

Halton Partners for Clean Air
www.halton.ca/hpca

CLEAN AIR PLAN

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Introduction

Smog is a form of poor air quality that negatively impacts one's health, the environment, and the economy. Serious smog episodes causing death were documented in the late 19th and early 20th century due to industrialization. Examples include the Meuse Valley in Belgium where 63 people died in 1930; Donora, Pennsylvania where 20 people out of a population of 14,000 died in 1948; and in London, England where 4,000 people died in 1952. In addition to the deaths, there were thousands who also experienced respiratory symptoms. Poor air quality continues to affect countries around the world contributing to approximately 5% of the 55 million deaths that occur each year, or almost 3 million people¹.

In Canada, poor air quality is known to predominantly affect the Lower Fraser Valley in British Columbia, the southern Atlantic Region, and the Windsor-Quebec City corridor, although other parts of Canada are not exempt. A large percentage of air pollution in southwestern Ontario is often blamed on the migration of emissions from power plants in the Ohio Valley. However, there is an increasing link between transportation and poor air quality. Although fuels are becoming cleaner and devices, such as catalytic converters, have been placed in vehicles significantly reducing tailpipe emissions, there are more vehicle kilometres travelled and increased traffic congestion. Vehicle size and weight trends have also been less favourable.

The Halton Public Sector Smog Response Committee² was formed in 1999 to consider joint actions that could be taken to address the growing concern regarding the health and environmental impacts of smog. The committee deliberated, wrote and endorsed the document *A Halton Public Sector Smog Response Plan*³ in 1999 and revised it in 2001.

Historically, the smog response plan focussed on actions that public sector agencies could employ to reduce their impacts on air quality when the Ministry of the Environment issued smog advisories. However, due to the significant number of smog advisories in 2005, there was much debate on shifting the focus of the plan to longer term, more permanent actions to improve air quality. Hence the name change from 'smog response plan' to 'clean air plan.'

The purpose of this new plan continues to be to:

- Increase the level of awareness about air pollution within all sectors in the region of Halton;
- Recognize our collective role in the cause of air pollution;
- Increase our understanding of the impact of poor air quality on the environment and our health; and,
- Promote actions that can be taken to achieve improved air quality throughout the year and specifically on smog advisory days.

This document is targeted to the public sector, the private sector and individuals in the community. It begins with a brief background about Halton Partners for Clean Air followed by the health and economic impacts of smog. The main components of smog are then identified and described. Next, Ontario's air quality monitoring system is explained followed by projects that are underway to improve local air quality data. Additionally, there are two sections that can be stand alone units - the first section is for employers and employees and the second section is for community members and individuals. Employers are asked to develop clean air plans and to disseminate the information to their employees. Suggestions are included in a checklist format to facilitate this process, highlighting short and long-term goals that employers and employees can achieve to reduce their impacts on air quality.

Community members are also asked to develop personal clean air plans, with a checklist of suggested actions included. All plans aim to incorporate proactive measures to reduce overall emissions throughout the year and not just reactionary steps that are only taken on smog days. The document concludes with a list of acronyms cited and a reference section.

Halton Partners for Clean Air

When Halton Partners for Clean Air (HPCA) first formed in 1999, it was comprised of 12 representatives from the following: Region of Halton, the area municipalities (Burlington, Halton Hills, Milton and Oakville), the hydro utilities (Burlington, Halton Hills, Milton and Oakville), the local school boards (Halton Catholic District and Halton District) and Conservation Halton. Since then, the partners have taken a number of actions to address smog including:

- Implementing activities to reduce emissions during smog days for all partners.
- Raising public awareness about the impacts of smog, through brochures, partner websites, displays, and community events.
- Advocating for public transit as a smog reduction strategy.
- Promoting new technology for cleaner or fuel-efficient vehicles, including investigation of alternative fuels (biodiesel and ethanol-gasoline blends).
- As members of HPCA, the Region of Halton, the City of Burlington and the Town of Oakville implemented local anti-idling awareness campaigns. In addition, the Region implemented an internal staff policy to limit idling time for vehicles while the municipalities of Burlington, Halton Hills and Oakville adopted anti-idling by-laws. The Region of Halton, City of Burlington, and Town of Oakville are also members of the Greater Toronto Area Clean Air Council (GTA-CAC), an inter-governmental working group with a mission to help reduce smog across the GTA.
- Promoting and participating in the Active and Safe Routes to School Program and International Walk to School Day.
- Ongoing participation in the 20/20 program, a social marketing campaign designed to encourage the public to reduce vehicle kilometres travelled and home energy use by 20%.
- Promoting employee and public participation and commitment in the federal government's One Tonne Challenge, a program encouraging everyone to take action to track and reduce greenhouse gas emissions mainly through energy conservation and reduced single occupant vehicle use.

In 2003, the partners identified that in order for HPCA to continue its influence, leadership had to be broadened beyond the public sector. As a result, the committee worked on a strategy to expand its mandate to include roles for industry, community groups and for the Ministries of the Environment and Transportation. The new structure (Figure 1), which was endorsed by all public sector partners in 2004, is composed of 25 official representatives, plus 2 advisory roles that provide relevant health and environmental expertise when required⁴. A representative from each of the 25 organizations sits on the steering committee and at least one of the three subcommittees representing the public sector, the private sector, and the community sector. The public sector and community sector subcommittees have met regularly since the beginning of 2005. The private sector subcommittee will meet when membership is finalized.

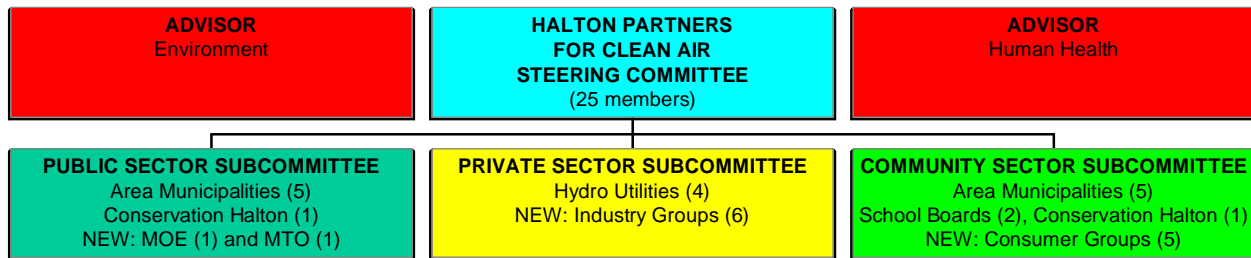


Figure 1: New Structure

Air Pollution and Your Health

The health of our entire respiratory and cardiovascular systems is affected by the quality of the air we breathe. Air pollutants typically increase the severity or frequency of common medical conditions or illnesses. Common health effects include difficulty in breathing, coughing and wheezing. Air pollution is also linked to triggering asthma attacks, chronic bronchitis in children, chronic obstructive pulmonary disease, cardiovascular disease, endocrine system effects, neurological effects and allergies.

In 1998, the Ontario Medical Association (OMA) declared air pollution "a public health crisis." This statement was based on strong scientific evidence linking air pollutants like ozone, nitrogen oxides, carbon monoxide and tiny airborne particulates and acid droplets to various illnesses and breathing problems.

A key health study in 2002 found that air pollution levels in major U.S. cities pose a health risk comparable to second hand smoke or moderate obesity⁵. Other scientific research shows that there is no "safe level" for air pollution, that is, there is no level below which there are no adverse health effects.

In 2005, the OMA estimated the number of Ontarians admitted to hospitals with health problems related to air pollution exposure was approximately 17,000, while the number of emergency room visits was estimated at almost 60,000. By 2026, these rates are expected to jump to over 24,000 and 88,000 respectively. The 2005 estimates for Halton included 190 premature deaths, 540 hospital admissions and 2,010 emergency room visits per year resulting in an estimated \$17 million in healthcare costs (not including visits to family doctors) and \$13 million in lost productivity costs (as employees were too sick to go to work due to poor air).⁶

Air pollution is a year-round health risk affecting all residents, especially children and adults who already face a lifetime of chronic breathing problems. These health impacts severely influence one's quality of life and place an unnecessary strain on the health care system.

Smog and its Sources

The term 'smog' is used to describe a mixture of pollutants, primarily made up of ground level ozone (O₃) and fine particulate matter (PM_{2.5}). Other major precursors include sulphur dioxide (SO₂), nitrogen oxides (NO_x), volatile organic compounds (VOCs), carbon monoxide (CO) and ammonia

(NH₃). Elevated levels of this mixture deteriorate air quality, impacting human and ecological health. A synopsis of these pollutants and their effects is contained in Table #1.

In Ontario, smog episodes were traditionally observed between May and September when nitrogen oxides and volatile organic compounds formed ground level ozone in the presence of sunlight. Such episodes tended to arise from burning gasoline and diesel in vehicles, and using fossil fuels to heat buildings, run industries and produce electricity in power plants.

The inclusion of fine particulate matter (PM_{2.5}) to the Ontario Ministry of the Environment's (MOE) Air Quality Index (AQI) in August 2002 enabled the monitoring and reporting of smog episodes year round. The first smog advisory issued by the MOE outside the traditional smog season was in Hamilton on October 10th, 2003 due to PM_{2.5}⁷. A more recent and longer lasting smog advisory was issued for several communities in Ontario and Quebec in February 2005. The advisory was in effect in the Halton-Peel region from February 4-7, 2005. Primary direct human sources of PM_{2.5} outside the traditional smog season are mainly due to wood heating (purchases of wood burning heating sources greatly increased in Quebec after the 1998 ice storm), motor vehicles and industrial activities^{8,9}.

Ontario's highest smog levels are typically observed in the southwest and south central parts of the province, due to both local pollution sources and smog precursors generated in the United States. Meteorological conditions favour polluted air masses to move northeast from the United States over the Great Lakes. This allows ground level ozone precursors (NO_x and VOCs) to react in the presence of sunlight, resulting in elevated ground level ozone concentrations in the province. These conditions also allow for fine particles to travel northeast, and consequently increase PM_{2.5} levels in Ontario.

Approximately 55 per cent of ozone and particulate matter measured in southern Ontario are transboundary and attributed to the long-range transport of these pollutants and their precursors from the United States. In some areas along the northern shores of Lake Erie, the eastern shores of Lake Huron, and the extreme southwest parts of the province along the US border, this figure is about 90 per cent. Despite this large contribution from our neighbours, local emission problems are still present within Ontario. For example, during a smog episode in the GTA, approximately half of the PM_{2.5} emissions are from human activity in Ontario^{10,11}. This shows that we all need to take action to reduce smog precursors. Doing so will not only be beneficial for Ontarians but also for residents of Quebec, upper New York state, Vermont, New Hampshire, and Canada's Maritime provinces who are the recipients of Ontario's pollution.

Table 1: Summary of Pollutant Characteristics, Sources and General Health and Ecological Effects^{12,13,14}

Pollutant	Characteristics	Sources	AAQC ¹⁵	General Health Effects	General Ecological Effects
Ground-level Ozone (O ₃)	A colourless, odourless gas at ambient concentrations. A major component of summer smog. Formation and transport strongly dependent on meteorological conditions.	O ₃ is not emitted directly into the atmosphere but produced when NO _x and VOCs react in the presence of sunlight.	1 hour average 80ppb 8 hour average 65ppb ¹⁶	Irritation of the respiratory tract and eyes. Exposure in sensitive people can result in chest tightness, coughing and wheezing. Linked to increased hospital admissions and premature deaths. O ₃ considered toxic under <i>Canadian Environmental Protection Act, 1999</i> (CEPA).	Agricultural crop loss and visible leaf damage in many crops, garden plants and trees.
Fine Particulate Matter (PM _{2.5})	Mixture of microscopic solid particles and liquid droplets in the air that are less than 2.5 microns in diameter. Major component of summer and winter smog. Composition varies with origin, residence time in the atmosphere, time of year and environmental conditions.	PM _{2.5} can be formed indirectly from chemical reactions in the atmosphere or directly through fuel combustion (motor vehicles, power generation, industrial facilities, residential fireplaces and woodstoves, agricultural burning and forest fires, construction activity and road dust).	24 hour average 30µg/m ³ ¹⁷	Particles may penetrate deep into the respiratory system, aggravate existing heart and lung diseases, and can exacerbate symptoms such as chest pain, shortness of breath, wheezing and fatigue. Linked to increased hospital admissions and premature deaths. PM containing metals released in emissions from copper smelters or refineries or zinc plants are considered toxic under CEPA.	Impacts include corrosion, soiling, damage to vegetation and reduced visibility.
Sulphur Dioxide (SO ₂)	Colourless gas with a strong odour similar to burnt matches.	Sources of SO ₂ include: smelters, utilities, iron and steel mills, petroleum refineries, and pulp and paper mills. Lesser sources include transportation, residential, commercial and industrial space heating.	1 hour average 250ppb 24 hour average 100ppb	Breathing discomfort, respiratory illness, aggravation of existing respiratory and cardiovascular disease. People with asthma, chronic lung or heart disease are most sensitive to SO ₂ . SO ₂ considered toxic under CEPA due to its contribution to formation of PM.	Leads to acid deposition that contributes to lake acidification, corroded buildings, reduced visibility and damage to trees and crops.

Pollutant	Characteristics	Sources	AAQC¹⁵	General Health Effects	General Ecological Effects
Nitrogen Oxides (NO _x)	A reddish-brown gas with a pungent and irritating odour. Includes nitric oxide, nitrogen dioxide (NO ₂) and nitrous oxide. A precursor to O ₃ .	All combustion in air produces NO _x . Major sources include transportation, power plants, primary metal production and incineration.	1 hour average 200ppb (NO ₂) 24 hour average 100ppb (NO ₂)	Increased sensitivity for people with asthma and bronchitis including coughing, wheezing, and shortness of breath. Lung function impairment and reduced resistance to respiratory infection. NO and NO ₂ considered toxic under CEPA due to its contribution to formation of PM.	Leads to acid deposition that contributes to lake acidification, corrodes metals, fades fabric, degrades rubber and damages trees and crops.
Carbon Monoxide (CO)	Colourless, odourless, tasteless and, at certain concentrations, a poisonous gas.	Major source is the incomplete combustion of fossil fuels mainly in the transportation sector.	1 hour average 30 ppm 8 hour average 13 ppm	Impairment of visual perception, work capacity, learning ability and performance of complex tasks. People with heart disease are particularly susceptible.	
Ammonia (NH ₃)	A colourless gas with a pungent odour noticeable above 50ppm. It is a precursor to smog yielding ammonium sulphates and nitrates.	Sources include agricultural livestock and poultry waste management and fertilizer and pesticide application.		Gaseous NH ₃ considered toxic under CEPA due to its contribution to formation of PM.	Can contribute to the nitrification and eutrophication of aquatic systems.
Volatile Organic Compounds (VOCs)	Carbon containing gases and vapours. They are “volatile” because they easily and quickly evaporate into the air. VOCs contribute to form O ₃ and secondary PM.	Sources are mainly transportation, such as road vehicles, and the use of general solvents.		Health effects vary according to the specific compound. Several, such as benzene (a carcinogen), have been declared “toxic” under the CEPA due to its contribution to formation of PM.	

Air Quality Monitoring¹⁸

The Air Quality Index (AQI) is a rating scale for outdoor air in Ontario. It ranges from 0-15 (very good) to 100+ (very poor). The lower the AQI, the better the air quality. The Ministry of the Environment (MOE) reports an AQI for many communities across Ontario, including Burlington and Oakville, to major media outlets and the ministry web site seven days a week. These reports are issued seven times a day between May and September and five times a day the rest of the year. The information is based on hourly real-time air quality data from its network of air monitoring stations.

The six key air pollutants monitored by MOE as part of the AQI are sulphur dioxide, ozone, nitrogen dioxide, total reduced sulphur compounds¹⁹, carbon monoxide and fine particulate matter. These pollutants were chosen because they have an adverse effect on humans and the environment.

The air monitoring data is sent to a computer centre at MOE. The data for each of the six pollutants is converted to a number on the AQI scale. The pollutant with the highest AQI number becomes the "overall" AQI for a particular location. For example, the AQI for ozone is 25, and this happens to be the highest out of the six pollutants. It is then reported as the overall AQI for a particular location (Figure 2). Specifically, it would be reported as an "AQI of 25, reason: ozone."



Figure 2: Air Quality Index

Members from a multi-stakeholder committee consisting of the Ontario Ministry of the Environment, Environment Canada and Health Canada are working to develop an improved index that takes into consideration more than one dominant air pollutant in the final AQI. The proposed system will be more protective of health than the current AQI system (which doesn't account for mixtures of pollutants) as research has shown that there can be increased health effects when more than one pollutant is elevated.²⁰

Air Quality Monitoring in the Region of Halton

Although monitoring stations might be present in a community, smog alerts are issued for areas larger than municipal boundaries. Air quality data from the monitoring stations in the regions of Halton (Burlington and Oakville) and Peel (Brampton and Mississauga) are combined into one geographic area. As a result, when a smog advisory is called for the Halton-Peel region, some communities might be reporting poor air quality at their monitoring station while others might not. A history of the number of smog advisories issued and the total number of smog days for the Halton-Peel region are highlighted in Figure 3. The years with more smog days tend to be hotter than those with few smog days indicating the presence of air masses from the south.

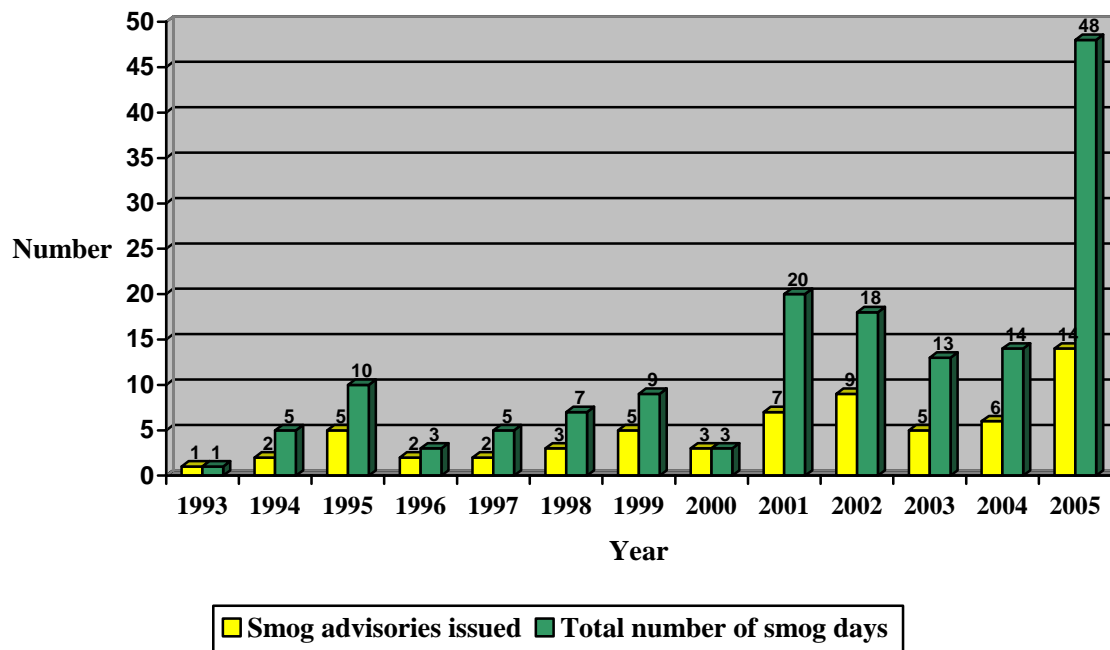


Figure 3: Number of smog advisories issued and total number of smog days in the Halton-Peel Region

In 2005, a proposal to expand the Region of Halton’s local air quality monitoring network was made to the Ministry of the Environment²¹. Monitors are currently located in the southern communities of Burlington and Oakville and none are in the northern communities of Halton Hills and Milton. Five air monitoring stations became available with the completion of the Clarkson Airshed Study that occurred at the southeast part of Oakville moving east along the QEW through Mississauga’s industrial area and ending at Lakeview Generating Station. Region of Halton staff were successful in their request for these stations. The project is pending on the obtainment of ongoing annual funding sources. If achieved, it is anticipated that two of the stations might be used to examine the impacts of urban growth on air quality, likely in Milton, by placing one station in Milton’s urban area and the other in the rural area outside town. Two stations might be used to measure the impacts of transportation and be placed on each side of a road to measure upwind and downwind results. Another station might be set up in the Milton Industrial Park to record the effects of increasing industrial development. In addition, it is hoped that the proposed urban growth monitoring station in Milton will be upgraded to an AQI monitor²².

Region of Halton staff are also involved in an air modelling project being undertaken by the Air Quality Monitoring Subcommittee of the GTA Clean Air Council. One of the goals of the project is to estimate air quality contaminant levels where no monitors are available. Such information will help to influence health-based public policy and regulations, develop informed public education regarding air

quality including more targeted messaging, expand and enhance the ability to comment on planning and siting decisions from a public health perspective, and prioritize emissions reduction options.

Smog Alert Notification Procedures²³

The Ontario Ministry of the Environment (MOE) notifies Ontario residents if a smog day is likely by issuing a three-day outlook or a smog prediction for today, tomorrow and the third day. In response, individuals and businesses can modify their daily routines to reduce their impact on and exposure to poor air. Since smog days are tied to weather, meteorologists closely watch short and long-range weather forecasts, and continually study air quality information for Ontario and neighbouring American states.

Air quality forecasts are issued in descriptive categories:

- *Good* means the Air Quality Index (AQI) reading is expected to range from 0 to 31.
- *Moderate* means the AQI reading may range from 32 to 49 and there may be some adverse effects on very sensitive people or people exercising outdoors.
- *Poor* means the AQI reading is expected to be between 50 and 99. There may be some adverse effects on human or animal populations, or significant damage to vegetation and property. If poor readings are predicted over a period of time, then a smog advisory is issued for that area.
- *Very poor* means the AQI is 100 or more and may cause adverse effects on a large proportion of those exposed.

There are three different types of smog notifications issued through the *Smog Alert Network*:

- A *Smog Watch* when there is a 50 per cent chance for a smog day within 72 hours.
- A *Smog Advisory* when there is a strong likelihood of a smog day within 24 hours. If a smog day has happened without warning and weather conditions conducive to elevated smog are forecast to continue, then a smog advisory is issued immediately.
- A *Smog Termination* notice is issued when the air is cleaner.

The *Smog Alert Network* is a year-round notification service offered by the Ontario Ministry of the Environment providing advanced warning for poor air quality. Interested parties can call the ministry's automatic telephone answering device (English recording 1-800-387-7768 and French recording 1-800-221-8852) or subscribe on the www.airqualityontario.com website. The email subscriber can expect to receive three types of smog notifications: *Smog Watch*, *Smog Advisory*, and a *Smog Termination*.

Year-round Actions for Clean Air	Will commit to doing this	Already do this
1. Reduce warm up idling to 30 seconds even in the winter, as long as the vehicle's windows are clear and visibility is not impaired. 2. Turn engines off after 10 seconds, unless in traffic. More fuel is wasted if idling longer than 10 seconds.	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
<p><i>Reduce energy consumption. Energy produced from fossil fuels contributes to smog. Save the air and your pocketbook.</i></p> 1. Install sensors to turn lights off when there is sufficient daylight. In the meantime, place stickers (prompts) on light switches to remind staff to turn the lights off when they leave. 2. Program the "sleep" mode to come on when you are not using your computer. Turn the computer and monitors off at the end of the day. 3. Replace lights and "exit" signs with more energy efficient units. 4. Have facility cleaning staff work through a building one section/floor at a time to minimize lighting requirements as opposed to working several sections/floors at once ("block cleaning"). 5. Conserve paper by printing on both sides and using any one sided paper in the printer for draft documents. In addition to saving energy by reducing the amount of paper used, more trees will remain in the forest to remove some of the excess CO ₂ from the atmosphere. 6. Reduce your water heating needs by simply using less water every day. Insulate your hot water tank. Install energy efficient showerheads if you have shower facilities at your workplace, low flow toilets and other water saving strategies. Low-flow showerheads use up to 60 per cent less water than conventional showerheads. Low-flow toilets use about 7.3 litres of water per flush, while traditional toilets can use 14 to 23 litres per flush.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Actions for Smog Days	Will commit to doing this	Already do this
<p><i>Develop a plan for Smog Advisory Days that reduces or prohibits activities where possible.</i></p> <p>Year round (on smog days)</p> 1. Notify all employees and other networks, if applicable, of the smog advisory. Post signs and suggested precautions on entrances and exits to all buildings/facilities. 2. Leave your vehicle at home. Find another way to get to work (carpool, transit, walk, cycle ²⁶ , etc). 3. Encourage staff to telework or do office-based work – using email and the telephone. 4. Suspend non-essential motor vehicle use. <ul style="list-style-type: none"> a. Encourage the use of public transit, where available, or alternative transportation; delay deliveries and errands; schedule teleconferences; for essential vehicle use, give priority to alternative fuel or zero emissions vehicles. b. Minimize, where possible, the use of trucks and other heavy equipment. 5. Don't idle. Turn your engine off when not in use. 6. Provide alternate work options for employees working outdoors, where possible. 7. Conserve electricity - Reduce the use of non-essential lighting and electrical equipment. 8. Minimize the use of chemical products that can contribute to smog formation. Use air	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

friendly products.		
9. Postpone strenuous outdoor activities to another day, if possible.	<input type="checkbox"/>	<input type="checkbox"/>
Summer (on smog days)		
1. Turn the air conditioner up to 25°C or more. Adopt a flexible dress code allowing for increased workplace temperatures.	<input type="checkbox"/>	<input type="checkbox"/>
2. Suspend or reduce the use of air conditioning in vehicles where possible. Using your air conditioner in stop-and-go traffic can increase fuel consumption by as much as 20%. Try opening the windows or fresh air vents to cool your vehicle. Using your air conditioning during highway driving is relatively equal in fuel consumption as having the windows open because of the drag caused by the open windows.	<input type="checkbox"/>	<input type="checkbox"/>
3. Suspend or reduce the use of gas and diesel powered engines such as lawn mowers, chainsaws and leaf blowers ²⁷ . Gas mowers create as much pollution in an hour as a car driving several thousand kilometres. If experiencing too many smog days and are falling behind schedule, consider using manual tools or cleaner technology such as, four stroke engines instead of two stroke.	<input type="checkbox"/>	<input type="checkbox"/>
4. Incorporate the use of alternate fuel, such as biodiesel, into the fleet and equipment used for grounds maintenance. If this is tendered, ensure the requirements are in the contract.	<input type="checkbox"/>	<input type="checkbox"/>
5. Avoid gas line-ups. When possible, refuel equipment early in the morning or late at night. Avoid spilling gas, don't "top up" the tank, and replace the gas tank cap tightly to minimize evaporation.	<input type="checkbox"/>	<input type="checkbox"/>
MUNICIPAL GOVERNMENT AND OTHERS, IF APPLICABLE		
1. Suspend road resurfacing, paving and asphalt roofing where possible. Include this in the agreement with the contractor.	<input type="checkbox"/>	<input type="checkbox"/>
2. Suspend road and path sweeping.	<input type="checkbox"/>	<input type="checkbox"/>
3. Suspend the use of demonstration fires for training.	<input type="checkbox"/>	<input type="checkbox"/>
Winter (on smog days)		
1. Use a block heater on a timer when the temperature drops below zero degrees Celsius (32 degrees F). A block heater warms the oil and engine coolant, making it easier to start your vehicle and improving winter fuel economy by as much as 10%. Set your block heater on a timer to switch on two hours before you plan to drive.	<input type="checkbox"/>	<input type="checkbox"/>
2. Suspend or reduce the use of gas and diesel powered engines, where possible.	<input type="checkbox"/>	<input type="checkbox"/>
3. Incorporate the use of alternate fuel, such as biodiesel, or lower emissions equipment into the fleet used for snow removal. If this is tendered, ensure such requirements are in the contract.	<input type="checkbox"/>	<input type="checkbox"/>

Long Term Strategies for Clean Air	Will commit to doing this	Already do this
<i>Green fleet policies</i>		
1. Adopt or enhance a "Green Fleet" policy to ensure that all fleet vehicles and motorized equipment are maintained at peak efficiency, are replaced with more fuel efficient equipment, use less polluting alternative fuels and that motor vehicle technology (i.e. hybrids, automatic turn-off) is optimized.	<input type="checkbox"/>	<input type="checkbox"/>
2. Implement an anti-idling policy and education/awareness campaign.	<input type="checkbox"/>	<input type="checkbox"/>

<i>Transportation Demand Management (TDM)</i>		
1. Implement a policy of flexible work schedules, if possible, to encourage off-peak vehicle use.	<input type="checkbox"/>	<input type="checkbox"/>
2. Allow employees to work from home eliminating emissions that are produced from the commute.	<input type="checkbox"/>	<input type="checkbox"/>
3. Develop a communications plan to promote alternatives to the single occupied vehicle.	<input type="checkbox"/>	<input type="checkbox"/>
4. Promote cycling or other forms of active transportation by providing suitable, secure bike racks and shower and change room facilities.	<input type="checkbox"/>	<input type="checkbox"/>
5. Encourage the use of public transportation by offering subsidized tickets, especially on smog days.	<input type="checkbox"/>	<input type="checkbox"/>
6. Contact Transport Canada for a Commuter Options workshop at your workplace.	<input type="checkbox"/>	<input type="checkbox"/>
7. Find out about existing smart commutes in the GTA and Hamilton through the Smart Commute Association.	<input type="checkbox"/>	<input type="checkbox"/>
8. Register your company with a carpooling organization.	<input type="checkbox"/>	<input type="checkbox"/>
9. Offer preferential parking spaces to carpoolers.	<input type="checkbox"/>	<input type="checkbox"/>
MUNICIPAL GOVERNMENT AND OTHERS, IF APPLICABLE		
1. Municipalities can encourage walking and cycling by increasing and improving bicycle paths and sidewalks.	<input type="checkbox"/>	<input type="checkbox"/>
2. For those municipalities that provide public transportation, establish a program to increase awareness of the air quality benefits of public transit aimed at increasing ridership. Examples include: media advertising and reduced/eliminated fares on days when the AQI is predicted to be 50 or more.	<input type="checkbox"/>	<input type="checkbox"/>

<p><i>Environmentally Responsible Purchasing</i></p> <ol style="list-style-type: none"> 1. Buying a fleet vehicle? Purchase the smallest vehicle necessary to meet your needs and consider fuel efficiency. Four-wheel drive, all-wheel drive, engine size, vehicle weight and tire size all influence the amount of fuel your vehicle uses. 2. Renovating your building? Consider energy efficiency in lighting, insulation, windows, furnace, etc. 3. Purchasing office equipment? Select Energy Star qualified products since they consume less energy and enter a low power mode when not in use. 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<p><i>Implement an energy management plan</i></p> <ol style="list-style-type: none"> 1. Conduct energy audits to obtain information on and increase the energy efficiency of buildings. 2. Continue to improve energy conservation and efficiencies in all buildings. Develop targets to reduce energy consumption. 3. Use green power to meet electricity needs where possible. 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<p><i>Wood burning</i></p> <p>MUNICIPAL GOVERNMENT AND OTHERS, IF APPLICABLE</p> <ol style="list-style-type: none"> 1. Implement a Burn it Smart²⁸ program throughout the year. 2. Discourage or implement a by-law, if feasible, restricting the use of wood stoves and fireplaces. 3. Encourage, where possible, the use of natural gas and other cleaner fuels. 4. When issuing outdoor burning permits, include restriction during smog alerts. 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Employee Awareness Raising Actions

It is recommended that employers implement a training program to raise awareness about air pollution, the impact our daily choices have on air quality, and the effects of air pollution on our health.

This program could include:

- A ‘Lunch and Learn’ session. At this session, the coordinator can introduce the issue by making a short presentation on smog. After, staff would be encouraged to contribute ideas, suggestions and assistance in implementing a smog program in their workplaces. Since employees carry out the activities, they are in the best position to provide advice on potential problems and solutions that work. Also, if employees contribute to the development of the program, they are more likely to embrace it, and carry the positive actions into their personal lives. Ensure that there continues to be annual training especially for new or seasonal employees.
- The use of workplace intranet sites to provide information about smog reduction initiatives, smog tips and the smog plan for access by all staff. A contact person should also be listed.
- Email notification of poor air quality episodes.
- Posting relevant information on all bulletin boards for those staff without intranet access.
- Displaying posters at common building entrances to notify staff of smog days.

- Annual articles in staff newsletters, on the intranet, or through email to remind staff of any new updates.

The following material is available on the Halton Partners for Clean Air website.

- Templates for:
 - Presentations.
 - Smog notification posters (for Spring/Summer and Fall/Winter) conveying tips and facts. The intent is to have these posted at entrances to buildings.
 - Smog information posters (for Spring/Summer and Fall/Winter) conveying tips and facts. The intent is to have these posted on bulletin boards.
 - Pay stub insert/attachment to reinforce key messages regarding smog and its effects and to encourage smog reduction activities.
 - Emails to be sent when a smog watch, advisory or termination is issued.
- Information will be updated on the website as it becomes available such as:
 - Best practices for smog alert days at work, on the road and at home (see smog reduction strategies for public and private sector employers and for individuals/community in this document).
 - Information on various challenges and programs that staff can register for such as commuter challenges, David Suzuki's Nature Challenge, 20/20 The Way to Clean Air, etc. This will help the organizations to help raise awareness about smog.
 - Information on anti-idling and the associated negative environmental and health effects including an opportunity for businesses to purchase 'idle free zone' signs to be posted on their property.
 - Links to air quality websites and networks to share information, technologies and best management practices.

Clean Air Strategies for Community/Individuals

The sources of air pollution are often considered to be out of our control and blamed on industry or transboundary sources. Many often forget that we are all responsible for air pollution and the smog advisories that are issued. For example, transportation is a major source of local air pollution. We can choose to drive a gas-guzzler with all of the extra features or drive a smaller vehicle that still meets our needs. Only when we realize that the choices we make every day have a huge impact on our air quality, will we all be able to make the changes necessary to improve the air we breathe.

Individuals and community groups wishing to make a difference and improve local air quality can use the tips below to get started. Some suggestions are year round actions and others are specific to smog days.

Year-round Actions for Clean Air	Will commit to doing this	Already do this
<p><i>Reduce single occupant vehicle use. Vehicle emissions are a major contributor to local sources of smog.</i></p> <ol style="list-style-type: none"> 1. Sign up for a program or challenge such as the 20/20 The Way to Clean Air²⁹, Commuter Challenge, David Suzuki's Nature Challenge, etc. 2. Walk, cycle, carpool or take public transit whenever possible. (For example, walk your children to their activities with their friends. If the activities are too far, carpool). 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
<p><i>Travel wisely to reduce fuel consumption and pollutant emissions.</i></p> <ol style="list-style-type: none"> 1. Group errands into one trip to maximize the efficiency of your vehicle. 2. Personal habits can have a great impact on fuel consumption and pollutant emissions. <ol style="list-style-type: none"> a. Keep your vehicle properly maintained. Neglecting to replace worn-out oil and air filters results in poor engine performance, higher fuel consumption, and, possibly severe engine damage. b. Carry out emissions testing on all vehicles as regulated (i.e. Drive Clean). c. Keep tires properly inflated to cut down on drag and increase fuel efficiency. Check monthly. d. Drive the posted speed limit. Increasing your highway cruising speed from 100km/h to 120 km/h will increase fuel consumption by 20 percent. e. Don't be a jackrabbit. Accelerating and braking rapidly saves little time, uses more fuel and releases more CO₂ and air pollutants into the environment. f. Refuel vehicles after sundown and before sunrise during the summer months if possible (minimum before 9a.m. or after 3p.m.) to reduce the emission of volatile organic compounds from reacting with sunlight, as this contributes to the smog. g. Fill up with ethanol-blended fuel. All gas-powered vehicles can use ethanol-blended fuel producing fewer emissions. h. Remove roof racks and especially roof storage units when not in use. Even when empty, aerodynamic drag and fuel consumption are increased. i. Don't idle. See below. 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<p><i>Commit to be idle-free. Unnecessary idling wastes fuel, is not good for the engine, pollutes the air, and impacts your health.</i></p> <ol style="list-style-type: none"> 1. Reduce warm up idling to 30 seconds even in the winter, as long as the vehicle's windows are clear. 	<input type="checkbox"/>	<input type="checkbox"/>

Year-round Actions for Clean Air	Will commit to doing this	Already do this
2. Turn engines off after 10 seconds, unless in traffic. More fuel is wasted if idling longer than 10 seconds.	<input type="checkbox"/>	<input type="checkbox"/>
<i>Reduce energy consumption. Energy produced from fossil fuels contributes to smog. Save the air and your pocketbook.</i>		
1. Open all window coverings facing south or west on sunny days for all daylight hours and close all window coverings from dusk until dawn. On hot, sunny days close window coverings to keep the house cool.	<input type="checkbox"/>	<input type="checkbox"/>
2. Install a programmable thermostat to save energy while you sleep and while you are away.	<input type="checkbox"/>	<input type="checkbox"/>
3. Close heat return vents and doors to any unused rooms.	<input type="checkbox"/>	<input type="checkbox"/>
4. Turn lights off when not in use.	<input type="checkbox"/>	<input type="checkbox"/>
5. Replace incandescent light bulbs with compact fluorescent lights (CFLs) to reduce energy use by 75%.	<input type="checkbox"/>	<input type="checkbox"/>
6. Install solar powered lights, or motion/daylight sensors, or simple timers on your outdoor lights.	<input type="checkbox"/>	<input type="checkbox"/>
7. Program the “sleep” mode to come on when you are not using your computer. Turn the computer and monitors off at the end of the day.	<input type="checkbox"/>	<input type="checkbox"/>
8. Wash and rinse clothes in cold water. Dry your clothes outside to take advantage of free, clean energy from the sun, when possible. Open the door on your dishwasher to air-dry your dishes too.	<input type="checkbox"/>	<input type="checkbox"/>
9. Turn off home audio and visual equipment when they are not being used. Unplug your cell phone charger when not in use. Turn power bars off when not in use.	<input type="checkbox"/>	<input type="checkbox"/>
10. Cook up energy savings. By choosing the most appropriate appliance for the task and changing some energy wasting habits you can reduce your cooking energy use by 50%.	<input type="checkbox"/>	<input type="checkbox"/>
11. Avoid the use of large appliances during business hours and try to do laundry, run the dishwasher, etc. early in the morning or later in the evening.	<input type="checkbox"/>	<input type="checkbox"/>
12. Lower the temperature of your water heater to 50 degrees Celsius, insulate the water heater and the hot water pipes and install a timer so the water heater automatically turns off late at night and back on a half hour before you wake up.	<input type="checkbox"/>	<input type="checkbox"/>
13. Reduce your water heating needs by simply using less water everyday. Installing energy efficient showerheads, low flow toilets and other water saving strategies will help. Low-flow showerheads use up to 60 percent less water than conventional showerheads. Low-flow toilets use about 7.3 litres of water per flush, while traditional toilets can use 14 to 23 litres per flush.	<input type="checkbox"/>	<input type="checkbox"/>
14. Install ceiling fans. Change the direction of the fan so that it pushes warm air down in the winter and pulls warm air up in the summer. This is particularly beneficial for houses with electric baseboards or high cathedral ceilings.	<input type="checkbox"/>	<input type="checkbox"/>
15. Nearly 50 percent of annual household energy costs go towards heating and cooling. Consider replacing your furnace or boiler, if it is old, worn out, inefficient or oversized, with a new high efficiency heating system. Even if you can't afford to buy a new high efficiency furnace, you can still achieve energy savings through maintenance and modifications to your current system. A well maintained unit uses 10 to 15 percent less energy than a poorly maintained one.	<input type="checkbox"/>	<input type="checkbox"/>

Actions for Smog Days	Will commit to doing this	Already do this
<i>Develop a personal response plan for Smog Advisory Days that reduces or prohibits activities where possible.</i>		
Year round (on smog days)		
1. Leave your vehicle at home. Find another way to get to work (carpool, transit, walk ³⁰ , etc).	<input type="checkbox"/>	<input type="checkbox"/>
2. Suspend the use of non-essential motor vehicle use. Use public transit, where available, or alternative transportation; delay deliveries and errands; work from home if possible.	<input type="checkbox"/>	<input type="checkbox"/>
3. Plan your car trips to reduce distance and travel time. Don't idle.	<input type="checkbox"/>	<input type="checkbox"/>
4. Conserve electricity - Reduce the use of non-essential lighting and electrical equipment.	<input type="checkbox"/>	<input type="checkbox"/>
5. Suspend the use of solvents, oil based paints and stains, solvent-based cleaners and other materials containing volatile organic compounds or chemicals. Use air friendly products.	<input type="checkbox"/>	<input type="checkbox"/>
6. Postpone strenuous outdoor work or exercise to another day, if possible.	<input type="checkbox"/>	<input type="checkbox"/>
Summer (on smog days)		
1. Turn the air conditioner up to 25°C or more.	<input type="checkbox"/>	<input type="checkbox"/>
2. Suspend or reduce the use of air conditioning in vehicles where possible. Using your air conditioner in stop-and-go traffic can increase fuel consumption by as much as 20%. Try opening the windows or fresh air vents to cool your vehicle. Using your air conditioning during highway driving is relatively equal in fuel consumption as having the windows open because of the drag caused by the open windows.	<input type="checkbox"/>	<input type="checkbox"/>
3. Suspend or reduce the use of gas and diesel powered engines such as lawn mowers, chainsaws and leaf blowers ³¹ . Gas mowers create as much pollution in an hour as a car driving several thousand kilometres. If experiencing too many smog days and are falling behind schedule consider using manual tools (i.e. rakes), cleaner technology (i.e. four stroke engines instead of two stroke), etc.	<input type="checkbox"/>	<input type="checkbox"/>
4. Avoid gas line-ups. When possible, refuel early in the morning or late at night. Avoid spilling gas, don't "top up" the tank, and replace the gas tank cap tightly to minimize evaporation.	<input type="checkbox"/>	<input type="checkbox"/>
5. Avoid outdoor fires (campfires, burning leaves, etc) and using off-road recreational vehicles (i.e. dirt bikes, all terrain vehicles, etc.) ³² until the air quality has improved.	<input type="checkbox"/>	<input type="checkbox"/>
Winter (on smog days)		
1. If possible, avoid using wood as a main heating source. Other options such as electricity, gas and oil generate less pollution.	<input type="checkbox"/>	<input type="checkbox"/>
2. When burning wood, use only the dry, seasoned variety.	<input type="checkbox"/>	<input type="checkbox"/>
3. If possible, reduce the use of small engine motors at work and outdoor activities such as using off-road vehicles (i.e. snowmobiles, all terrain vehicles, etc.)	<input type="checkbox"/>	<input type="checkbox"/>
4. Use a block heater on a timer when the temperature drops below zero degrees Celsius (32 degrees F). A block heater warms the oil and engine coolant, making it easier to start your vehicle and improves winter fuel economy by as much as 10%. Set your block heater on a timer to switch on two hours before you plan to drive.	<input type="checkbox"/>	<input type="checkbox"/>

- Templates include:
 - Presentations.
 - Smog notification posters (for Spring/Summer and Fall/Winter) conveying tips and facts. The intent is to have these posted at entrances to buildings.
 - Smog information posters (for Spring/Summer and Fall/Winter) conveying tips and facts. The intent is to have these posted on bulletin boards.
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 - Best practices for smog alert days at work, on the road and at home (see smog reduction strategies for public and private sector employers and for individuals/community in this document).
 - Information on various challenges that staff can register for such as commuter challenges, David Suzuki's Nature Challenge, 20/20 The Way to Clean Air, etc. This will help the organizations to help raise awareness about smog.
 - Information on anti-idling and the associated negative environmental and health effects including an opportunity for businesses to purchase 'idle free zone' signs to be posted on their property.
 - Links to air quality websites and networks to share information, technologies and best management practices.

Plan Evaluation

It is important to develop a means of evaluating the Clean Air Plan. One approach could be to prepare an annual report card or progress report, where appropriate. The report might include:

- Trends in air pollution.
- Annual progress in reducing smog and improving air quality.
- Summary of the initiatives set forth in the Clean Air Plan and to what degree they were implemented.
- Determining whether the level of awareness regarding air quality issues has increased and whether this has resulted in behavioural change. This would likely require conducting pre/post surveys which require a substantial investment in time and money if they are to be statistically appropriate.
- Assessing whether there were any barriers to implementing the plan i.e. operational issues?
- Are there ways to improve the Clean Air Plan?

Other methods of evaluation include determining:

- Number of promotional items distributed such as posters, stickers, etc.
- Number of articles/newsletters posted
- Number of hits on the Halton Partners for Clean Air website
- Number of visitors at a Halton Partners for Clean Air display

Endorsement

By resolution of their respective governing bodies, boards, etc., the partners are committed to implementing the Clean Air Plan as a means not only to reduce the partners' air pollution but also encouraging other stakeholders to take similar action.

Plan Review

The plan will be reviewed and updated, if necessary, in 2009.

Acronyms Cited

AAQC	Ambient Air Quality Criteria
AQI	Air Quality Index
CEPA	Canadian Environmental Protection Act
CO	Carbon monoxide
GTA	Greater Toronto Area
HPCA	Halton Partners for Clean Air
NH ₃	Ammonia
MOE	Ontario Ministry of the Environment
NO _x	Nitrogen oxides
O ₃	Ozone
OMA	Ontario Medical Association
ppb	Parts per billion
PM	Particulate matter
PM _{2.5}	Fine particulate matter
ppm	Parts per million
SO ₂	Sulphur dioxide
µg	Microgram
VOCs	Volatile organic compounds

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¹⁵ Ontario Ambient Air Quality Criteria

¹⁶ Jurisdictions are required to meet the Canada Wide Standard (CWS) by 2010 and commence reporting on the achievement of the CWS by 2011. However comprehensive reporting on progress toward meeting the CWS commences in 2006.

¹⁷ See endnote #16.

¹⁸ Ontario Ministry of the Environment. 2005. *Air Quality Ontario*. Available at www.airqualityontario.com

¹⁹ Total reduced sulphur (TRS) compounds produce an offensive odour similar to rotten eggs or decomposed cabbage. TRS compounds are not normally considered a health hazard. They are, however, a primary cause of nuisance odours at some locations in the province (MOE 2004).

²⁰ Environment Canada. Clean Air Online Ontario Region. 2005. *Air Quality Index and Atmospheric Hazards*. Retrieved September 2, 2005 from <http://www.ec.gc.ca/cleanair-airpur/default.asp?lang=En&n=8EFB3B57-1>

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²³ Ontario Ministry of the Environment. 2005. *Air Quality Ontario*. Available at www.airqualityontario.com

²⁴ The tips have been taken from a number of sources including the One Tonne Challenge, 20/20 The Way to Clean Air, the original Halton Public Sector Smog Response Plan and MOE's Smog Alert Response Guide.

²⁵ 20/20 The Way to Clean Air is a campaign of health units in the regions of Halton, York, Peel, Durham and Toronto, and is coordinated through the Clean Air Partnership. It is designed to provide individuals in the Greater Toronto Area with resources to help reduce home energy use and vehicle use by 20 per cent, the equivalent of one tonne of emissions. <http://www.halton.ca/hpca>

²⁶ Please refer to the following resource for more information Ontario Ministry of the Environment. 2005. *Outdoor Activities: Smog Matters*. <http://www.ene.gov.on.ca/envision/air/smog/pdfs/5097e.pdf>

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