

## **What You Need To Know**

-compiled by Lynn Perreault, Ph.D.

### **The Greenhouse Effect**

About half of the sun's heat that reaches Earth is absorbed by the land and water. When the sun goes down, the absorbed heat is slowly released into the air. We also have an atmosphere - a layer of gases surrounding the earth - that absorbs some of the sun's heat and also helps keep the released surface heat from floating quickly off into space. The atmosphere is like a blanket that surrounds the world. It lets in just the right amount of the sun's heat (about 70%) and reflects the rest - sending it packing back out into space.

Like the plastic or glass covering a greenhouse, water vapour and trace gases (e.g., carbon dioxide, methane, and nitrous oxide) trap the heat radiated from the sun. If we didn't have these Greenhouse Gases (GHGs for short), the earth would be an icebox. Our average temperature would be about  $-18^{\circ}\text{C}$ . People refer to this heat-trapping role of the atmosphere as the "greenhouse effect".

To understand why we are getting too warm in our greenhouse, let's look at carbon dioxide ( $\text{CO}^2$ ), one of the most important GHGs. Carbon dioxide makes up about 25% of the natural greenhouse effect and is therefore a key player. A number of things can put  $\text{CO}^2$  into the atmosphere (e.g., the burning of fossil fuels from driving and idling our automobiles). If you have smelled the fumes from a car, you have got a nose full of  $\text{CO}^2$  at the same time. Also, a number of things remove  $\text{CO}^2$  from the atmosphere (e.g., plants and trees through photosynthesis). Over the past 10,000 years, the balance between the annual atmospheric release and removal of large amounts of  $\text{CO}^2$  has been remarkably stable on average.

Imagine two kids playing on a teeter-totter. At one end, the child weighs the same as the amount of  $\text{CO}^2$  removed from the atmosphere. The child on the other end weighs the same as the amount of  $\text{CO}^2$  put into that atmosphere. The teeter-totter was essentially in balance for about 10,000 years.

### **Out of Balance**

Since the last ice age, the amount of carbon in our atmospheric blanket has been relatively stable and temperatures on earth have been fairly comfortable. That is, until the last 200 years or so. Unfortunately, when the industrial revolution began in the late 1700s, people started to add billions of tonnes of extra CO<sup>2</sup> to the atmosphere.

People put CO<sup>2</sup> into the atmosphere when we run our industries, heat our homes, and drive our cars. This is because when we do these things, we usually burn fossil fuels - oil, gas, and coal. These fossil fuels are made from the carbon of plants and animals that decomposed millions of years ago.

Based on studies of ice cores from glaciers, scientists believe that there is much more CO<sup>2</sup> in the atmosphere now than there has been for a very, very, very long time. The teeter-totter has now tipped. The kid who puts CO<sup>2</sup> into the atmosphere is now much heavier than the kid who takes CO<sup>2</sup> out of the atmosphere. And the one putting it in keeps getting heavier and heavier. Having this much CO<sup>2</sup> in the atmosphere is kind of like throwing a much thicker blanket on your bed - things can get a little too toasty for comfort. It is time for the kid putting CO<sup>2</sup> into the atmosphere to go on a diet!

### **Enhanced Greenhouse Effect**

When we add more GHGs to the atmosphere we get what is called the "enhanced greenhouse effect". We are changing the natural processes of the world and making it difficult for the atmosphere to keep a balance. This enhanced greenhouse effect isn't making us sweat buckets yet, but it is starting to change the climate and the world we are used to.

### **Climate Change**

The climate is changing everywhere. Worldwide, new plant and wildlife species will appear in some areas. Familiar species will disappear if they can't handle the new climate. Around the world, many cities, towns and villages are built close to sea level. Scientists expect climate change to cause sea levels to rise. This means that tens of millions of people who live close to the sea will have to move to higher ground. Whole islands or countries could disappear under water. Salt water could flood low-lying farmland and displace fresh water. This would harm farm crops because many plants can't grow in salty soil.

Climate change is expected to mean very unreliable weather. Some parts of the world will get more rain and floods. Other parts will get more droughts and really hot weather. When it gets really hot and dry, more water evaporates. That means less drinking water for people and less water for farm crops and animals. Some countries may find it even more difficult to feed and house their people.

Most of this is not good news for our planet. And it means major challenges for the animals, plants and people that live there. But don't despair. There are things that people can do - and are doing - to help slow climate change and reduce its impacts (e.g., turning the automobile engine off when parked).

## **Vehicle Emissions**

Climate change is a complex issue studied by hundreds of scientists in Canada and around the world. Although we still have much to learn, there is general scientific agreement that human-made emissions of carbon dioxide (CO<sup>2</sup>) and other greenhouse gases (GHGs) are at the root of the problem. Human activities, particularly the combustion of fossil fuels, are a major source of GHG emissions. And Canadians' love affair with the car - we own more of them and drive them farther than ever before - is a big part of the problem. In fact, the transportation sector is the single largest source of GHG emissions in Canada. Personal vehicle use by Canadians is now responsible for half of all transportation emissions, and over two thirds (68%) of on-road transportation emissions. Close to 17 million vehicles are registered in Canada today.

Automakers have developed the technology (catalytic converters) to reduce harmful vehicle emissions that contribute to air pollution and smog such as hydrocarbons, carbon monoxide and nitrous oxide (also a GHG). But no technology exists for "cleaning up" the major GHG contributor: CO<sup>2</sup>. Carbon dioxide is simply an unavoidable by-product of burning gasoline or diesel fuel.

### **Vehicle Idling**

A recent study of driving habits and behaviour shows that Canadians idle their vehicles year-round (an average of 5-10 minutes per day) and they do so for many reasons. Warming up a vehicle is the most common excuse for idling. Drivers also spend a lot of time running

their cars needlessly in the drive-thru lanes of fast-food restaurants and while waiting for someone. Moreover, drivers idle while they are stopped at railway crossings, wait to park, run quick errands, stop to talk to an acquaintance or friend, wait in line to get gasoline or have the car washed, and preparing to leave the house. All these situations have two things in common: they waste fuel and money, and they cause environmental damage.

Idling produces unnecessary emissions of CO<sup>2</sup>, the principal GHG that contributes to climate change. Carbon dioxide is an unavoidable by-product of burning gasoline. Every time drivers turn on their vehicle's engine, they generate CO<sup>2</sup> – and the more fuel they use, the greater their GHG emissions. The average car produces about 2.4 kg of CO<sup>2</sup> for every litre of gasoline used. It generates three times its own weight in CO<sup>2</sup> every year. Vehicle exhaust emissions also contribute to other environmental problems such as smog and acid rain.

### **Air Pollutants and Health**

Ground-level ozone, or “smog” is one of Canada's most dangerous air-borne pollutants. Smog occurs when nitrogen oxide (NO<sup>2</sup>), a by-product of burning fossil fuels such as gasoline, combines with volatile organic compounds (VOCs) in sunlight and becomes a colourless, odourless, gas. Because of the role that sunlight plays in its production, ground-level ozone is more prevalent during the sunny months, from about mid-May until mid-September, called the “smog season”.

Increasing levels of ground-level ozone coincide with increased admissions to hospital for respiratory diseases. In Windsor-Essex County (WEC), smog is causing thousands of emergency hospital visits, costing our health care system over 23 million dollars to treat unnecessary respiratory illness. What's worse is that 9% of all non-accidental deaths in WEC are due to smog.

Children are particularly vulnerable to smog because their lungs are still developing, they spend more time outdoors being physically active, they breathe faster than adults and inhale more air per kilogram of body weight, and their breathing zone is lower than adults which exposes them to vehicle exhausts and heavier pollutants that concentrate at lower levels in the air. In fact, smog has been found to:

- aggravate asthma, leading to more frequent and severe asthma attacks;

- increase the number of respiratory infections;
- aggravate and induce allergies;
- increase school day absences; and
- increase emergency room visits, hospital admissions and premature deaths.

Idling is particularly an issue at schools - many parents idle their vehicles while waiting to pick up their children. This is compounded by the fact that due to commuting traffic, smog is already at its daily peak when parents are picking up their kids.

### **Did you know?**

Many people believe that they are protected from air pollution if they remain inside their vehicles. However, the International Centre for Technology Assessment found that exposure to most auto pollutants, including volatile organic compounds (VOCs) and carbon monoxide (CO), is much higher inside vehicles than at the roadside. VOCs and CO are linked to serious health problems - like respiratory irritation and cancer - and are known to shorten life [www.icta.org](http://www.icta.org). The highest exposure occurs when sitting in traffic congestion on highways or in a line-up of idling vehicles outside a school.

## **Anti-Idling Bylaws**

More than 20 Ontario municipalities have either stand-alone idling control by-laws, or anti-idling provisions in other by-laws. At the time of writing, 15 municipalities, all of them in Ontario, have passed stand-alone idling control by-laws. These include: Burlington, Guelph, Huntsville, Kingston, London, Markham, Niagara Falls, Oakville, Pickering, Stratford, Toronto, Vaughan, Whitchurch/Stouffville, Windsor, and Woodstock. Although many other municipal councils have considered passing idling control by-laws, they decided against a regulatory approach largely on the grounds that the by-laws are difficult to enforce.

### **Windsor's Anti-Idling By-Law**

Windsor has an anti-idling by-law titled "A By-Law to Prohibit Excessive Idling of Vehicles and Boats" (By-Law No. 233-2001 [www.citywindsor.ca](http://www.citywindsor.ca)). It states that people shouldn't idle their vehicles or boats for more than five minutes in a sixty minute period. Twelve exceptions to the rule are also listed in this by-law (e.g., when the ambient temperature inside a vehicle or boat is more than 27°C or less

than 5°C). To make a complaint about an idling vehicle, please call the City of Windsor at **311** or **519-255-2489**.

## Ready To Do Your Part?

Here's a five-step process that can help you reduce vehicle idling:

**Step 1:** Reduce warm-up idling. Start driving after no more than 30 seconds of idling, assuming your vehicle's windows are clear.

**Step 2:** If you are going to be stopped for more than 10 seconds (except in traffic), turn off your engine. Idling your vehicle for longer than 10 seconds uses more fuel than it would take to restart the vehicle.

**Step 3:** Avoid using a remote car starter. These devices encourage you to start your vehicle before you are ready to leave, which means wasteful idling.

**Step 4:** In temperatures below 0°C, use a block heater to warm the engine before you start your vehicle. This will improve fuel efficiency and reduce exhaust emissions.

**Step 5:** Talk to your family, friends and neighbours about the benefits of reduced idling. Encourage them to join you in saving money, protecting the environment, and contributing to a healthier community.

### Do you want to start your very own no-idling campaign?

**'Guide to an Effective No-Idling Campaign.'** This document's step-by-step approach will take you from the initial tasks of setting project objectives and designing your communications strategy to finding ways to sustain the momentum of your campaign. Use the document to launch a no-idling campaign at your school or workplace, or learn how to develop a larger-scale community awareness and outreach campaign.

Idle-Free Windsor is a program of the Citizens Environment Alliance  
[www.citizensenvironmentalliance.org](http://www.citizensenvironmentalliance.org)