

# SmogAlerts





## WHAT IS SMOG AND HOW IS IT FORMED?

### Did you Know?

In urban areas, vehicles produce up to three-quarters of the pollutants that combine to form ground-level ozone, the main ingredient of smog.

(Source: Weathering the changes - climate change in Ontario poster, Natural Resources Canada, 2001)

Smog refers to the harmful mixture of air pollutants that often appears as yellowish-brown haze and most often occurs on hot, humid summer days. It is formed when heat and sunlight react with gases and fine particles in the air to produce a 'chemical soup'. An example would be when exhaust emissions released from gasoline and diesel powered vehicles react with heat and sunlight.

Other sources of smog include:

- pollutants from refineries and industrial processes
- oil and gas emissions from homes
- coal-fired generating stations
- gasoline-powered lawn and garden equipment
- barbecues
- pesticides
- solvents

Components in the formation of smog include nitrogen oxides, volatile organic compounds, ozone, particles, sulphur dioxide and carbon monoxide. In southern Ontario, the main ingredients of smog are elevated concentrations of ground-level ozone and fine particulate matter.

Ground level ozone forms when nitrogen oxides and volatile organic compounds react together in the presence of intense sunlight. Fine particulate matter is a mixture of solid particles and liquid droplets. One of the most harmful types is 'acid aerosols'. Once inhaled, they can introduce harmful mixtures of chemical compounds into the lungs. Fine particulate matter comes from many sources, including:

- factory emissions
- windblown dust from construction sites and roads
- vehicle exhausts

Smog levels are influenced by factors such as weather systems and air flow patterns. High levels of smog are often removed from the air after a heavy rainfall occurrence.

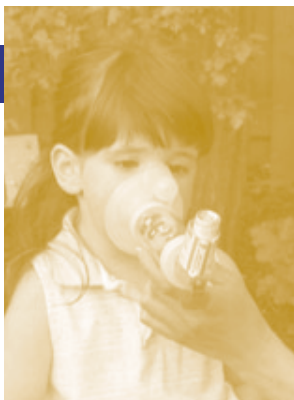
### Did you Know?

Each light-duty vehicle is driven an average 17,000 kilometres per year for an annual total of approximately 282 billion kilometres.

(Source: Statistics Canada, 2000, Canadian Vehicle Survey Catalogue No. 53-223-XIE. Statistics Canada and Transport Canada.)



## THE IMPACT OF SMOG ON OUR HEALTH:



### Did you Know?

More than 2.4 million Canadians suffer from asthma

(source: The Smog Primer, Pollution Probe, 2002)

Recent research has shown that exposure to smog contributes to a wide range of health problems, including:

- heart problems, asthma, bronchitis
- reduced lung functions in healthy people
- irritation of the eyes, nose and throat
- increased visits to doctors or emergency rooms
- increased use of medications
- increased hospitalization for respiratory and cardiac disease
- premature death

For information on recent research on the health effects of air pollution, please see links to various websites on the back page

### Health Effects of Ground Level Ozone

Ground level ozone can inflame breathing passages, irritate the eyes and nose, decrease the lung's working capacity and cause such symptoms as shortness of breath, wheezing and coughing.

### Health Effects of Fine Particulate Matter

Fine particulate matter can reach the lower regions of the respiratory tract and can affect breathing and aggravate existing respiratory diseases. Fine particulate matter can also trigger wheezing, coughing and shortness of breath and can decrease the lung's working capacity in individuals with existing respiratory problems.

## WHO ARE MOST AFFECTED BY SMOG

While everyone can be affected to some degree by poor air quality, certain people may be more vulnerable:

- young children
- pregnant woman
- seniors
- people suffering from asthma
- people with heart and lung problems
- smokers
- people with allergies
- people who regularly work or exercise outdoors



### Did you Know?

10 seconds of vehicle idling uses more fuel than restarting your engine

(Source: Natural Resources Canada, [www.oeec.nrcan.gc.ca/autosmart/idling](http://www.oeec.nrcan.gc.ca/autosmart/idling))



## HOW ARE SMOG LEVELS MEASURED?

The tool used by the Ontario Ministry of Environment (MOE) to measure and report on levels of smog is called the Air Quality Index (AQI). The AQI is a rating scale for outdoor air quality in Ontario. Generally, the lower the AQI, the better the air quality. The MOE monitors six key pollutants as part of the AQI:

- sulphur dioxide
- ozone
- nitrogen dioxide
- total reduced sulphur compounds
- carbon monoxide
- fine particulate matter

These pollutants are monitored because of their known adverse effects on human health and the environment at particularly high levels. The AQI translates pollutant levels into numbers to determine whether the air quality is considered to be 'good', 'moderate' or 'poor'.

With the present system a 'good' rating suggests that most people will not experience adverse health effects. A 'moderate' rating suggests that vulnerable and sensitive people could experience some adverse health effects. A 'poor' rating suggests that many people may experience serious adverse health effects especially vulnerable and sensitive individuals who are at most risk.

However, recent studies have indicated that there is no 'threshold' or 'safe level' of exposure for many air pollutants especially ground level ozone and airborne particles. In other words even when the AQI indicates that the air quality is good, vulnerable and sensitive people may be adversely affected.

## Did you Know?

The MOE estimates that there will be approximately 10% more smog alert days annually as a result of PM<sub>2.5</sub> being added to the AQI in August 2002.

## AIR MONITORING STATIONS IN YORK REGION

A network of AQI stations across the province provides continuous data to a computer centre at the MOE. Each station's information is computed and recorded hourly and values are released to the media at least seven times a day. The AQI of a region can be retrieved from the MOE website [www.airqualityontario.com](http://www.airqualityontario.com). AQI data for York Region is taken from the air monitoring station located in Newmarket .





## HOW IS THE PUBLIC NOTIFIED ABOUT HIGH LEVELS OF SMOG ?

When the AQI is expected to be 'poor' the MOE and Environment Canada issues Smog Alerts to notify the public. Smog Alerts are based on a 6 hour weather forecast where smog levels are expected to be widespread, persistent and elevated. This notification system includes Medical Officers of Health, media, and an e-mail system to subscribers of the MOE's Smog Alert program. There are two kinds of Smog Alerts:

- A Smog Watch is issued when there is a 50% chance that the AQI will be 'poor' within the next three days.
- A Smog Advisory is issued when there is a strong likelihood that the AQI will be 'poor' within the next 24 hours.

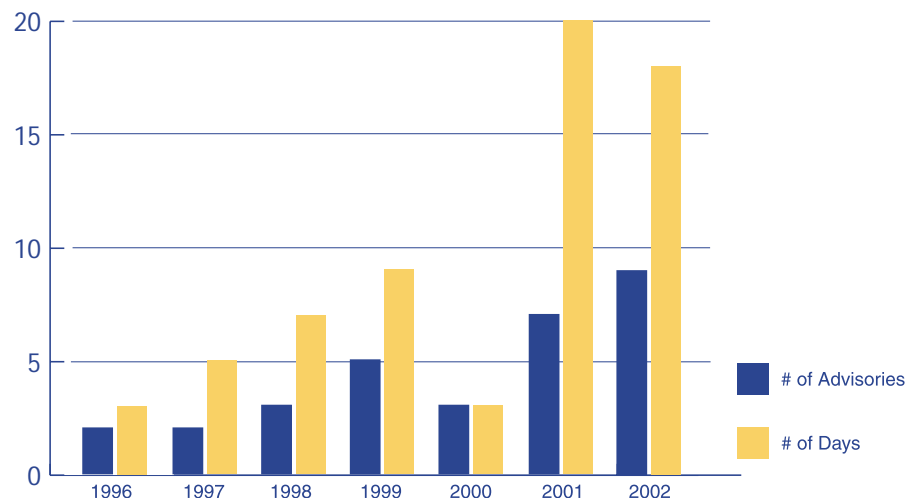
Smog Alerts are usually issued during early May to late September. The MOE often refers to Smog Alerts as an Air Quality Advisory. During an Air Quality Advisory, the public is advised to take appropriate action to minimize the health effects associated with the poor air quality event and to refrain from activities that could worsen the air quality.



## SUMMARY OF AIR QUALITY ADVISORIES FOR YORK REGION (1996-2002)



In York Region between 1996-2002, there were 31 air quality advisories covering a total of 65 days. The number and duration of air quality advisories are highly dependent on summer weather conditions experienced over Southern Ontario between May and September.



Source, Ontario Ministry of the Environment, 2003



## HOW TO PROTECT THOSE MOST AFFECTED DURING A SMOG ALERT?

Take appropriate precautions to reduce overall exposure to smog:

- be attentive to information from various media and government sources to reports of Smog Alerts or Air Quality Advisories
- avoid strenuous exercise and limit outdoor activities
- reschedule and/or plan outdoor activities early in the morning or late in the day when pollutant levels are considerably lower
- keep away from high traffic areas to reduce overall exposure to excessive levels of smog
- stay inside in a cool air-conditioned or well-ventilated environment. If no air conditioner is available try using a fan or visit a friend or family member who has air-conditioning
- drink plenty of fluids to prevent dehydration
- seek medical attention for those complaining of symptoms such as tightness in their chests, coughing, wheezing or shortness of breath and excessive weakness or fatigue

## HOW IS SMOG LINKED TO CLIMATE CHANGE?

The same processes that lead to the formation of smog (e.g. fossil fuel combustion) also produce greenhouse gases such as carbon dioxide (CO<sub>2</sub>) and methane. Anti-smog actions to reduce emissions have the co-benefit of reducing these greenhouse gases.

Global temperatures are rising and in fact the 1980's and 1990's were the warmest decades on record. Many scientists believe that human activities through the burning of fossil fuels have caused the average global temperature to rise leading to the phenomenon known as 'Climate Change'. As society continues to burn fossil fuels in an accelerated manner increased concentrations of greenhouse gases are being released into the atmosphere.

Many scientists have concluded that one of the effects of releasing these greenhouse gases into the air is that more heat is being trapped in the atmosphere resulting in increases in overall surface temperatures. Many scientists believe that the

continued addition of greenhouse gases to the atmosphere will raise the Earth's average temperature by several degrees in the next 100 years. Some potential effects of rising global temperatures include:

- extremes in temperatures and weather events
- adverse impacts on the quantity and quality on our water systems
- spread of infectious diseases

In Ontario, a major impact of climate change will be the number and extent of heat waves. It is projected that more frequent and longer heat waves may result in an increase in heat-related illnesses and deaths and a significant rise in the number of smog alert episodes and adverse health outcomes.



## Did you Know?

Every litre of gasoline you use in your car produces almost 2.5 kgs of CO<sub>2</sub>, as well as other pollutants.

(Source: Weathering the changes - climate change in Ontario poster, Natural resources Canada, 2001)

## THINGS YOU CAN DO EVERYDAY TO SPARE THE AIR AND IMPROVE AIR QUALITY



Individuals, businesses and corporations, governments and workplaces can make a big difference in helping to reduce smog levels and making our air cleaner. These actions will improve air quality by reducing air pollutants and greenhouse gas emissions everyday in York Region, but especially on Smog Alert days. Try incorporating some of these ideas into your everyday activities, both at work and at home.

### DO'S

- Avoid or limit use of your car whenever possible
  - Walk or ride a bike and consider alternative modes of transportation such as carpooling, and taking public transit
  - Telecommute (work from home) and teleconference whenever possible
  - Share a ride with a friend to social or recreational activities
  - Refuel the car early in the day or late in the evening after the sun has set and the air has cooled and purchase gas containing ethanol
  - Give your vehicle regular tune-ups so the engine will run smoothly and pollute less. Ensure your tires are properly inflated which saves fuel
  - Purchase and use green cleaning products that do not contain volatile organic compounds. Look for the federal government's Eco-logo on consumer products
  - Reduce unnecessary engine idling of your vehicle at all times. If you are going to be stopped for more than 10 seconds (except in traffic), turn off the engine. Walk-in rather than idle at the drive-through!
  - Restrict or postpone the use of oil-based paints, solvents, pesticides, glues, gas-powered engines (i.e. lawnmowers and leaf blowers) and barbecues
  - Reduce or suspend pavement resurfacing
  - Avoid or postpone lighting a fire where wood smoke is produced to reduce the amount of fine particles emitted into the air
- Conserve energy to reduce fossil fuel requirements by:
- Turning off unneeded lights
  - Turning down furnace thermostats and setting warmer temperatures on air conditioning units
  - Installing energy saving lighting (i.e. replacing incandescent light bulbs with fluorescent ones)
  - Reducing drafts and home heat loss by improving your insulation, installing or replacing weather-stripping and caulking
  - Purchasing or upgrading to an energy efficient furnace or appliance. Look for the EnerGuide ratings on appliances
  - Using appliances wisely
  - Installing low-flow showerheads and aerators in faucets to conserve water
  - Conducting a home energy audit to identify areas that need improvement
  - Purchasing green energy for your electricity needs.

## Did you Know?

Replacing one frequently used regular light bulb with an energy efficient compact fluorescent bulb will save 225 kg of CO<sub>2</sub> per year.

(Source: Weathering the changes - climate change in Ontario poster, Natural resources Canada, 2001)



## Did you Know?

One busload of passengers takes 40 vehicles off the road, saving 70,000 litres of fuel, 175 tonnes of CO<sub>2</sub> emissions and 9 tonnes of pollutants per year.

(Source: Change Think Climate brochure, Government of Canada, 2001, [www.climatechange.gc.ca](http://www.climatechange.gc.ca))

## WHERE CAN I GET MORE INFORMATION?

For further information please contact York Region Health Services Health Connection at 1-800-361-5653 or [www.region.york.on.ca](http://www.region.york.on.ca). To learn more about issues related to air quality, smog, air pollution, climate change, energy efficiency, and alternative modes of transportation, link to these web sites:

- Ontario Ministry of the Environment: 1-800-387-7768 or [www.airqualityontario.com](http://www.airqualityontario.com)
- Environment Canada: 1-800-668-6767 or  
Air Quality Services website: [www.ec.gc.ca/air/](http://www.ec.gc.ca/air/)  
Ecologo Program: [www.environmentalchoice.com](http://www.environmentalchoice.com)
- Natural Resources Canada (NRCAN) Office of Energy Efficiency: 1-613-947-4291 or [www.oe.nrcan.gc.ca](http://www.oe.nrcan.gc.ca)  
NRCAN Autosmart Program: [www.oe.nrcan.gc.ca/autosmart](http://www.oe.nrcan.gc.ca/autosmart) or 1-800-387-2000  
NRCAN Idle Free Zone: [www.oe.nrcan.gc.ca/idling](http://www.oe.nrcan.gc.ca/idling)
- Health Canada: 1 613 957 1876 or [www.hc-sc.gc.ca/air](http://www.hc-sc.gc.ca/air)
- Government of Canada: 1 800 622 6232 or [www.climatechange.gc.ca](http://www.climatechange.gc.ca)
- 20/20 The Way to Clean Air Campaign: [www.city.toronto.on.ca/health/2020/](http://www.city.toronto.on.ca/health/2020/)
- The Ontario Medical Association: [www.oma.org](http://www.oma.org)
- Canadian Lung Association: 1 888-566-LUNG or [www.lung.ca](http://www.lung.ca)
- The David Suzuki Foundation: [www.davidsuzuki.org/climatereports.htm](http://www.davidsuzuki.org/climatereports.htm)
- Pollution Probe: 416 340-7888 [www.pollutionprobe.org](http://www.pollutionprobe.org)
- Go for Green: [www.goforgreen.ca](http://www.goforgreen.ca)
- Green Communities Association: [www.gca.ca](http://www.gca.ca)
- Greenest City: [www.greenestcity.org](http://www.greenestcity.org)
- Clean Air Consumer Guide: [www.city.toronto.on.ca/cleanairguide/](http://www.city.toronto.on.ca/cleanairguide/)
- Greenest City's Active and Safe Routes to School Program: 1-866-588-0788 or [www.greenestcity.org](http://www.greenestcity.org)
- Smog Summit information: [www.city.toronto.on.ca/cleanairpartnership/smog\\_summit.htm](http://www.city.toronto.on.ca/cleanairpartnership/smog_summit.htm)
- Carpooling organizations:
  - Black Creek Regional Transportation Management Association (TMAs): [www.bcrmta.org](http://www.bcrmta.org)
  - VivaCommute: [www.vivacommute.ca](http://www.vivacommute.ca)
  - GoSmart: [www.gosmart.ca](http://www.gosmart.ca)
  - Carpooltool.com: [www.carpooltool.com](http://www.carpooltool.com)
- Public Transit information:
  - York Region Transit (YRT): 1-866-MOVEYRT or [www.yorkregiontransit.com](http://www.yorkregiontransit.com)
  - Go Transit: [www.gotransit.com](http://www.gotransit.com)
- Home Energy Audit contact:
  - WindFall Ecology Centre: 1-866-280-4431 or [www.windfallecoworks.com](http://www.windfallecoworks.com)

