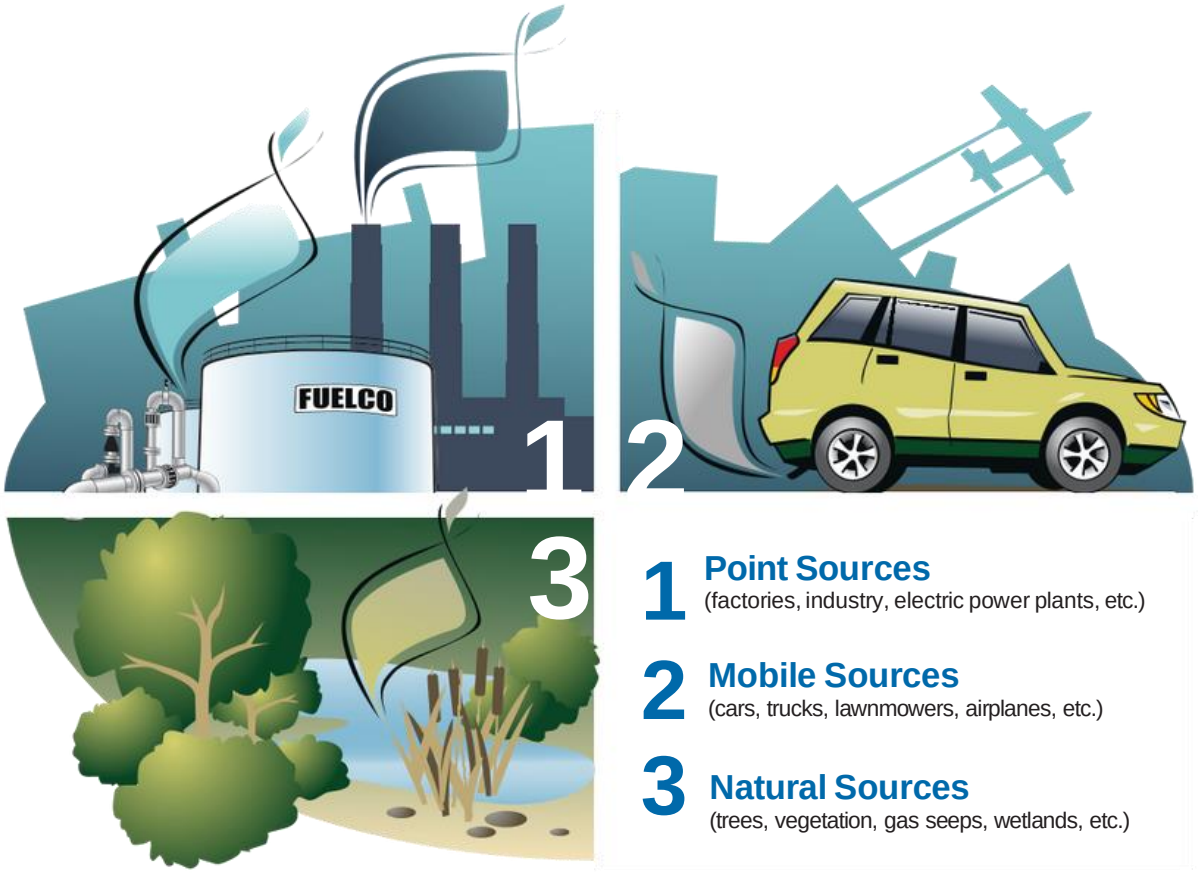
EMISSIONS

Heartland Air Monitoring Partnership
We Monitor the Air You Breathe

The substances measured at monitoring stations are released into the air by both human activity and through natural processes. Emission sources can be grouped into three categories:



1 Point Sources
(factories, industry, electric power plants, etc.)

2 Mobile Sources
(cars, trucks, lawnmowers, airplanes, etc.)

3 Natural Sources
(trees, vegetation, gas seeps, wetlands, etc.)

Emission Types

REGULATED EMISSIONS

In Alberta, the sources of industrial air emissions are regulated to minimize emissions and ensure air quality is maintained within established government objectives. The Government of Alberta regulates emissions either directly or with other agencies based on the type of industry.

Under the Environmental Protection and Enhancement Act and its regulations, approvals are required for specific activities. A regulatory approval issued by the Government of Alberta covers all phases of an industrial operation including construction, operation and reclamation.

Emissions are minimized through pollution prevention, the installation of air pollution control equipment or both. Determining the maximum amount of pollution a facility is allowed to emit depends on several factors. In some cases computer simulations (models) are used to help evaluate the environmental impact. Monitoring and reporting requirements are set to ensure that emissions are kept below approved limits. Monitoring may be done through an Airshed or the industry may conduct its own monitoring which must meet pre-set standards.

NON-REGULATED EMISSIONS

Some emissions, such as those from vehicles and home heating/cooling, are not easily regulated by the traditional approval methods. Managing emissions from these sources is done at the manufacturing stage and also through public awareness efforts. Much of the responsibility for controlling these non-regulated emissions falls to the general public.

Impacts of Emissions on the Environment

SMOG

The two primary substances in smog are ground level ozone and particulate matter. Summer smog is produced as oxides of nitrogen and Volatile Organic Compounds (VOCs) reacting with sunlight. Winter smog is likely to occur in cities during temperature inversions, when particulate matter and oxides of nitrogen accumulate in stagnant air.

In humans, smog can aggravate respiratory and heart problems, as well as allergies. The severity and type of symptoms depend on the substance, the concentration in the air, the length of exposure and the sensitivity of the person to the substance. Smog can make plants grow more slowly and be more vulnerable to disease, pests and stressful environmental conditions such as drought and cold.

ACID DEPOSITION

Acid deposition refers to the transfer of acidic substances in the air onto surfaces such as soils, lakes, rivers and vegetation. Acid deposition can be wet in the form of rain or snow, or dry settling on land, vegetation and water surfaces. Two common air pollutants – sulphur dioxide and nitrogen oxides – are the primary components of acid rain.

In Alberta, the main sources of sulphur dioxide and nitrogen oxides are the oil and gas industry, coal-fired power plants, and motor vehicles. In the air, these substances can form acids such as nitric acid and sulphuric acid. When rain washes these acids out of the atmosphere, virtually anything they contact can be affected including lakes, rivers, forests, soils, plants, fish, wildlife, buildings, and humans.

CLIMATE CHANGE

Climate change is the result of an excess of Greenhouse Gases (GHGs) in the atmosphere. GHGs maintain the earth's temperature. Without naturally occurring GHGs, the earth's average temperature would be too cold to support life. Too much greenhouse gas, on the other hand, is also a problem, causing the earth's temperature to increase beyond normal climate fluctuations. The burning of fossil fuels is the primary source of manmade GHGs. Motor vehicles, industrial activity, wood-burning stoves and power generation all produce carbon dioxide. Landfills, natural gas and oil use, agriculture and coal mining produce methane, which is a more potent GHG than carbon dioxide.

Climate change has many impacts:

- Drought and rapidly shrinking glaciers. This will result in changes to the amount and timing of water availability during the growing season, and can result in a decrease in the quality and quantity of drinking water.
- Changes in plant species and growth patterns and growing season, as well as compromised food production.
- More severe and frequent extreme weather events such as heat waves, storms, floods and tornadoes.
- A reduction in biodiversity. While humans can adapt to a changing climate, plants and animals in some ecosystems may not be resilient enough to survive.
- Increased threat of forest fires and insect invasions on forested areas and agricultural crops.
- A rise in sea level.

What is Being Done?

POLLUTION PREVENTION

Pollution prevention is the most effective means of protecting the environment. It focuses on avoiding the creation of pollutants rather than trying to manage them after they have been created.

Industrial and manufacturing businesses can do their part by adopting pollution prevention measures such as improving energy efficiency, switching to renewable energy sources and using cleaner fuels. Conservation, along with a more efficient use of energy, will lead to a reduction of pollutants being released.

Renewable energy sources can be used to produce power such as electricity. These sources can come from the sun, wind, water, biomass and heat from the Earth's interior (geothermal). When low-emitting forms of renewable energy are used instead of fossil fuel energy, air pollution is reduced.

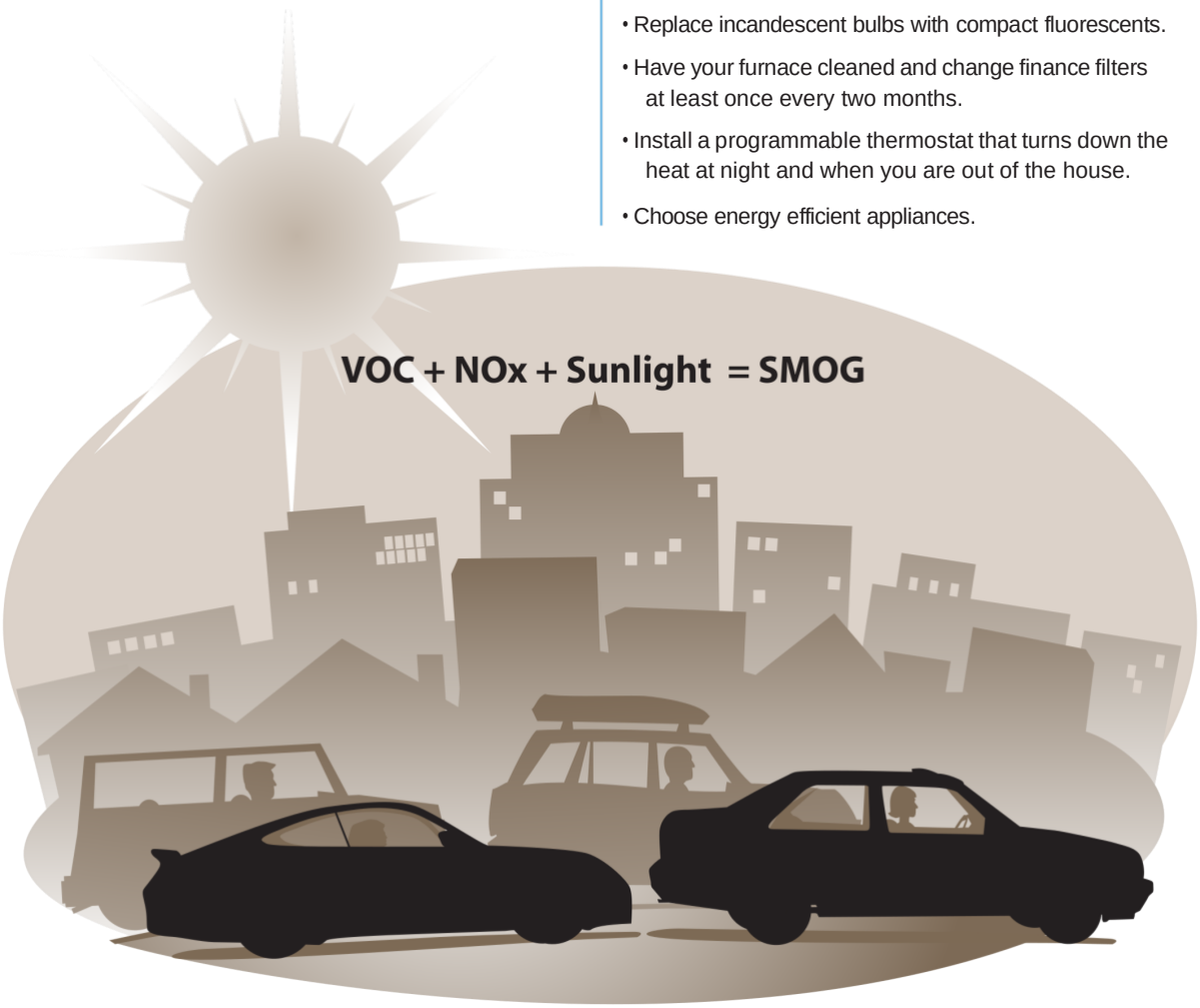
POLLUTION CONTROL

Pollution control technology is used to reduce harmful substances coming from sources like motor vehicles. These technologies reduce the amount of pollution released into the air by capturing or transforming substances that are generated.

What Can You Do?

Individuals can take action at the local level to reduce energy use at home, on the road, at work and at play. The following is a short list of tips that you can use to reduce your energy consumption and control the amount of pollution that you emit into the air.

- Take public transportation or car pool.
- Walk or ride your bike.
- Keep your car tuned up and don't idle.
- Turn off lights and other electrical devices when not in use.
- Replace incandescent bulbs with compact fluorescents.
- Have your furnace cleaned and change finance filters at least once every two months.
- Install a programmable thermostat that turns down the heat at night and when you are out of the house.
- Choose energy efficient appliances.



Definitions

Biological Diversity – The variety of organisms (plants and animals) found within a specified geographic region.

Ecosystem – A biological community of interacting organisms and their physical environment.

Environmental regulatory approval – An approval that defines the emission levels, required pollution control equipment, monitoring and reporting practices required in Alberta.

Fossil fuels – Fuels formed from dead plants and animals, coal, oil and natural gas.

Greenhouse gases – gases in the earth's atmosphere that work to maintain the earth's temperature. Water vapour, carbon dioxide, methane and nitrogen oxide are all greenhouse cases.

Winter smog – usually caused by substances emitted into stagnate air from wood heating and vehicle exhausts. The severity of winter smog depends on how poorly the substances are being dispersed in the atmosphere.

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This is one of a series of fact sheets on air quality developed by Heartland Air Monitoring Partnership in cooperation with the Government of Alberta.
The rest of the series is available at heartlandairmonitoring.org.