



**THE REGIONAL MUNICIPALITY OF DURHAM
CORPORATE MODEL FOR CLEAN AIR**

May 2006

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1.0 Background

As part of a commitment to the GTA Clean Air Council, the Durham Region Air Quality Working Group (DRAQWG), chaired by the Health Department, was formed in the spring of 2002. This group was comprised of representatives from the Health, Works and Planning Departments. The initial purpose of the DRAQWG was to discuss ongoing Regional initiatives that could be incorporated into the Toronto Smog Summit 2002 *“Inter-Governmental Declaration on Clean Air”*. Additionally, the DRAQWG was to consider joint actions that could be undertaken to address the growing concern regarding health and environmental impacts of smog and generate a corporate model for clean air.

With Durham Region acting as a lead in this initiative, area municipalities would be encouraged to voluntarily adopt similar programs that would help ensure the community-wide success of many of the proposed strategies and action plans intended to reduce smog and improve air quality.

The following plan was based on information in the Ontario Ministry of the Environment’s (MOE) document *“Smog Alert: A Municipal Response Guide”* and supporting resource kit available at www.ene.gov.on.ca/envision/gp/3760e.pdf and <http://www.ene.gov.on.ca/envision/gp/3760e-01.pdf> respectively. These documents were developed to encourage municipalities to enact smog plans. The Guide and resource kit provide a list of actions to reduce smog throughout the year and on smog days. Also considered for this document were Corporate Smog Plans developed by the Regions of Peel, Halton and York and the Municipalities of Burlington, Hamilton, Mississauga and Toronto.

2.0 Overview of Smog

Durham Region experiences episodes of poor air quality during the summer months that are characterized by a brownish-yellow haze on hot, sunny days when there is little or no wind. This phenomenon is known as smog.

Smog is a noxious mixture of airborne pollutants. The main components of smog are ground-level ozone and fine particles known as particulate matter. Ground-level ozone is produced by a reaction in the lower atmosphere between nitrogen oxides (NO_x) and volatile organic compounds (VOC). Particulate matter consists of solid particles and fine liquid droplets that are primarily formed by chemical reactions in the atmosphere. Other components of smog include Sulphur oxides and sulfates, peroxyacetyl nitrate and carbon monoxide.

NO_x are produced when fossil fuels such as gasoline, natural gas, heating oil and coal are burned. NO_x are emitted from many sources including automobiles, electrical generating stations and incinerators.

VOC's originate mainly from industrial processes by the evaporation of liquid fuels, solvents and organic chemicals and from burning of gasoline.

Particulate matter are fine particles produced mainly as the by-products of fuel combustion and industrial processes and include fine dust, ash, pollen, aerosols, smoke and fumes.

Another component of smog are Acid gases. These include Sulphur and nitric acid, which form when Sulphur dioxide and nitrogen oxides react with water. Acid gases are produced mainly from the burning of fossil fuels and smelting operations. Sulphur dioxide is corrosive and ozone can damage synthetic materials by causing cracks in rubber, accelerating the fading of dyes and the deterioration of some paints and coatings. Ozone also affects cotton, acetate, nylon and other fabrics.

Smog-forming reactions occur near ground level and are dependent on elevated temperature, sunlight and the presence of pollution. Pollution originates from a variety of sources including, vehicle exhaust, factories and utilities, solvents e.g. oil-based paints, chemical sprays and cleaners, lawnmowers and other gasoline or diesel powered machinery, pesticides, asphalt road paving and construction and barbecues.

Pollution from industrial sources and vehicle exhausts are the primary contributors to smog. Natural sources of pollutants also contribute to periods of poor air quality and include forest fires and lightning strikes.

Ontario's smog problem is generally observed from May to September. Local pollution sources and pollution from the United States contribute to elevated smog concentrations because of the release of significant amounts of ozone and ozone-forming compounds into the air. During periods of widespread elevated ozone, it is estimated that more than 50% of Ontario's ground-level ozone can be attributed to trans-boundary pollution from the United States.

Smog has serious and damaging effects on human health, commercial crops, ornamental plants and property. The Ministry of the Environment estimates that excessive ozone costs Ontario farmers approximately \$70 million a year through reduced crop yields and related problems.

3.0 Health Effects of Air Pollution

Smog can cause health problems for all people especially the elderly, those who suffer from respiratory and cardiac problems and children. Children are particularly at risk because they breathe faster and spend more active time outdoors. Even healthy young adults breathe less efficiently on days when the air is heavily polluted. Exposure to smog increases as people spend more time outdoors in the spring and summer. The likelihood of experiencing adverse health effects increases with the amount of smog breathed. Sensitive people may experience symptoms after only one or two hours outdoors. The health impacts of smog can include irritation of the eyes, nose and throat, reduced lung capacity and aggravation of respiratory disease. Studies also indicate that smog can lead to premature death, increased hospital admissions and emergency room visits, and higher rates of absenteeism.

The Ontario Medical Association's 1998 position paper "*The Health Effects of Ground-Level Ozone, Acid Aerosols and Particulate Matter*" concluded that ground-level ozone, acid aerosols and particulates in the air in the Great Lake Basin cause illness and premature death in both urban and rural communities. In 2000, the Ontario Medical Association released a report entitled "*The Illness Cost of Air Pollution*", which estimates that approximately 1,900 premature deaths, 9,800 hospitalizations and 13,000 visits to Ontario emergency rooms occur each year due to air pollution.

Ground-level ozone, a major component of smog, affects the respiratory system causing inflammation of airways and can continue for several hours following exposure. Ground-level ozone can also cause coughing, wheezing and chest tightness. In addition, preexisting heart and lung conditions may be aggravated. Evidence also indicates that exposure to ground-level ozone heightens the sensitivity of asthmatics to allergens. A recent Federal/Provincial scientific assessment document indicated that health effects attributable to ozone occur at much lower ozone concentrations than thought of in the past and suggested that there may be no threshold level below which adverse health impacts do not occur. Typically, those who are sensitive to ground-level ozone are also sensitive to airborne particles.

Small airborne particles known as particulate matter is another major component of smog. Particulate matter is responsible for approximately one quarter of hospital admissions for pollution-related lung problems. High concentrations of particulate matter are responsible for the dirty haze on smog days. Particulate matter is classified by size. Very fine particles (PM 2.5) can penetrate deep into the lungs and interfere with the functioning of the respiratory system. These fine particles have been linked to increases in asthmatic symptoms, hospital admissions and premature mortality. Evidence also suggests that long-term exposure to fine particulate matter is associated with an increased risk for the development of lung cancer and heart disease.

Acid particles penetrate deep into the lungs and cause a range of respiratory problems including coughing, congestion and constriction of the airways, increased mucous

production and a reduced ability to clear foreign matter from the lungs. Eye irritation associated with smog is the result of exposure to peroxyacetyl nitrate and aldehydes.

4.0 Air Quality Index

The *Air Quality Index (AQI)* is a numerical outdoor air quality scale ranging from 0 - 100+. The following scale is currently used to explain the quality of outdoor air in Ontario:

0 – 15 VERY GOOD	16 – 31 GOOD	32 – 49 MODERATE	50 – 99 POOR	100 + VERY POOR
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- If the AQI value is below 32, the air quality is considered **GOOD** and there are no known health effects for the majority of the population.
- If the AQI value ranges between 32 and 49, the air quality is considered **MODERATE** and there may be some adverse health effects for very sensitive people.
- If the AQI value is in the range of 50 – 99, the air quality is considered **POOR** and the most sensitive people and animals may have adverse health effects. Vegetation and property may also be damaged.
- If the AQI value is 100 or above, the air quality is considered **VERY POOR** and may affect the health of a large number of people and animals as well as plant life and property.

How Is the Air Quality Index Calculated?

The Ontario Ministry of the Environment (MOE) measures the following six key pollutants as part of the AQI:

- Sulphur Dioxide
- Ozone
- Nitrogen Dioxide
- Total Reduced Sulphur Compounds
- Carbon Monoxide
- Fine Particulate Matter (PM 2.5)

These pollutants were selected because of their potential for adverse human health effects and environmental impacts.

On an hourly basis, data is collected from air monitoring stations across Ontario for each of the six key pollutants. This data is compared to the Ambient Air Quality Criterion (AAQC) that is the maximum safe level for each pollutant. If any of the six pollutants exceeds the AAQC, the pollutant is said to have an undesirable impact on people and the environment. Using the AAQC, the monitoring data are converted into a number from zero upward using a common scale/index known as the AQI. The pollutant with the highest AQI becomes the “**overall**” AQI for a particular location (e.g. York-Durham). For example, if the AQI for ozone is 20 and this happens to be the highest number for the six pollutants then this number would be reported as the overall AQI for the particular

location. More specifically, the MOE would report this as an “AQI of 20, Reason: Ozone.”

5.0 Smog Watches & Smog Advisories

The main purpose of smog watches and advisories are to warn people with breathing difficulties to avoid unnecessary exposure to smog and to provide advice to the public about actions they can take to reduce activities that contribute to smog.

A **Smog Watch** is issued by the MOE when there is at least a 50 % probability that smog conditions will occur within the next three days.

A **Smog Advisory** is issued by the MOE when there is a high probability of a smog day occurring within the next 24 hours. A Smog Advisory would also be issued immediately if a smog day had occurred without warning and weather conditions conducive to elevated smog were forecast to continue for six hours.

A **Smog Advisory Termination Notice** is issued by the MOE after the weather changes, the air clears and a Smog Advisory is no longer required.

Ontario Smog Days – Historical Data

Year	# of Advisories	Duration (# of days)
1995	6	14
1996	3	5
1997	3	6
1998	3	8
1999	5	9
2000	3	4
2001	7	23
2002	10	27
2003	7	19
2004	8	20
2005	15	53

Obtained April 28, 2006 from the Ontario Ministry of the Environment website: <http://www.airqualityontario.com/press/faq.cfm>

6.0 Durham Region - Corporate Model for Clean Air

The Durham Region Corporate Model for Clean Air addresses actions that can be taken when smog alerts are issued and year round initiatives that have a positive impact on air quality.

The Durham Region Corporate Model for Clean Air consists of four components

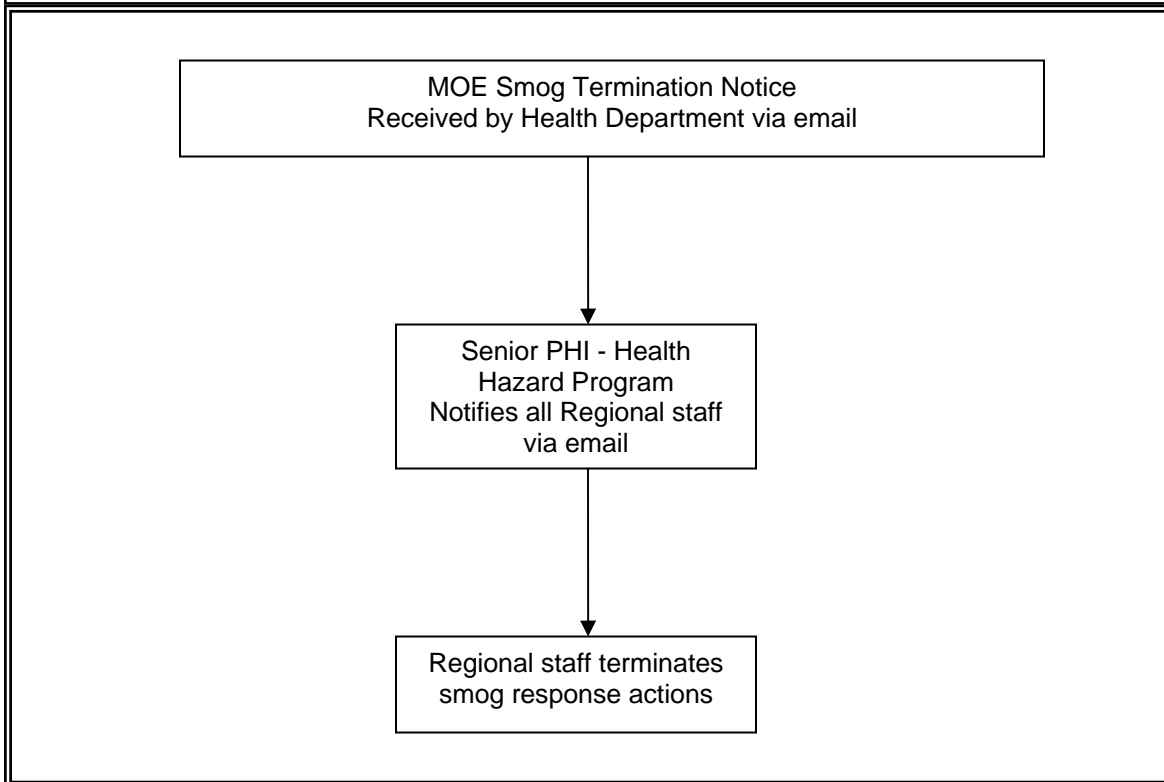
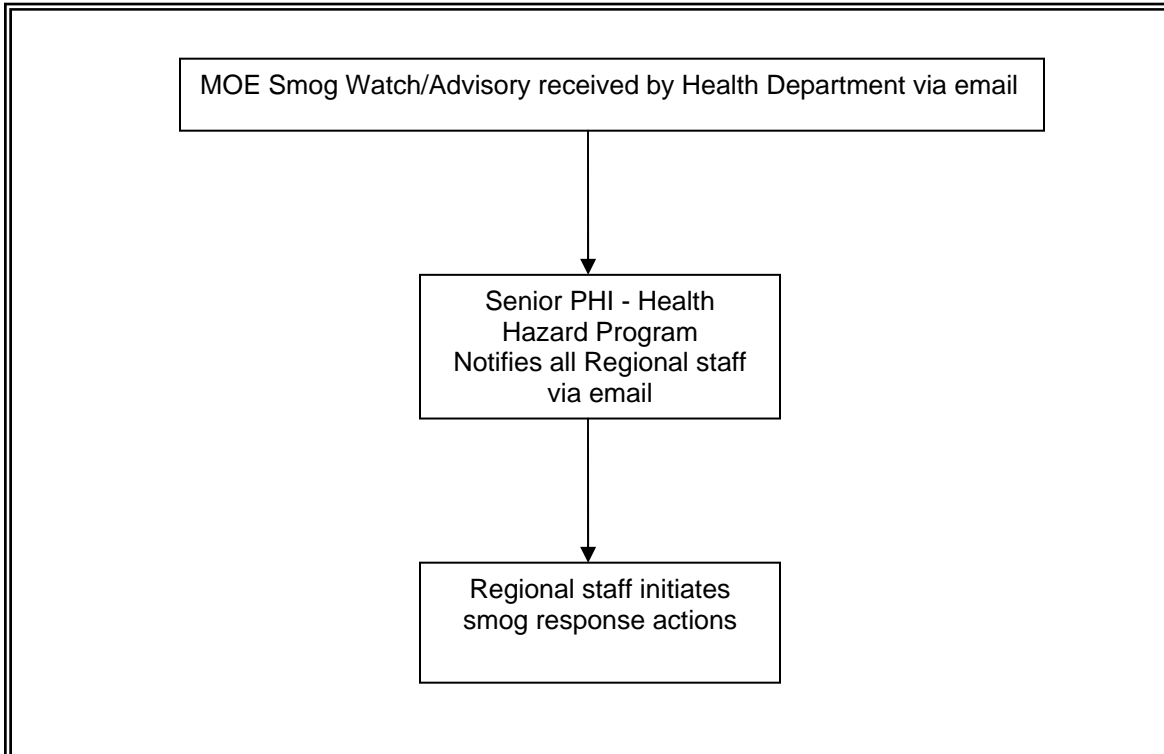
- **Employee notification procedure for MOE smog events,**
- **Specific Corporate/Operational responses,**
- **Communication strategy, and**
- **Evaluation strategy.**

6.1 Employee Notification Procedure

All DRAQWG members and alternates will register with the MOE Smog Alert Network (<http://www.airqualityontario.com/alerts/signup.cfm>). When a Smog Watch or Smog Advisory is issued, members will automatically receive an e-mail notifying them about the existing or impending period of poor air quality.

An internal notification system has been created to ensure that all Regional staff will be made aware of Smog Watch and Smog Advisory events. The Health Department is responsible for initiating the notification system that is outlined on the following page.

Durham Region Employee Smog Response Notification Plan



6.2 Specific Corporate/Operational Responses

6.2.1 Year Round Activities

Item	Responsibility
Encourage car pooling	All Departments
Encourage staff to minimize vehicle idling time	All Departments
Develop partnerships with the community to disseminate information	All Departments
Encourage staff to keep their vehicles well-tuned	All Departments
Encourage staff to use lower emission fuel	All Departments
Encourage staff to replace vehicle gas caps that have broken seals or stripped threads	All Departments
Encourage staff to check their vehicle tire pressure every 1000 km	All Departments
Encourage staff to plan outside activities and errands to reduce driving time	All Departments
Encourage staff to be energy efficient at work	All Departments
Keep all fuel-powered maintenance equipment working efficiently and repair any improper seals that may lead to fuel leaks or evaporative loss	Works Department
Continue to investigate and implement measures to increase energy efficiency at Regional facilities	Works Department
Increase the maintenance of air filters at child care centers and Long-term care facilities	Works Department
Consider the establishment of an anti-idling policy for corporate vehicles	Works Department
Maintain an inventory of diesel, traditional fuel vehicles and equipment. Continually investigate options for upgrading or replacing them	Works Department
Consider the establishing a green fleet procurement policy to purchase alternative fuel powered vehicles such as electrical, methanol/ethanol, natural gas or propane	Works Department

Item	Responsibility
Purchase water-based paints, stains and sealers where feasible. If oil-based paints, stains and sealers must be purchased, consider a low VOC content	Works & Purchasing Departments
Encourage schools, hospitals and daycare facilities to establish anti-idling drop-off/pick-up zones	Health Department
Continue to participate in the "20/20 The Way to Clean Air" program	Health Department

6.2.2 Peak Smog Season Activities - May to October

Item	Responsibility
Use, where possible, teleconferencing for meetings	All Departments
Encourage employees to use vehicle air conditioning only when necessary and only on long trips	All Departments
Provide information about the health effects of smog and provide advice on everyday activities that people can do to reduce smog	Health Department (provide/develop) All Departments (distribution)

6.2.3 Smog Watch/Smog Advisory Day Activities

Item	Responsibility
Encourage staff to walk/take public transit/car pool	All Departments
Where possible, with supervisor/manager approval, work from home	All Departments
Where possible, with supervisor/manager approval, field staff could work in the office for the day	All Departments
Encourage staff not to fuel their vehicles during the day. Refuel after sundown or before sunrise.	All Departments
Air conditioning could be slightly reduced resulting in slightly warmer office temperatures. Staff could be allowed to dress casually, as long as they remain professional, to account for the warmer office temperatures.	All Departments
Encourage deliveries in the morning	All Departments
Reduce roadway painting during the day	Works Department
Reduce or suspend street sweeping	Works Department
Reduce the use of gas and diesel powered equipment including lawn mowers and other landscape equipment	Works Department
Reduce or eliminate the use of pesticides	Works Department
Reduce or eliminate the use of oil-based paints. If painting must be performed use water-based paints on smog days. If oil-based paints, stains or sealers must be used, be sure they are identified as having a low VOC content.	Works Department
If large painting projects must be performed, the job should be performed between 4:00 PM and 11:00 PM	Works Department

6.3 Communication Strategy

The Communication Strategy is intended to address both internal and external communication and outlines a series of initiatives to support smog reduction in the Regional Municipality of Durham. The objectives of the Communication Strategy are as follows:

- To raise awareness about smog,
- To raise awareness about the effects of smog on human health and the environment,
- To raise awareness on how to reduce health risks associated with smog exposure,
- To educate the public on how to reduce smog and the benefits of smog reduction activities,
- To encourage the public to use smog reduction activities, and
- To generate media attention about smog, its effects, how to reduce smog and the benefits of taking smog reduction actions.

The Health Department will take the lead role in the implementation of the Communication Strategy. In accordance with the direction given by Regional Council, the Health Department (Medical Officer of Health or designate) will continue to represent Durham Region on the GTA Clean Air Council.

6.3.1 Internal Communication Initiatives

a) Promotional Materials

- Develop a visual identity with a slogan for all Regional smog-related materials.
- Design posters/information on how to reduce smog.
- Display these posters/pamphlets in all Regional facilities during the smog season.

b) Communi K, Health Intranet, Durham Intranet

- Post articles about Regional initiatives to reduce smog, how Regional staff can help reduce smog and the benefits of actions that reduce smog.
- Post notices on the Durham Intranet when the MOE issues a smog watch/smog advisory.

c) Smog Display

- Produce a display with information about smog, its causes and actions that will help reduce smog. The display could be placed at Regional facilities throughout the year to raise awareness about smog, air pollution and initiatives being undertaken by the Region to improve air quality.

6.3.2 External Communication Initiatives

a) Regional Website

- During the peak smog season, smog information that is on our Regional website could be made available on the opening page of the site. The information consists of what is smog, smog advisories, the air quality index, an overview of smog pollutants, what the public can do to reduce smog, related health effects and additional reference information.

b) Smog Display

- Produce a Smog Reduction display with information about smog, its causes and actions persons can take to reduce smog. This display and information would be available to be set up at local community events, etc.

c) Environmental Help Line

- Public health inspectors in the Environmental Health Division of the Health Department are available during regular business hours to respond to public inquiries about smog and related adverse health effects related to exposure to smog.

d) Media

- The Health Department would be responsible for providing media releases when the MOE issues smog watches/advisories. Key messages would include actions the public can take to reduce smog and health information on how to reduce exposure to smog and the related adverse health effects.
- Provide other media responses as requested.

6.4 Evaluation Strategy

6.4.1 Internal Evaluation

Communication Initiative	Evaluation
Promotional Materials	# of posters developed # of posters displayed
CommuniK, Health Intranet, Durham Intranet, Insider	# of articles posted # of hits on Health/Durham Intranet
Smog Display	# of visitors – dependent where display is located # of requests/questions # of promotional materials taken

6.4.2 External Evaluation

Communication Initiative	Evaluation
Regional Website	Track # of website hits
Smog Display	Track # of visitors – dependent where display is located # of requests/questions # of promotional materials taken
Environmental Help Line	Track # of calls Track # of information requests
Media Relations	Track # of calls Track # of media releases

7.0 Summary

The implementation of the *“Corporate Model for Clean Air”* will establish a framework for the Region to implement policies, procedures and practices aimed at improving local air quality, improving the health of the community and protecting the environment.

SMOG WATCH ISSUED

ALL REGIONAL EMPLOYEES

Effective Date:

The Ontario Ministry of the Environment has issued a Smog Watch. A Smog Watch means that there is at least a 50% probability that smog conditions will occur within the next three days.

Please be prepared to implement Corporate Smog Response Plan actions if a Smog Advisory is issued.

If you would like to find out more about the Durham Region Corporate Smog Plan or actions that you can take at home to reduce smog, visit the Durham Region “Insider”.

For additional information, please contact the Health Department’s Environmental Help Line during regular business hours at (905) 723-3818 Ext. 2188.

SMOG ADVISORY ISSUED

ALL REGIONAL EMPLOYEES

Effective Date:

The Ontario Ministry of the Environment has issued a Smog Advisory. A Smog Advisory means that there is a strong likelihood that there may be poor air quality within the next 24 hours due to ground-level ozone and particulate matter.

The purpose of this bulletin is to notify all staff that **Corporate Smog Response Plan actions are to be implemented immediately**. The plan will remain in effect until the Ontario Ministry of the Environment issues a Smog Advisory Termination Notice.

If you would like to find out more about the Corporate Model for Clean Air or actions that you can take to reduce smog, visit the Durham Region "Insider".

For additional information, please contact the Health Department's Environmental Help Line during regular business hours at (905) 723-3818 Ext. 2188.

“Spare the Air”

Corporate Clean Air Actions

We encourage our staff to take the following actions to reduce smog and improve the air we breathe:

- ❖ Walk, bike, take public transit or carpool whenever possible.
- ❖ Be energy efficient. Turn off lights, computers, fans and other equipment if you are away for prolonged periods of time.
- ❖ Plan outside activities and errands to reduce driving time
- ❖ Minimize vehicle idling time. Idling for more than 10 seconds, except in traffic, is a waste of money and causes unnecessary damage to the environment
- ❖ Keep vehicles well tuned. You will save fuel and money, reduce your long-term maintenance costs and reduce vehicle emissions.
- ❖ Check vehicle tire pressure every 1000 kilometers. Under-inflated tires can waste fuel, affect vehicle performance, reduce safety and reduce the life of the vehicle’s tires.
- ❖ Use vehicle air conditioning only when necessary.
- ❖ On smog days, fuel your vehicle before sunrise or after sundown
- ❖ Consider purchasing fuel-efficient vehicles and alternative low emission fuels
- ❖ Encourage your family and friends to be energy efficient and take action to reduce smog and improve air quality.

For additional information about smog, visit www.region.durham.on.ca or contact the Environmental Help Line at 905-723-3818 Ext. 2188