April 2001

The Government of Canada's

Interim Plan 2001 on Particulate Matter and Ozone

Government of Canada Gouvernement du Canada

Canada

Message from the Minister of the Environment

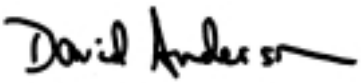
A clean and healthy environment is essential to a sustainable economy and to ensuring the health and quality of life of Canadians. Air quality is a significant environmental concern to Canadians, and that is why, as outlined in the January 2001 Speech from the Throne, clean air is a priority for the Government of Canada. Through policy, partnerships, technological solutions and science, we are working to deliver on the commitment to clean air.

To reduce the hospital admissions and the 5,000 premature deaths we know occur each year due to poor air quality, we are setting courses of action in transportation, industrial emissions, improving our science, working internationally and engaging Canadians at home.

There has already been significant progress since clean air was declared a national priority in May 2000. A notable example is the recent announcement of a Canadian action plan for implementing the Ozone Annex to the Canada-U.S. Air Quality Agreement. We are also working with the provinces and territories to implement the Canada-wide Standards that will reduce emissions of particulate matter and ozone.

The greatest cause of air pollution is being addressed through a ten-year regulatory agenda to reduce pollution from all vehicles and engines, and from the fuels that power them. Never before has a government in Canada produced an agenda for action on products that so many people know and use. We are also seeking to strengthen our investments in the science that is needed to move us forward – to improve our air quality data and predictions, and to give Canadians the information they need to protect themselves. In this way, we can provide the motivation Canadians seek for the individual and community actions that are necessary for an effective solution.

The *Interim Plan 2001 on Particulate Matter and Ozone* furthers the clean air agenda and raises the bar for action and commitment, but it is not the final word. We will report back on our progress and we will continue to explore new solutions to secure a clean and healthy environment for ourselves and for our children.



David Anderson, P.C., M.P.
Minister of the Environment

Introduction

Air pollution is one of the top environmental issues, and public health officials have expressed a growing concern over its impacts on the population. Recent statistics show air pollution causes an estimated 5,000 premature deaths in Canada each year, and thousands more suffer from adverse health effects.

Air pollution has been a problem since the industrial age began, but only recently has the real extent of its impact on human health been understood, with a link between two key elements of smog (particulate matter and ozone) and premature deaths and respiratory ailments.

Significant progress has been made in reducing air pollutants in some key areas. However, challenges remain in controlling major sources of pollution, in providing information so that Canadians can make responsible decisions, and in acquiring a better understanding of the health risks.

The federal strategy on clean air brings together science, actions on emissions and outreach. In this way, the measures and actions to control emissions are backed by science, we understand as much as possible about the effects on health, and we reach out to Canadians through a coordinated partnership process.

Air Issues Management in Canada

Jurisdiction for environmental management in Canada is shared among the federal government, provinces and territories. These governments work together under the Canadian Council of Ministers of the Environment (CCME) and the *Canada-wide Accord on Environmental Harmonization*.

The Government of Canada's role in air issues is:

- science and research;
- national standards such as those involving vehicles, fuels and products;
- international air issues;
- international trade and obligations, including the import and export of commercial and consumer products;
- management of toxic substances (with provinces and territories);
- development (in consultation with provinces and territories) of national guidelines, codes of practice, monitoring networks and air quality prediction; and
- promotion of best practices in all federal departments.

Jurisdictions that signed the *Canada-wide Standards for Particulate Matter (PM) and Ozone* in June 2000 made a commitment at that time to set out an implementation plan for meeting the standards. Like other agreements on Canada-wide Standards (CWS), this plan is based on the principle that responsibility and actions will be assumed by the best-situated order of government.

As this federal plan is the first to set out a series of commitments, initiatives and actions under this particular CWS process, it has been designated as an interim plan. Regular updates will reflect progress, new initiatives and the ongoing consultations and coordination with provincial and territorial partners on commitments in their jurisdictions.

Canada has many regions where air quality is better than the levels set out in the CWS. However, there is still no apparent lower threshold for health effects. Therefore, we will continue to implement practicable pollution prevention and best management practices that have been identified as the best course of action by the Government of Canada and other jurisdictions.

Smog in Canada

Smog is often perceived as dirty or hazy air, most often in the warm summer months. Smog not only reduces visibility, it also affects health.

Extensive studies indicate there are significant health and environmental effects associated with PM and ozone. Epidemiological and human exposure studies show that as ozone levels rise, adverse health symptoms increase. Field and controlled human exposure studies have indicated that patients with pre-existing respiratory diseases (e.g., asthma) are more susceptible to ozone-induced health effects, and that exercise makes these effects even more noticeable. The smallest particles, $PM_{2.5}$, have potential for the greatest health impact on a larger segment of the general population.

Elevated concentrations of PM are found year-round in all regions of Canada, while ground-level ozone is a summertime regional problem. Exposure to elevated levels of ozone is most frequent in the Windsor-Quebec City corridor of Ontario and Quebec, the southern Atlantic region of southern New Brunswick and southwestern Nova Scotia, and the Lower Fraser Valley of British Columbia.

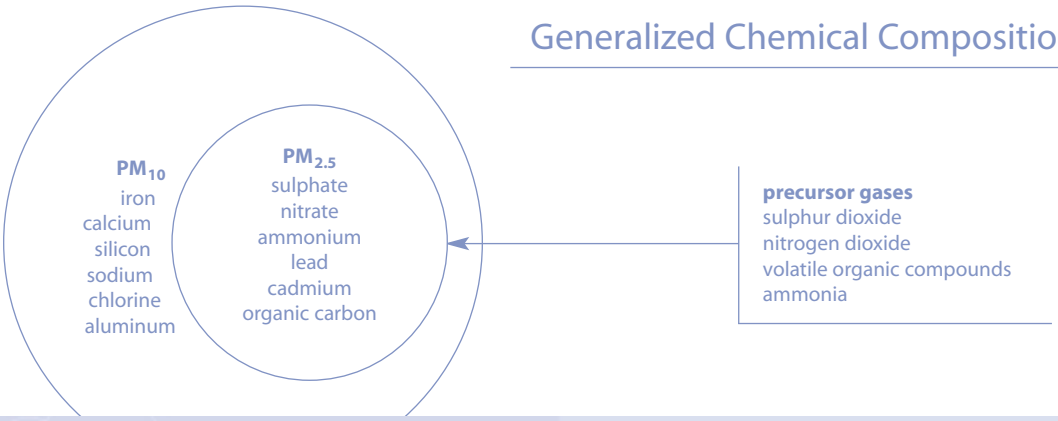
What is Smog?

Smog consists primarily of ozone and particulate matter (PM) in ambient air. Ozone is a gas formed in sunlight and warm, stagnant air, from the precursor gases of nitrogen oxides (NO_x) and volatile organic compounds (VOC).

$$VOC + NO_X + Heat + Sunlight = Ozone$$

PM is tiny solids or liquid droplets released either directly into the air from a variety of sources such as cars, trucks, factories, construction sites, agriculture, unpaved roads, stone crushing, and burning of wood, or formed in the air from the chemical change of gases. PM is indirectly formed when gases from burning fuels react with sunlight and water vapour. These gases can result from fuel combustion in motor vehicles, at power plants, and in other industrial processes.

Generalized Chemical Composition of Ambient PM



Emissions

The basis of this *Interim Plan 2001 on Particulate Matter and Ozone* is a series of actions aimed at emission sources with the greatest impact on air quality. Transboundary pollution, and the transportation and industrial sectors, are the major sources. The table below shows the importance of addressing emissions in the transportation and industrial sectors.

Emissions Profile — Selected Transportation and Stationary Sources
Percentage of National Totals in 1995*

Sector	$PM_{2.5}$**	SO_2	NO_X	VOC	CO_2 equiv
Transportation:					
• On-Road Vehicles	9	2	35	22	21
• Off-Road Engines	5	1	10	3	3
• Rail	4	—	5	—	1
• Air & Marine	2	2	7	2	3
Stationary Sources:					
• Electric Power	4	20	11	—	18
• Steel & Metals	4	36	1	1	3
• Pulp & Paper/Wood	22	3	3	3	2
• Coatings & Solvents	—	—	—	14	—
• Residential Wood Combustion	31	—	—	15	—
Total Percentage Addressed	81	64	72	60	51

* Excluding open sources.

** Refers to direct emissions only; total $PM_{2.5}$ would be greater.

Transboundary Pollution

International cooperation for clean air is essential, particularly with the United States. Studies show that in some regions of eastern Canada, between 30 per cent and 90 per cent of smog comes from the United States.

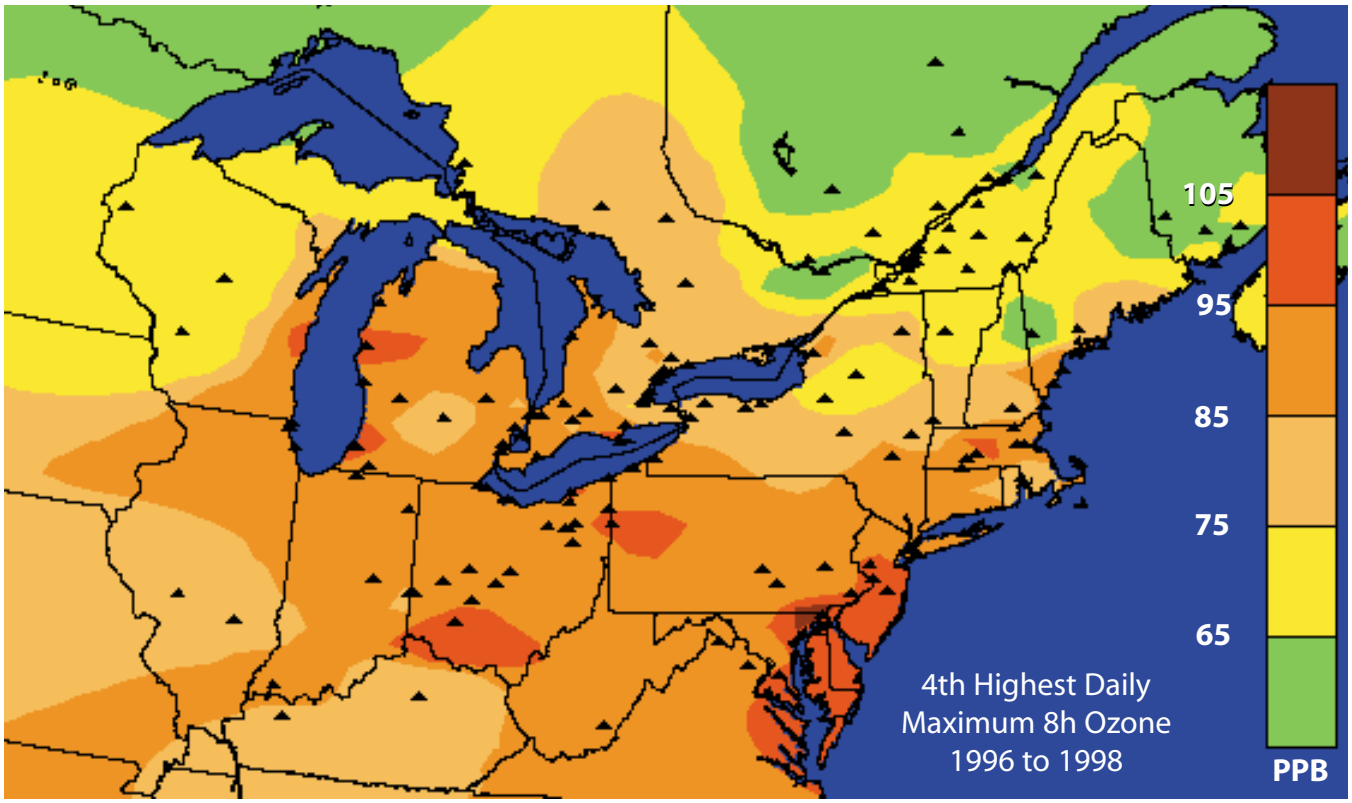
In recognition of the critical importance of reducing smog, Canada and the United States recently signed the Ozone Annex to the Canada-U.S. Air Quality Agreement. The measures set out in the Annex are designed to reduce transboundary flows of ozone and bring cleaner air to more than 16 million Canadians in southern Ontario, southern Quebec and Atlantic Canada.

Under the Annex, the United States is committed to reducing emissions of nitrogen oxides (NO_x) and volatile organic compounds (VOC) from 18 northern and northeastern states starting in 2004. The United States will reduce NO_x emissions by 35 per cent by 2007, representing a 70 per cent reduction in U.S. emissions from power plants and major industrial sources during

the summer months when smog creates the greatest health risk.

In Canada, we have put an annual cap of 39 kilotonnes on nitrogen dioxide (NO_2) emissions from fossil fuel power plants in central and southern Ontario, and a five-kilotonne cap on NO_2 emissions from southern Quebec by 2007. For Ontario, this represents a 50-per-cent reduction in power plant emissions of NO_2 from the current 78 kilotonnes.

The implementation agenda for the Ozone Annex also includes: reducing NO_x and VOC emissions from transportation sources; taking initial actions on a number of industrial sectors (e.g., the fossil fuel sector) and products (e.g., paints and coatings, degreasing agents and solvents); developing a regional risk analysis to characterize major sources of smog in eastern Canada; and developing new modeling applications to verify the impact of current and future actions.



Possible future areas of action

The Ozone Annex will be revisited in 2004 to gauge progress and determine if it should be expanded to include air pollution problems identified along the British Columbia-Washington State border, where air quality is of considerable concern to residents of the Fraser Valley in southern British Columbia. To that end, initial multi-stakeholder discussions have begun between Canada and the United States to identify common issues and discuss international airshed planning.

Canada also wants to negotiate an Annex to the Canada-U.S. Air Quality Agreement that specifically relates to particulate matter. The Annex would focus on transboundary PM and the emissions that produce it. As well, Canada wants to continue work under the Canada-U.S. Air Quality Agreement to reduce emissions that cause acid rain.

Transportation

Transportation is essential to Canada's economic and social fabric, bringing people and goods together across our large country. No sector of the economy could function without an effective transportation system. Transportation, however, also affects the quality of our air, water and land. Canadians expect a safe and efficient transportation system, but they also want a clean environment. Balancing these economic and social needs with the need to protect the environment is central to the concept of sustainable development.

The Government of Canada is addressing emissions from this sector in a variety of ways. Some of the initiatives include:

- emission reduction standards for light-duty vehicles;
- promotion of the CCME's *Environmental Code of Practice for Light Duty Motor Vehicle Emission Inspection and Maintenance Programs;*

- new stringent fuel standards for low-sulphur gasoline and diesel;
- four agreements to fast-track the introduction in 2000 and 2001 of cleaner, less polluting off-road engines into Canada (such as those in string trimmers, leaf blowers, chainsaws, lawnmowers and portable generators, engines in construction and agricultural equipment, recreational marine engines and personal watercraft).

Further initiatives are also planned to reduce transportation emissions. Under the federal government's cleaner vehicles and fuels agenda, announced in February 2001, current regulated vehicle standards will be replaced by new standards that will reduce NO_x emissions by approximately 88 per cent from passenger cars and up to 95 per cent for light-duty trucks, including sport/utility vehicles (SUVs). Another important goal of the new regulatory regime in both Canada and the United States is to bring the performance standards for light-duty trucks in line with those for passenger cars.

Vehicles and Engines

- Regulations will be developed by 2002 to align Canadian emission standards for on-road vehicles and engines with those of the U.S. Environmental Protection Agency, which are generally recognized as the most stringent in the world. The regulations will apply to light-duty vehicles and light-duty trucks (for example, cars, pick-ups, SUVs), and will be phased in starting with the 2004 model year. New regulations for heavy-duty vehicles and engines will come into effect in the 2007 model year.
- An interim agreement with vehicle manufacturers to bring low-emission vehicles into Canada has been developed for model years 2001-2003.
- A code of practice for heavy-duty vehicle inspection and maintenance programs will be developed in 2001.
- Emission control programs for off-road engines will be aligned with those in the United States by 2002, to take effect in the 2004 model year. Programs are also planned for the off-road sector, including gasoline utility engines such as those used in snowblowers, portable generators, lawnmowers, and chainsaws, and diesel engines used in construction and agricultural equipment.These small engines are often many times dirtier and less friendly to the environment than modern car engines.

Fuels

Environment Canada will continue its general approach of aligning Canadian fuel requirements with those in the United States. In some cases, however, additional measures may be warranted. Initiatives include:

- new regulations to reduce sulphur in on-road diesel fuel to 15 parts per million by 2006, down from today's average of 320 parts per million;
- initiating work to support a reduction in sulphur in off-road diesel fuel and home heating and industrial fuel oils;
- requiring companies to provide information on their use of methyl tertiary butyl ether (MTBE) in gasoline (spills of MTBE, which is sometimes used in gasoline, can contaminate groundwater);
- launching studies to determine future standards for gasoline to further reduce emissions of toxic substances such as benzene from vehicles, and to promote the earlier introduction of cleaner fuels.

Full details on the contents of the Government's Notice of Intent for Cleaner Vehicles and Cleaner Fuels are available on Environment Canada's website at **www.ec.gc.ca/air/taking-action_e.shtml.**

Marine

International controls will be developed through the International Maritime Organization (IMO) on the sulphur content of marine bunker oils and international standards for NO_x emissions. Current IMO proposals limit the sulphur content of marine fuels to 4.5 per cent and only a small amount of fuel currently used is above that level. The IMO process could create Special Areas where sulphur levels are restricted to 1.5 per cent. One example is the Greater Vancouver Regional District, where Transport Canada and Environment Canada have been asked to begin the process of declaring the west coast a Special Area.

Aviation

Aircraft emissions and operational practices that affect local air quality will be addressed by Transport Canada and the International Civil Aviation Organization (ICAO).

- Transport Canada and ICAO will work together to ensure that annual improvements in fuel efficiency for aircraft produced prior to 2004 are not offset by increases in distances traveled.
- Emission reductions are also possible from aviation ground support activities and air traffic management through Transport Canada participation in two air emissions working groups under the ICAO Committee on Aviation Environmental Protection.

Possible future areas of action

Strategic expansion of rail traffic in major corridors, including shifts of freight and passengers from other modes, could become a key component of national transportation demand management. This could increase rail's market share, thereby helping to reduce overall emissions from the shipment of goods.

Given the new responsibility undertaken by Transport Canada to regulate air emissions and pollution from railway equipment, Transport Canada is exploring means to fulfill this new regulatory capacity, including investigating technology options for rail and establishing a technical working group on emissions control.

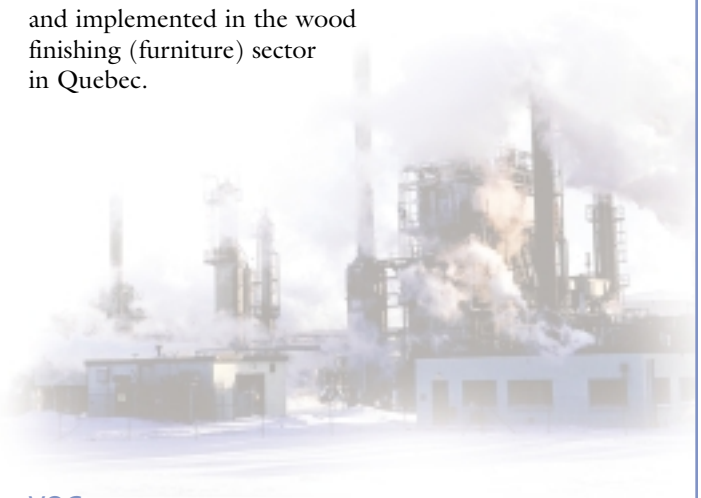
Marine transportation contributes to sulphur oxides (SO_x) and NO_x emissions in Canada. Canada's aim is to implement policies and regulations on marine air pollution under the *Canada Shipping Act* to reduce harmful air emissions from ships.

Air traffic around the world continues to increase rapidly. Further to Transport Canada's work with ICAO, consideration is being given to building partnerships with airport authorities to reduce emissions at airports. As well, research needs to be undertaken to assess the impact of emissions on the atmosphere in Canadian airspace, including Canada's polar region.

Industrial Sectors

Pollution Prevention

Reducing emissions from industrial sectors and other stationary sources will be a coordinated effort at the national and regional levels. A key component of effective reduction is preventing pollution from occurring in the first place. Many industries have developed effective pollution prevention programs, and this will be further encouraged. For instance, in Quebec, partnerships have been established with selected small and mid-sized industrial installations (Enviroclubs) to implement in-plant pollution prevention projects, and this work will continue. In addition, in cooperation with industry, pollution prevention projects aimed at reducing VOC emissions will be identified and implemented in the wood finishing (furniture) sector in Quebec.



VOC

The use of paints, solvents and other industrial, commercial and consumer products is a major source of VOC that contribute significantly to air pollution across Canada. A ten-year plan, similar to the Action Plan for Cleaner Vehicles and Fuels, will be developed to reduce VOC emissions from consumer products and from the use of paints, solvents and other products in industrial and commercial processes. Reductions will require a mixture of strategies and measures, as there is a wide range of products, companies and uses. Foundation analysis will include comparisons with the United States and a review of the current Canadian measures as the basis for national multi-stakeholder consultations on the ten-year plan. Following these consultations, prevention and control measures will be developed for a number of key sectors.

Facility-based Environmental Performance Agreements

Voluntary tools, known as Facility-based Environmental Performance Agreements, are being pursued with industries and others. These are multi-pollutant, multi-media agreements for beyond-compliance commitments by individual facilities. Two such agreements have been

signed in Ontario with Dofasco Inc. and Algoma Steel Inc. Under these agreements, the companies are committed to reducing pollutants such as benzene and polycyclic aromatic hydrocarbons and have further agreed to other measures such as facility-wide air inventories and the development of waste management plans. The companies report to Environment Canada and to the Ontario Ministry of the Environment on their progress, and the reports are also made available to the public.

Canadian-wide Standards and Multi-Pollutant Emission Reduction Strategies

In June 2000, federal, provincial and territorial Ministers agreed to a set of joint initial actions under the *Canada-wide Standards for Particulate Matter (PM) and Ozone,* including the development of multi-pollutant emission reduction strategies (MERS) for key industrial sectors. These include electric power, iron and steel, base metals smelting and others, chosen by Ministers because they are major emitters common to several jurisdictions. Similar actions are under way in Quebec to match the level of protection in other provinces and territories.

The MERS will complement and support the development of emission reduction actions in jurisdictional implementation plans, and provide the basis for a national projection of each sector's potential contribution toward meeting ambient air standards. The MERS process will provide opportunities for partnership and dialogue among governments and with stakeholders. Regional analysis will be conducted in Quebec to complement the national MERS.

Work is already under way in the electric power generation sector. The CCME organized a workshop in January 2001 with representation from provinces, industry, environmental non-government organizations, and consumer and health groups. Areas were identified for national multi-pollutant analysis and consultation as input to the development of emission reduction initiatives, and a process was developed for undertaking the work. The federal government will work in partnership with provinces and stakeholders over the coming months to gather information and analysis in areas such as options and costs, industry competitiveness, energy policy perspectives and policy instruments.

Wood-burning Appliances

Wood stoves and fireplaces are significant sources of fine PM and VOC emissions in every province and territory in Canada. Therefore, the Government of Canada is participating in new initiatives to reduce emissions from residential wood-burning appliances, including:

- developing standards for new wood-burning appliances;
- exploring options for a national regulation for new clean-burning residential wood heating appliances;
- developing and launching a social marketing and public education campaign on residential wood combustion;
- conducting a program to evaluate the impact of residential wood combustion on air quality in residential areas in Quebec; and
- collaborating with public health organizations in the Montreal area to assess people's exposure to pollutants resulting from residential wood combustion.

Farm Emissions

Increasing attention is being directed at farm emissions of primary particulates such as airborne soil from cultivation and wind erosion, and PM precursors such as ammonia from livestock manure and chemical fertilizers. Farmers, as longstanding environmental stewards, have always emphasized the protection and conservation of the resources on which their livelihood depends, and as good neighbours have been conscientious about minimizing off-site environmental effects of farming operations.

Oil and Gas

Environmental assessment reviews, particularly those relating to major new oil and gas development proposals in Alberta and the North, will contribute to understanding the potential impacts of these developments on air quality, and to establishing measures to reduce those impacts. Federal participation with provinces and stakeholders on project teams addressing a variety of air issues will also assist in reducing emissions. For instance, federal representatives in the Clean Air Strategic Alliance in Alberta are involved in intensive work on PM and ozone emissions, acidifying emissions, flaring/venting and other areas that will respond to both clean air and climate change concerns.

Possible future areas of action

- The MERS processes would be undertaken for the iron and steel, base metals smelting, pulp and paper, wood and allied wood products industries, and concrete batch and asphalt mix plants. Measures to reduce emissions could be developed for the petroleum sector and for key consumer and industrial sources of VOC emissions. Each MERS would be tailored to a specific sector and developed with a variety of components: competitiveness, best practices by industries in Canada and abroad, technologies and policy instruments.
- Green power is also an important area for future action that would not only help to achieve clean air objectives, but also address climate change emissions. The federal *Action Plan 2000 on Climate Change* includes a number of complementary initiatives to reduce greenhouse gas emissions by shifting to cleaner sources of electricity (e.g., wind power). The procurement of green power for federal facilities, and the development and expansion of green power in the market, will help reduce greenhouse gas emissions. In an effort to speed up the use of green power, a renewable low impact electricity guideline under the Environmental Choice[M] Program for green power producers and consumers will be published in 2001.
- Other areas for future action:
  - Analysis may be undertaken to better characterize pollutants from paved roads and their sources in several major communities across Canada, and to assist in developing prevention and control instruments based on best practices.
  - Work with the Alberta government could scope out a multi-pollutant air management strategy for the upstream oil and gas sector. The work would build on current research partnerships with Alberta and with other governments on developing model emission management measures for use by all Canadian jurisdictions to reduce emissions from the construction and demolition sectors.
  - Options for a national wood stove change-out program may be assessed, and a national public education program developed in partnership with provinces and stakeholders.
  - Prevention and control instruments, including an education program with hospitals, could be further developed to reduce emissions of PM and other substances from waste incineration that are considered toxic under the *Canadian Environmental Protection Act*.

Outreach

Regulations and policies alone are not enough to achieve clean air for Canadians. It is also important to promote individual and collective actions to reduce air pollution. Governments have an obligation to provide regular information to the public, based on good science, so that Canadians can understand the health impacts of air pollution and how they can take steps to protect themselves.

Canadians are being engaged and informed through federal initiatives such as the following:

- The Commercial Building Incentive Program provides incentives for energy efficiency in new commercial and institutional buildings, along with the Energy Innovators Initiative for organizations wishing to reduce energy operating costs, greenhouse gases and other pollutant emissions.
- The EnerGuide for houses helps assess the energy efficiency of houses, while the EnerGuide for vehicles promotes fuel consumption labeling of new vehicles.
- Regular trends reports are issued on pollution emitted to air, water and land.
- A Smog Advisory Program for several key areas has been in place since 1993.
- The National Pollutant Release Inventory (NPRI) provides enhanced reporting to Canadians through an interactive on-line database that allows tracking of pollutant releases in individual neighbourhoods. The NPRI list of substances will be expanded in 2002 to include precursors of ground-level ozone and smog: total particulate matter (TPM), PM_{10}, $PM_{2.5}$, SO_x, NO_x, VOC, total ammonia, and carbon monoxide. As well, the number of industrial facilities reporting pollutant emissions is expected to rise from 2,100 in 1999 to more than 7,000 by 2005. Communication tools have been developed to facilitate access to and use of the NPRI.

- The Clean Air website **(www.ec.gc.ca/air/menu_e.shtml)** provides information on science and research, as well as ideas for action that Canadians can take to help achieve clean air, and progress reports on such actions.
- Clean Air Day Canada (June 6, 2001) provides a focal point for local and national activities promoting clean air awareness and actions to reduce smog.
- Of 800 community-based environmental projects funded by the EcoAction Community Funding Program, 9 per cent related to air quality and climate change.
- The Community Animation Program, with its focus on developing the capacity of health and environment groups to work together on shared issues, has helped engage the broader community.
- Sustainable Communities programs and contributions to the Federation of Canadian Municipalities have helped develop programs and projects that promote environmental action and energy efficiency, and also contribute to clean air actions at the local level.
- In the agriculture sector, the Agricultural Environmental Stewardship Initiative and the Livestock Environmental Initiative promote practices that help to achieve clean air.

"We are also seeking to strengthen our investments in the science that is needed to move us forward..."

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Possible future areas of action

Canadians are concerned about air pollution and want to do their part for clean air, but many are unsure what practical actions they should take to support that concern. SUVs are popular, there are more cars and light trucks on the roads than ever before, communities continue to expand the number of roads and grow far from work-places and services.

Efforts to engage Canadians should target those who are concerned but not yet active in finding solutions; those who are most vulnerable to health effects from smog; and communities and networks that reach industry, public health and the voluntary sector.

An effective engagement program is required that balances raising national awareness with support for local communities. It would recognize that real change happens locally at the community level, and provide the tools, information and support that respond to community needs. On-line communications would be emphasized as an effective method of sharing knowledge with communities and supporting wise choices.

Partnerships are a key component of successful engagement. They should focus on industry leaders to promote incorporating sustainable practices. As well, a public health information program on air quality involving partnerships with key organizations would help spread the message about individual responsibilities for clean air. Other measures to promote better understanding of what individuals can do to achieve cleaner air include peer training sessions to increase understanding and capacity in the medical community, and work with industry groups to support community initiatives.

Science

Understanding the impacts of PM and ozone on human health and the environment, and measuring the success of actions on these two key air quality issues, are the main knowledge components of this Interim Plan. In addition, solid scientific evidence is the basis for responsible environmental decision-making, and is the foundation for all of Canada's policies and regulations on clean air.

The Government of Canada has played a key role since the early 1970s in the research and measurement of air quality and toxic substances in the atmosphere, and the effects of air pollution on people and the environment. Such work involves scientific research, preparing emission inventories, air quality monitoring and the application of data analysis techniques. The scientific evidence helps us understand where air pollution comes from, how it affects our health, and how to reduce or eliminate its sources. The data also support provincial air quality management, along with international negotiations, agreements and programs aimed at controlling trans-boundary and global transport of toxic air pollutants.

Science and Monitoring Network

In partnership with the provinces and territories, the federal government will enhance and maintain a monitoring network to meet the requirements of the *Canada-wide Standards for Particulate Matter (PM) and Ozone* and the Ozone Annex to the Canada-U.S. Air Quality Agreement. Air quality data are also used to demonstrate the links between air pollution and human health, to design and evaluate air pollution control strategies, identify air quality trends and forewarn of emerging air pollution issues.

Canada already has a well-established monitoring network with over 250 sites located in 139 communities and several rural locations measuring the components of smog. Over the next five years Environment Canada will add new monitoring stations, refurbish critical ones and replace aging instrumentation, such as outdated monitors. Equipment for calibrating monitoring instruments will be upgraded or replaced. New samplers will be added to some existing sites to provide more detailed data on levels and components of PM.

In addition, Environment Canada will improve and upgrade its electronic infrastructure behind the networks. This will enable better and faster reporting to the public, including both long-term trends data and real-time information.

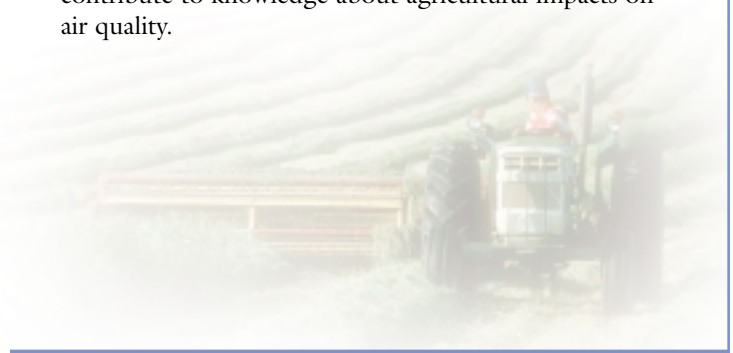
Forecasting

Air quality forecasting is provided in the Maritime provinces. British Columbia is completing a pilot project and other forecasts are issued in conjunction with provincial and municipal agencies. In the Montreal area, a pilot project in the winter of 2001 made forecasts for dispersion rates of pollutants available on the Internet and through the media. As well, national air quality predictions are publicly available through maps posted on the Clean Air site of Environment Canada's Green Lane. Work is also under way to launch daily ozone-based forecasts in Montreal and Vancouver. In Ontario, Environment Canada contributes to the Provincial Air Quality Index and Smog Alert programs.

Environment Canada is also working with the New England Governors and Eastern Canadian Premiers, who initiated a joint Eastern Canada-U.S. mapping-without-borders project in the summer of 2000. The project provides seamless, animated, near real-time Canadian and U.S. ground-level ozone maps for, on the Canadian side, New Brunswick, Nova Scotia, Prince Edward Island, and Quebec. The maps are available to the public during the smog season–May through September–on Environment Canada's website at **www.ec.gc.ca/air/ozone-maps_e.shtml.**

Agriculture

Research is also ongoing on ammonia sources in agriculture, soil erosion modeling, reduced tillage practices, and soil and resource database management. The findings will contribute to knowledge about agricultural impacts on air quality.



Possible future areas of action

In addition to the scientific work now under way, future clean air policy and initiatives would benefit from the increased knowledge that could be provided by an integrated atmospheric and health science research program specifically focused on Canada's environment and population. Such a program would address critical science gaps, such as:

- undertaking atmospheric chemistry research (field and laboratory) that supports model development;
- determining how smog-related pollutants move long distances over boundaries;
- identifying further the effects of human exposure to smog-related pollutants and other toxic substances, especially chronic exposure;
- identifying the factors that make certain individuals susceptible to adverse effects from poor air quality;
- determining how to avoid illness that comes from exposure to air pollution; and
- increasing sampling and analysis at sites across Canada of persistent and toxic chemicals, and of hazardous chemicals concentrated in polar regions, to better understand their distribution and health impacts.

Health surveillance research should ideally include developing or enhancing existing capacity to further understand air pollution-related effects on circulatory diseases, asthma and other respiratory diseases, pregnancy, infant and children's health, cancer, neuro-behavioral problems and other emerging issues.

Federal House in Order

The federal government is the largest employer in Canada. It has an on-road vehicle fleet of some 23,000 vehicles, occupies over 25 million square metres of floor space, and emits a significant amount of air pollutants from its operations. Its thousands of employees also contribute to air pollution through commuting between home and work and through business travel.

Environment Canada, in cooperation with Health Canada and Public Works and Government Services Canada, is promoting the implementation of Corporate Smog Action Plans by federal departments and agencies in Ontario. These plans have four components:

1) a notification procedure to advise employees of impending smog alert days;
2) an immediate response by employees on smog alert days to reduce emissions of smog-causing air pollutants;
3) longer-term strategies for federal government operations that lead to air quality improvements during the summer smog season and throughout the year; and
4) an information and education component that provides employees with facts and options for reducing smog-causing emissions, both at work and at home.

The Canadian government, through the Federal House in Order initiative, is committed to reducing greenhouse gas emissions from the 11 largest emitting departments and agencies by 31 per cent in 2010 from 1990 levels. Reductions in greenhouse gas emissions and associated air pollutants will be achieved by building upon existing federal programs such as the Federal Buildings Initiative and FleetWise to increase energy efficiency and encourage the purchase of more fuel-efficient and alternative-fuel vehicles. The purchase of low-impact renewable energy, referred to as "green power", by federal facilities is also a key component of the Federal House in Order initative. The goal of this initiative is for the federal government to purchase 20 per cent of its electricity from green power sources by 2005.

Other projects include contracts to supply green power to Environment Canada and Natural Resources Canada in Alberta, and a pilot project to promote sustainable transportation for federal employees from Environment Canada and the Canada Customs and Revenue Agency in Montreal, in partnership with the Agence métropolitaine de transport.

In addition, Natural Resources Canada, in collaboration with Public Works and Government Services Canada and Environment Canada, has developed the *Sustainable Development in Government Operations* program, which sets out goals for green government by following best practices in:

- energy use in government-owned and leased facilities;
- the development and implementation of energy management plans;
- the assessment of energy efficiency knowledge requirements of building operators and managers, and provision of the required training;
- the implementation of economically attractive energy retrofits;
- the incorporation of the Federal Buildings Initiative where applicable to obtain products and services for energy efficiency, and the facilitating of energy conservation efforts by building occupants;
- vehicle fleet management.

"Understanding the impacts of PM and ozone on human health and the environment, and measuring the success of actions on these two key air quality issues, are the main knowledge components of this Interim Plan."

Possible future areas of action

The Federal Vehicle Ethanol Initiative is a new program designed to show federal leadership in the development and use of renewable fuels. Operators of federal vehicles will be encouraged to select ethanol blended fuels at commercial and bulk fueling stations. The purchase of E-85 vehicles will also be promoted within federal departments.

A program will be developed within the National Capital Region to encourage the reduction of emissions from employee commuting. Possible initiatives include offering employees discounted bus passes and encouraging ride-sharing.

Supporting Actions on Climate Change

Many of the environmental challenges that Canada faces are interrelated, and action on one can affect others. For example, many of the human activities that contribute to PM and ozone production also produce excess greenhouse gases that lead to climate change. Burning fossil fuels releases NO_x into the atmosphere, and also carbon dioxide (CO_2) – a greenhouse gas that absorbs some of the sun's heat and warms the Earth. Global use of fossil fuels releases more than 22 billion tonnes of CO_2 into the atmosphere every year.

The *Action Plan 2000 on Climate Change* will help Canada become a world leader in sustainable development, and a leading nation in the production and use of all forms of energy. Canadians can also expect other direct benefits from investing in measures to reduce climate change, including cleaner air, cost savings from energy efficiency measures, and expanded use of renewable energy technologies.

Individual actions, and programs by organizations, communities, municipalities and industries, will also reduce emissions that affect both air quality and climate change. Industries can have some security in the investments they make to take action in these areas, knowing there are benefits to both environmental and human health. Sustainable agriculture initiatives such as the Climate Change Skills and Knowledge Transfer Initiatives and research projects on carbon sequestration in soils and climate change assessments could also help improve air quality.

Conclusion

The Government of Canada will act, through a mixture of regulations, economic instruments and voluntary measures, to meet its obligations under the *Canada-wide Standards for Particulate Matter (PM) and Ozone* and the Ozone Annex agreement, as well as its obligations to protect health and the environment for all Canadians through the provision of clean air. Many of the initiatives set out in this Interim Plan require partnerships with provinces, territories, industry, business, municipalities and organizations. Future progress reports will provide updates on the nature of these partnerships and our progress towards meeting Canada's commitments, nationally and internationally, to reduce emissions of PM and ozone.

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