. Similarly, growth in trade and the continued dominance of just-in-time delivery models in the freight sector are leading to significant increases in transport activity.

Transportation accounts for about 25% of Canada's total greenhouse gas emissions, and total transport-related greenhouse gas emissions increased by 27% between 1990 and 2004.

Major air pollutants from transportation activity include carbon monoxide (CO), NO_x, SO_x, and VOCs, many of which lead to the formation of smog. Transportation accounts for 59% of Canada's total CO emissions and 53% of Canada's total NO_x emissions. The effects of transportation emissions and their contribution to smog are of particular concern in urban areas, where populations are dense and transportation demand is high. Over 80% of Canadians live in urban areas, with more than 50% concentrated in the nine largest cities. One-third of Canadians live in Canada's largest three cities: Toronto, Montréal, and Vancouver.

The emission of air pollutants from cars and light trucks has improved significantly over the last two decades and is projected to continue declining over the next decade. Greenhouse gas emissions from cars and light trucks have been growing steadily, however, and this is an issue that must be addressed now.

Cars and light trucks contribute approximately 13% of total Canadian greenhouse gas emissions. There is a need to focus on personal vehicle emissions and to improve the overall energy efficiency of this mode.

Under the Clean Air Regulatory Agenda, the government will pursue appropriate regulatory action throughout the transportation system, including for the motor vehicle, engine, rail, marine, and aviation sectors.

B. Regulating the Fuel Consumption of Motor Vehicles

As part of a broader transportation policy package, a mandatory fuel-efficiency standard, beginning with the 2011 model year, will be developed through a process that will involve input from all the stakeholders, and it will be published by the end of 2008. It will be designed for Canada to maximize our environmental and economic benefits and will be benchmarked against a stringent, dominant North American standard.

There is currently a Memorandum of Understanding between the auto industry and the government, with a target of 5.3 Mt of greenhouse gas emissions reductions by 2010. The government will build on this 2005 agreement in establishing its ambitious regulated fuel-efficiency standard. These new regulations will be developed and implemented

under the *Motor Vehicle Fuel Consumption Standards Act*.

The government recognizes that the auto industry operates in an integrated North American market. The government will establish a standard that is achievable within the North American market and that will ensure sustained reductions in greenhouse gas emissions following completion of the 2005–2010 MOU. The level of this standard will be determined through the normal regulatory process, including consultation with the automotive industry and other stakeholders. The government has already started consultations with the auto industry and intends to pursue further consultations.

The federal government intends to work in close collaboration with the U.S. government pursuing the concept of a Clean Auto Pact, towards establishing an environmentally ambitious North American regulatory standard for cars and light-duty trucks.

The following schedule is planned with respect to the development of fuel consumption regulations under the *Motor Vehicle Fuel Consumption Standards Act*.

1. Consultation paper issued	Summer/Fall 2007
2. Consultations with industry, provinces, non-governmental organizations, and other stakeholders	Summer/Fall 2007
3. Draft regulations published in the *Canada Gazette, Part I*	Fall/Winter 2007-08
4. Comment period (90 days)	
5. Final regulations published in the *Canada Gazette, Part II*	by the end of 2008
6. Regulations come into force for the 2011 model year	

C. Regulating the Rail Sector

The Minister of Transport, with the Minister of the Environment, will support an MOU with the Railway Association of Canada that is consistent with the U.S. air pollution standards and that ensures that the rail industry continues to improve its greenhouse gas emission performance during the period 2006-2010. Once the MOU expires, the voluntary approach will be replaced with a regulatory regime. The Minister of Transport will implement new regulations, under the *Railway Safety Act*, to take effect in 2011.

D. Regulating the Marine and Aviation Sectors

The marine and aviation sectors present unique challenges with respect to reductions in emissions of greenhouse gases and air pollutants. They operate in a truly international context in which countries collaborate on their respective regulations through international bodies such as the International Maritime Organization and the International Civil Aviation Organization.

In the marine sector, the Minister of Transport is adopting current international standards established by the International Maritime Organization for controlling emissions of air pollutants from ships and, with the Minister of the Environment, is supporting the development of new, stricter international standards. The Minister of Transport intends to ensure their application domestically under the *Canada Shipping Act*. This includes work now under way with Environment Canada and the U.S. Environmental Protection Agency on a feasibility study examining whether North American waters should be designated as areas where ships must reduce sulphur emissions.

The government continues to support harmonized international efforts to limit or reduce both domestic and international aviation emissions

of both greenhouse gases and air pollutants. The Minister of Transport, as Canada's official representative, supports the work of the International Civil Aviation Organization to develop international standards and recommended practices for the reduction of greenhouse gas and air pollutant emissions from aviation sources. These standards and recommended practices will be considered in the development of domestic regulations under the *Aeronautics Act.*

Canada is the first country in the world to have negotiated an MOU with its aviation industry to reduce emissions of greenhouse gases from aviation sources.[11] The agreement sets a clear and measurable annual fuel efficiency target that will achieve a cumulative reduction in greenhouse gas emissions of 24% by 2012, relative to 1990 levels.

E. Regulations to Reduce Air Pollutant Emissions from On-Road and Off-Road Vehicles and Engines

The government is developing and will implement a series of regulations to reduce air pollutant emissions from on-road and off-road vehicles and engines in alignment with the world-leading national standards of the U.S. Environmental Protection Agency. Continuing to align Canada's regulations with stringent U.S. federal rules ensures that significantly cleaner vehicles and engines will be marketed in Canada while maintaining a level playing field among companies.

The government has already published final regulations to maintain alignment with new requirements introduced by the U.S. Environmental Protection Agency for 2006 and later model year motorcycles[12] and proposed new regulations to establish stringent smog-forming emission standards applicable to outboard engines, personal watercraft, snowmobiles, off-road motorcycles, and all-terrain vehicles manufactured after January 1, 2008.[13] The government plans to finalize these regulations in June 2007. Other regulatory measures will be put in place to deal with, among others, on-road heavy-duty engines and off-road diesel engines.

11 *Agreement to Reduce Greenhouse Gas Emissions in the Aviation Sector*, June 29, 2005, available at www.tc.gc.ca/mediaroom/releases/nat/2005/05-h150e.htm.

12 *Regulations Amending the On-Road Vehicle and Engine Emission Regulations,* Canada Gazette, Part II, November 15, 2006, Vol. 140, No. 23 at page 1701, available at www.ec.gc.ca/ceparegistry/documents/regs/g2-14023_r1.pdf.

13 *Marine Spark-Ignition Engine and Off-Road Recreational Vehicle Emission Regulations*, Canada Gazette, Part I, December 30, 2006, Vol. 140, No. 52 at page 4553, available at www.ec.gc.ca/ceparegistry/documents/regs/g1-14052_r1.pdf.

IV. Actions on Consumer and Commercial Products

A. Energy Efficiency Standards

To reduce air emissions from consumer and commercial products, the government is developing and will implement regulations under the *Energy Efficiency Act*. The government has begun work to strengthen energy efficiency standards for those products. The Minister of Natural Resources will introduce amendments to the *Energy Efficiency Regulations* under the *Energy Efficiency Ac*t. The amendments will include:

- new energy performance standards for 18 currently unregulated products, such as commercial clothes washers and commercial boilers; and
- more stringent requirements for 10 currently regulated products, such as dishwashers and dehumidifiers.

These actions will result in significant reductions in air emissions from the products used daily by households and businesses across Canada.

A list of proposed products to be included in the amendments to the *Energy Efficiency Regulations* has been established. As well, a proposed schedule for implementation of the amendments has been developed.

- Amendment 10 will affect standards for 10 products and implement labelling requirements for incandescent and fluorescent lamps. Consultations with stakeholders will be undertaken over the next few months and will include dedicated consultations with provincial governments on the series of amendments. The planned pre-publication date for this amendment is December 2007.

- Amendment 11 will set standards for incandescent reflector lamps, digital television adaptors, external power supplies, and standby power requirements for consumer electronics and low-voltage dry-type distribution transformers. Significant internal analysis has been completed, standards development work initiated with the Canadian Standards Association, and affected stakeholders alerted. The planned pre-publication date is December 2008.

- Amendment 12 proposes new or additional standards for hot tubs and spas, and refrigerators, as well as additional standards for standby power consumption, battery chargers, cable and satellite set top boxes, mercury vapour lamp ballasts, high-intensity discharge lamp ballasts, large air conditioners, liquid-type electrical transformers, package terminal air conditioners, and commercial boilers. In addition, labelling requirements for gas water heaters are contemplated. The planned pre-publication date is December 2010.

Performance standards for lighting

The government commits to setting performance standards for all lighting that would phase out the use of inefficient incandescent light bulbs in common applications by 2012.

A consultative regulatory process will take place over the next eight months to determine exact performance standards and details, such

as exemptions and scope. Timelines will be established to allow industry time to develop effective alternatives and to establish the infrastructure to deal with the rapid changeover of the Canadian stock of inefficient lights.

The target date for delivering the standards would be the end of 2007.

B. Volatile Organic Compound Emissions

Volatile organic compound (VOC) emissions from the manufacture and use of consumer and commercial products, such as cleaning products, personal care products, paints and printing inks, and other products, contribute significantly to the formation of smog. The government is therefore taking action to reduce VOC emissions from consumer and commercial products.

Significant reductions of VOC emissions can be achieved by minimizing the amount of solvents used in consumer and commercial products. In Canada, solvents account for over 21% of urban VOC emissions and the consumer and commercial products sector represents nearly half of all solvent-related VOC emissions.

In December 2006, the government published *2-Butoxyethanol Regulations.*[14] 2-Butoxyethanol is found in various commercial and consumer products (such as cleaners, paints, and coatings). The *2-Butoxyethanol Regulations* will protect the health of Canadians by setting limits for the concentration of 2-butoxyethanol in commercial and consumer products designed for indoor use.

In 2007, the government will bring forward three regulations to limit VOC content in architectural and industrial maintenance coatings, automotive refinish coatings, and selected consumer products in Canada. The proposed measures will align the VOC content limits, where appropriate, with requirements in the United States. This will also increase opportunities for the Canadian industry to compete in the North American market on an equal footing.

The government will develop other regulatory and non-regulatory measures to reduce VOC emissions from consumer and commercial products. A strategic plan is being developed to guide action in other consumer and commercial products sectors for the 2007-2010 period.

14 *2-Butoxyethanol Regulations*, Canada Gazette, Part II, December 27, 2006, Vol. 140, No. 26 at page 2224, available at: www.ec.gc.ca/ceparegistry/documents/regs/g2-14026_r1.pdf.

V. Regulatory Framework for Improvement of Indoor Air Quality

Canadians spend 90% of their time indoors, where they are exposed to various pollutants. Some indoor air pollutants infiltrate from outdoors, while others come from indoor sources, such as mould from excessive moisture and inadequate ventilation; carbon monoxide from gas and oil appliances that are not properly maintained or vented to the outside; ozone emitted by ozone generators sold as air cleaners; and volatile organic compounds, such as formaldehyde, emitted by building materials.

In addition to human-made sources, some key indoor air pollutants occur naturally. For example, radon is a naturally-occurring radioactive gas which can accumulate to a dangerous level when present in a confined space such as a home basement. In Canada, radon is responsible for 1900 lung cancer deaths a year, second only to tobacco smoke as a cause of lung cancer. It is the leading cause of lung cancer in non-smokers.

The U.S. Environmental Protection Agency ranks indoor air among the top five environmental risks to public health. Poor indoor air quality has been shown to cause or exacerbate a wide range of health effects, including allergies, asthma, lung cancer, respiratory infections, and ear, nose, and throat irritation.

Historically, indoor air pollution has been addressed mainly as an occupational issue, with a limited amount of guidance provided for residences and public buildings. Health Canada's main roles have been to establish residential indoor air quality guidelines, used mainly by provincial public health authorities, as well as to provide limited advice to the public on how to protect their health from indoor air pollution.

The government will develop measures for improving indoor air quality. In consultation with provincial and territorial health departments as well as key stakeholders, the Minister of Health will develop a priority list of indoor contaminants that are national in scope and require government action. To guide decisions on the development of guidelines and product regulations, the federal government will collect information on these contaminants under the provisions of CEPA 1999.

Consultation on the list of priority contaminants will begin in the spring of 2007, with information gathering and the development of regulations to follow.

VI. Conclusion

In consultation with Canadians, the government has developed a regulatory framework that introduces an integrated approach to the implementation of mandatory reductions in emissions of greenhouse gases and air pollutants while preserving economic growth. The government understands that air issues are of concern locally, regionally, nationally, and globally. Canada cannot expect others to act unless Canadians are prepared to take significant, measurable action at home.

Through this regulatory framework, the government is implementing enforceable measures for the major sources of air emissions: industry, transportation, and consumer and commercial products. In addition to delivering significant reductions in emissions, the framework provides regulatory certainty with specific emission targets and timelines, flexible compliance options, and regular monitoring and review in order to provide a complete package that delivers a better overall outcome than previous plans.

Annex

"Business-as-Usual" Projection

In order to assess the impacts of the emission-reduction targets, a projection of emissions and output that would have occurred in the absence of the regulations is required. This is referred to as a "business-as-usual" (BAU) projection. This annex provides an overview of the BAU projection used in developing and assessing the proposed targets for greenhouse gas and air pollutant emissions.

The BAU projection is based on *Canada's Energy Outlook: The Reference Case 2006* (CEO 2006).[15] CEO 2006 provides "business-as-usual" production and greenhouse gas emission projections for Canada as a whole and for various sectors of the economy. The production projections were used as the basis for the assessment of both greenhouse gas and air pollutant targets. Because the CEO 2006 projection is not sufficiently disaggregated by industrial sector, especially for the mining and manufacturing sectors, additional sources of information were needed for the greenhouse gas emission projections. CEO 2006 does not include air pollutant emissions, so a separate but consistent BAU projection of air pollutant emissions was developed.

Greenhouse Gases

The CEO 2006 projections of both emissions and production were used as a basis for the assessment of the greenhouse gas emission-intensity targets for electricity and most oil and gas sectors, with some minor modifications due to differences in coverage. For the majority of the remaining sectors, the CEO 2006 emission projections were combined with production growth and emission-intensity improvement estimates from Environment Canada in developing and assessing the targets.

Air Pollutants

The emissions projections used to develop and assess the 2015 targets for air pollutants are based on the *Canadian Criteria Air Contaminants (CAC) Emissions Outlook,*[16] adjusted in most cases to reflect the projected production numbers from CEO 2006 or other factors described below. The *CAC Emissions Outlook* provided "business-as-usual" projections for each of the ten provinces and three territories (though the Northwest Territories and Nunavut are treated as one region) for all industrial and non-industrial sources of emissions. It includes sector-specific adjustments based on input from interested stakeholders, industry and industry associations, and government (federal, provincial, and territorial).

The projections in the *CAC Emissions Outlook* were adjusted in most cases to incorporate information provided by Environment Canada. These adjustments were made:

- to take into account the most recent production data from CEO 2006 or the most recent data from other sources on emissions of air pollutants;
- to incorporate improvements in emission estimation methodologies in order to ensure consistency with the 2006 baseline emission estimates; or
- to account for differences in sector definitions and covered sources for targeted sectors when compared with the published *CAC Emissions Outlook*.

15 *Canada's Energy Outlook: The Reference Case 2006,* available at www.nrcan-rncan.gc.ca/com/resoress/publications/peo/peo-eng.php.

16 *Canadian Criteria Air Contaminants (CAC) Emissions Outlook*, available at www.ec.gc.ca/pdb/cac/Emissions1990-2015/emissions1990-2015_e.cfm.