

# OUR AIR, OUR HEALTH, YOUR CHOICE

*Air pollution knows no boundaries...*

*From neighbour to neighbour  
From community to community*

**YOUR AIR QUALITY GUIDE**  
Please keep for reference

THE  LUNG ASSOCIATION™  
British Columbia



## CONTENTS

<b>Air Quality</b>	<b>3</b>
<b>Earth's Atmosphere</b>	<b>4</b>
<b>About Air</b>	<b>5</b>
<b>About Valley Communities</b>	<b>6</b>
<b>Air Pollution</b>	<b>8</b>
<b>Monitoring Air Pollution</b>	<b>13</b>
<b>Health and Air Pollution</b>	<b>14</b>
<b>Understanding the sources of pollution</b>	<b>16</b>
<b>Engine Emissions</b>	<b>17</b>
<b>Wood Smoke</b>	<b>20</b>
<b>Firewood</b>	<b>22</b>
<b>Burning Wood Waste</b>	<b>24</b>
<b>Air Curtain Burners</b>	<b>26</b>
<b>Land Clearing</b>	<b>26</b>
<b>Chipping or Salvaging</b>	<b>27</b>
<b>Eliminate Garbage Burning</b>	<b>28</b>
<b>Do Not Burn Yard Waste</b>	<b>29</b>
<b>Composting</b>	<b>30</b>
<b>Reduce Dust</b>	<b>31</b>
<b>The Future</b>	<b>33</b>
<b>Resources</b>	<b>36</b>

# Air Quality

Air Quality is a growing concern in communities across BC because it can affect our health, the environment and the economy. Poor air quality is the result of many factors, both natural and human caused. Choices we make every day, can significantly impact the quality of our local air quality.

Until a decade ago, it was thought that there was a threshold for exposure to pollutants. New studies show that there are health effects at much lower levels than previously thought and that there does not appear to be a threshold. Everyone can be affected.

We cannot get rid of air pollution, but we can minimize it.

One poorly burning wood appliance will pollute an entire neighbourhood. By choosing to burn efficiently, meaning no smoke is visible out the chimney, it will minimize air pollution and negative health affects to those living in the neighbourhood.

**ONE PERSON CAN MAKE A DIFFERENCE.**

We cannot get rid of air pollution, but we can minimize it. Everyday choices make a difference.



*Air... "is the whirlwind and the breeze, a moving ocean of invisible forces in which we swim all the days of our lives, from our first gasp at birth to our last."*

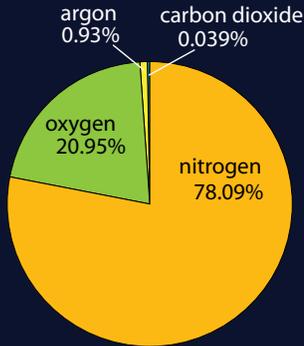
- David Suzuki, A Sacred Balance

# Earth's Atmosphere

The Earth's atmosphere consists of a mixture of gases that extend from the Earth's surface to outer space. The atmosphere is divided into four layers according to altitude.

Air is the name given to the layer of the atmosphere where respiration (breathing) and photosynthesis can occur. Dry air contains roughly (by volume) 78.09% nitrogen, 20.95% oxygen, 0.93% argon, 0.039% carbon dioxide, and small amounts of other gases.

## DRY AIR



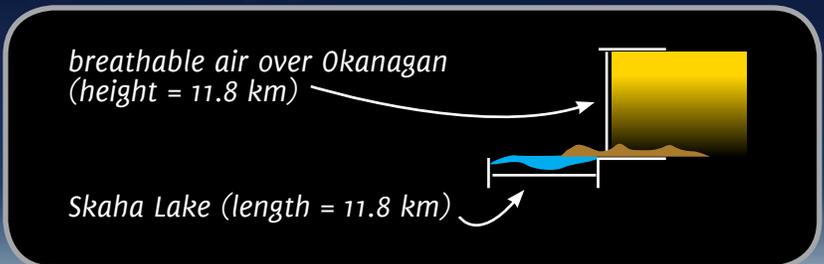
Air also contains a variable amount of water vapour, on average around 1%. While air content and atmospheric pressure varies at different layers, air suitable for the survival of terrestrial plants and terrestrial animals only occurs in the layer closest to Earth's surface, known as the troposphere.

Nearly all the Earth's weather – including rain, snow and most clouds, and the rising and falling packets of air, occur in the first layer (troposphere), which extends about 9 kilometers at the poles and 17 kilometers at the equator with some variation due to weather. Above this elevation, air becomes too thin (lacking oxygen) to support life.

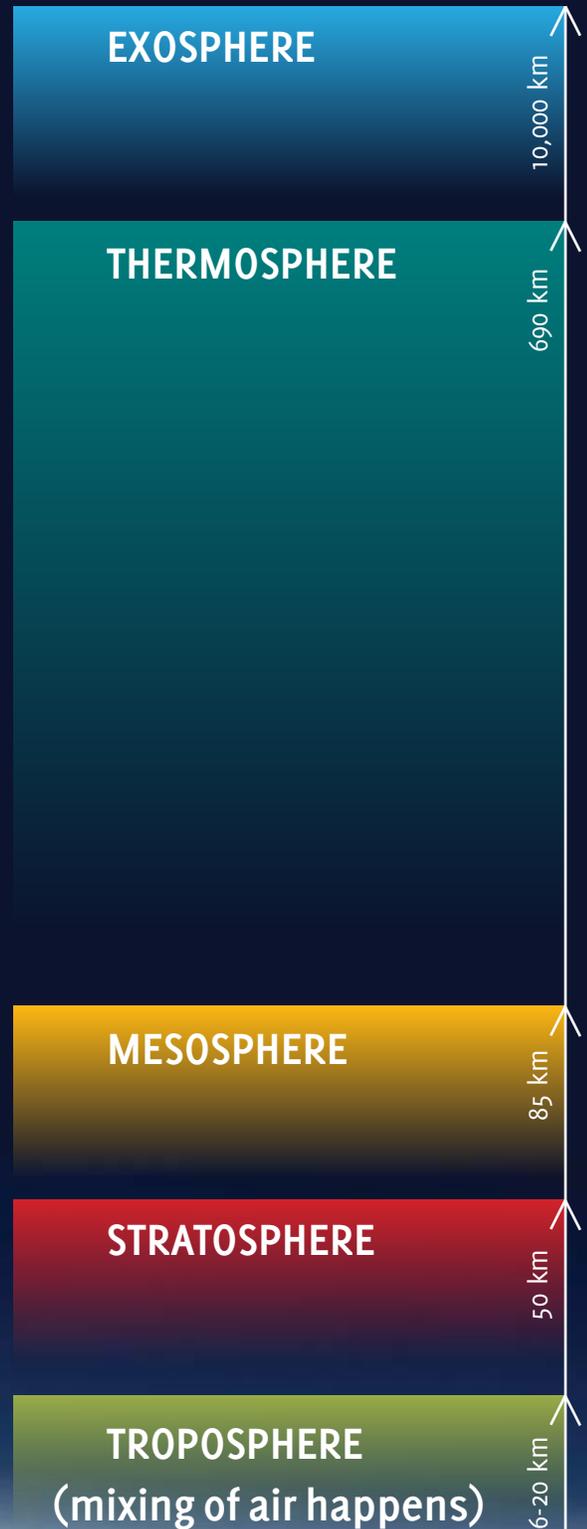
**The breathable air over the Okanagan extends about 11.8km (7.5 miles) above the surface – roughly the length of Skaha Lake.**

The atmosphere protects the Earth from the sun's harmful radiation and also maintains temperatures that allow for life on Earth. Water vapour, particulate matter and carbon dioxide in the air absorb heat from the sun and prevent some of the surface heat created by sunlight from escaping back into space.

As the Sun warms the Earth's surface, heat is transferred to the troposphere, making it the warmest layer of the atmosphere. Warm air rises leading to vertical mixing which warms the air above. As warm air rises, it carries with it generated pollutants and disperses them in the air. As the warm air disperses, it cools and moves back downwards.



\*not to scale



**DID YOU KNOW?** If the Earth were the size of a basketball, the thickness of the atmosphere could be modeled by a thin sheet of plastic wrapped around the ball. This atmosphere houses the air that sustains life on this planet.



# About Air



Without air, there could be no life on Earth. People can live more than a month without food and a week without water, but a person can only live a few minutes without air.

Oxygen from the air is filtered into the bloodstream through the lungs. Blood then carries oxygen to the cells of the body where it combines with other chemicals obtained from food to produce energy and to perform the

functions of the individual cells.

Every day, the average adult breathes about 15,000 to 20,000 litres of air. Children breathe more air per body weight than adults. Lungs are still developing in infants and children and air pollution, such as wood smoke and ground level ozone, affects the growth and function of lungs.

Clean air is colourless and odourless. Our actions can affect the quality of the air we breathe.

For example, DO NOT leave your vehicle idling when dropping or picking up children from school. It adds unnecessary pollutants to the air.



**DID YOU KNOW?** All people over the age of twenty have taken at least 100 million breaths and have inhaled argon atoms that were exhaled in the first breath of every child born in the world a year before.

*Source: David Suzuki, A Sacred Balance*

**Air quality is everyone's responsibility – individuals, local government, provincial and federal government.**

*We all share the air!*



# About Valley Communities

Once pollutants are released in the air, the weather and terrain determine where pollutants will end up.

BC's mountainous topography means that many communities are situated either at valley bottoms or in more complex undulating landscapes.

Valley communities are subject to temperature inversions which result in a layer of colder air getting trapped at the surface under a system of warmer air.

The warmer air acts like a lid and any air pollutants released into the lower layer are trapped in that layer and can only be removed by strong horizontal winds.

**INVERSIONS** generally occur in the mornings year-round, but can occur more frequently and can last all day during winter months (mid-Nov thru to mid-March), when there are no up-drafts to carry pollutants out of the valley bottom.

Inversions can last several days which means that air pollutants like wood smoke & vehicle emission pollutants will increase in concentration over that time.

**POOR WIND DISPERSION** creates a similar condition to a temperature inversion, because smoke, vehicle emissions and other pollutants are not carried away by normal winds, causing local air quality to deteriorate.

**WIND PATTERNS AND PLACEMENT OF BUILDINGS** can influence air flow and could result in unintended air quality "hot spots" in an area or neighbouring area.

Close proximity of farms and communities to each other in a valley means what we put into the air immediately affects our neighbours. Small particulate matter (PM2.5) from smoke can enter homes and create unhealthy living conditions.

It is important that we do what we can during the winter to minimize air pollution (carpooling, burning only clean dry wood, etc.), in order to ensure good air quality throughout the year.



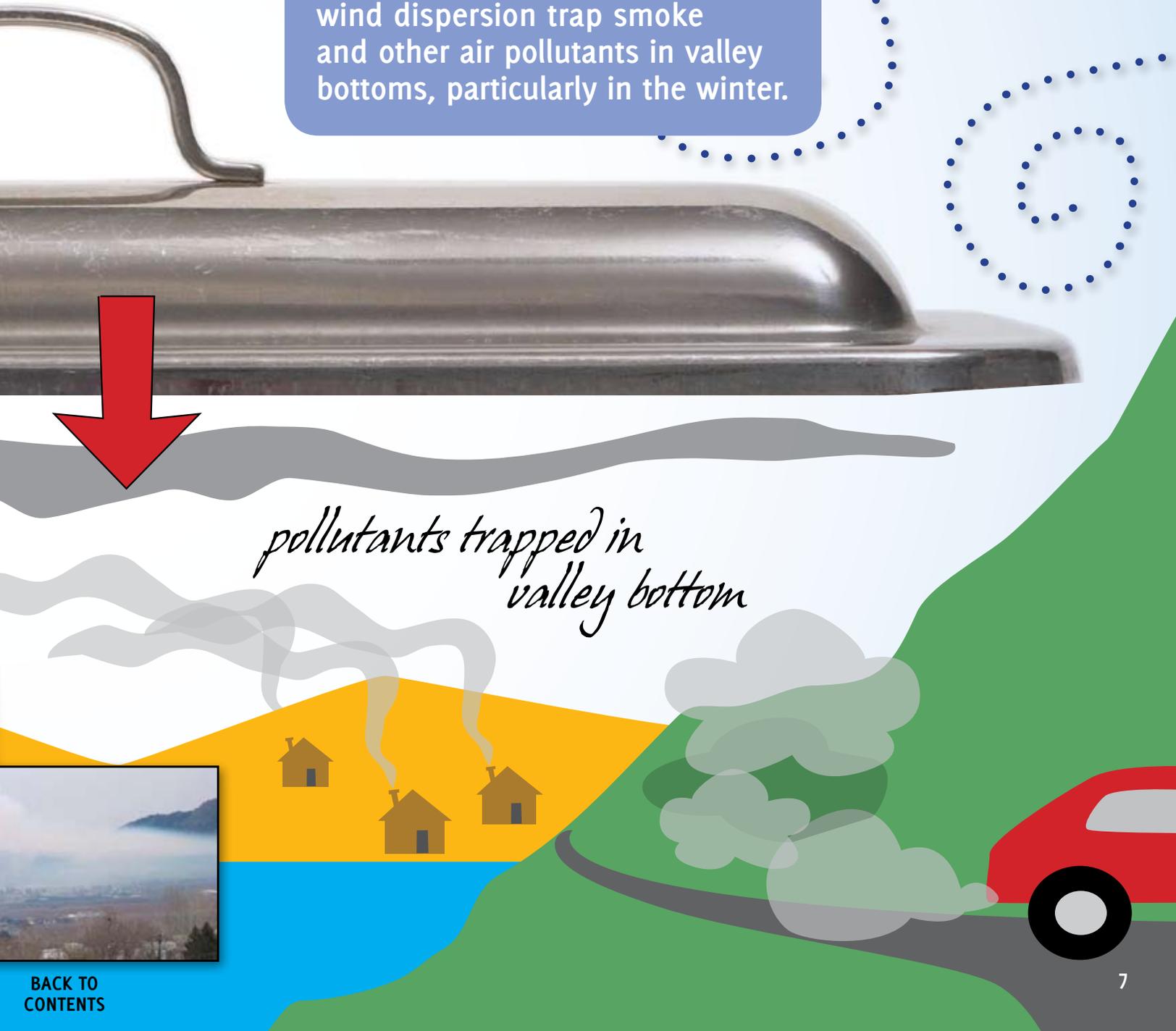
*warm upper air acts like a lid*



Example of (1) a poorly planned open burn (wet wood) polluting the valley, (2) The same burn affected by a temperature inversion. (3) Pollutants from the burn trapped and dispersing into the homes and community miles away.

### DID YOU KNOW?

Temperature inversions and poor wind dispersion trap smoke and other air pollutants in valley bottoms, particularly in the winter.



# Air Pollution

Air pollution describes chemical, physical or biological materials introduced into the air that alter the natural characteristics of the atmosphere that can affect human health and the environment (Environment Canada).

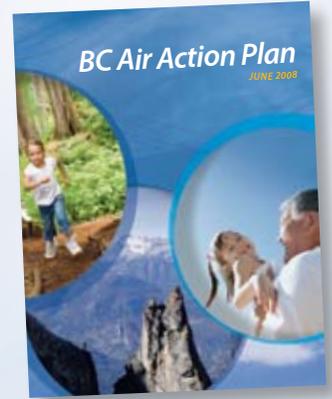
Air pollutants can originate from natural sources or human activity. Natural sources include dust, pollen, soil particles, and smoke from wildfires. In contrast, human activities produce waste products that are the source of thousands of different air pollutants. These air pollutants impact the quality of the air we breathe and the health of our lungs.

Common activities that result in air pollution in the Okanagan and Similkameen valleys are the burning of fossil fuels for energy, heating, transportation, and industrial operations; agriculture and forestry operations; residential wood heating; open and backyard burning. Sources of air pollution vary greatly in terms of the amount of pollution produced, as well as where, when and what they emit. When you think about air pollution, be sure to consider the full range of sources because they can all impact the air we breathe, whether they are big or small, public or private, urban or rural, mobile or stationary, commercial or residential.

Important air pollution sources can include everything from seemingly small sources, such as a backyard fire pit in a residential neighbourhood, a small dry-cleaning operation, an automobile collision repair business, or a diesel school bus idling in front of a school, to large industrial sources such as resource extraction or commercial operations in rural or urban areas or vehicles on a busy highway linking together communities.

**HERE'S A LITTLE CHALLENGE:** before reading further, take a few moments to think of at least five more sources of AIR POLLUTION in or near your community.

When it comes to the most common air pollutants, the Province of BC has identified **FINE PARTICULATE** (page 9) and **GROUND LEVEL OZONE** (page 10) as the most two serious air pollutants in its BC Air Action Plan.



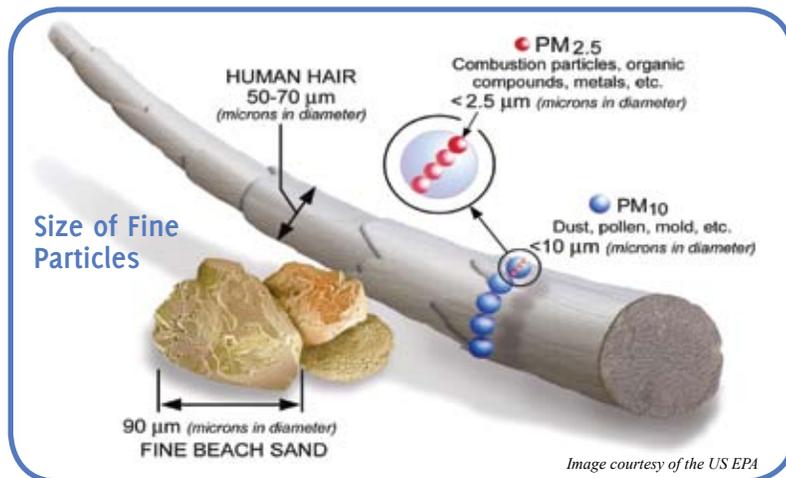
## Samples of air pollution sources: gasoline and diesel fuel engines, wood smoke, industry



## Particulate Matter

Particulate matter (PM) is the term used to refer to tiny particles in the air that come from a very wide range of emission sources. PM is classified according to size, which in turn tells us how deeply it can penetrate into our lungs and tissue.

Concerns over air quality focus on the concentration of fine PM in the air people breathe. Scientists generally believe that there is no safe level of exposure to fine and ultrafine PM. In other words, any actions to reduce PM emissions can have real health benefits.



## THREE SIZES OF PM

### PM<sub>10</sub>

PM<sub>10</sub> (diameter less than 10 $\mu$ ) is also known as **COARSE PARTICULATE**

- inhalable particles that can stay in the air for minutes or hours.
- can include dust, soil particles, large smoke particles, pollen and fibers (tire rubber, ground up vegetative matter).
- can travel as little as a hundred yards or as much as 30 miles.
- partially filtered by nose and throat, but can penetrate the deepest part of the lungs such as the bronchioles or alveoli.

### PM<sub>2.5</sub>

PM<sub>2.5</sub> (diameter less than 2.5 $\mu$ ) is also known as **FINE PARTICULATE**

- tiny, respirable particles that can stay in the air for days or weeks.
- can include wood smoke, emissions from burning fossil fuels, industrial emissions and aerosols.
- can travel airborne many hundreds of miles.
- can go even deeper into the lungs than PM<sub>10</sub>, right to the boundary where oxygen and carbon dioxide are exchanged inside the lungs.
- other hazardous chemical pollutants may adhere to PM and increase its toxicity.

### Ultrafine Particulates

**ULTRAFINE PARTICULATES** (less than 100 nanometres in diameter) are 1/100th the size of PM<sub>10</sub> or less

- come from a wide range of both natural sources and human activity.
- diesel fuel and wood smoke are common sources of concern.
- most concern is in areas of heavy traffic corridors.
- are so small that they can penetrate through the lungs, into the blood, and affect other organs.

Environment Canada and Health Canada have identified the following hazardous chemical substances in wood smoke\*:

- **Particulate matter**, a mixture of microscopic particles of varied size and composition, has been declared a toxic substance under the Canadian Environmental Protection Act. Inhaling these particles can lead to respiratory problems, and result in mortality for those with pre-existing heart and lung disease.
- **Carbon monoxide (CO)** is a colourless, odourless, poisonous gas that can reduce

the blood's ability to supply oxygen to the body's tissues. Inhaling high levels of CO may cause fatigue, headaches, dizziness, nausea, confusion and disorientation. Inhaling very high levels of CO leads to unconsciousness and death.

- **Nitrogen oxides** can lower your resistance to lung infections. In particular, nitrogen dioxide can cause shortness of breath and irritate the upper airways, especially in

people with lung diseases such as emphysema and asthma.

- **Volatile organic compounds (VOCs)** can cause respiratory irritation and illness. Some VOCs emitted by wood-burning appliances, such as benzene, are known to be carcinogenic.
- **Polycyclic aromatic hydrocarbons** are believed to pose a cancer risk with prolonged exposure.

- **Formaldehyde** can cause coughing, headaches and eye irritation and act as a trigger for people with asthma.
- **Hydrocarbons** can damage the lungs.
- **Dioxins and furans**: some have been found carcinogenic.
- **Acrolein** can cause eye and respiratory tract irritation.

\* from BC Lung Association "Wood Stoves and Your Health" brochure

## Ground Level Ozone

Some air pollutants are released directly into the air (primary pollutants) and some are formed by chemical and physical reactions that take place in the air (secondary pollutants), powered by the energy of the sun.

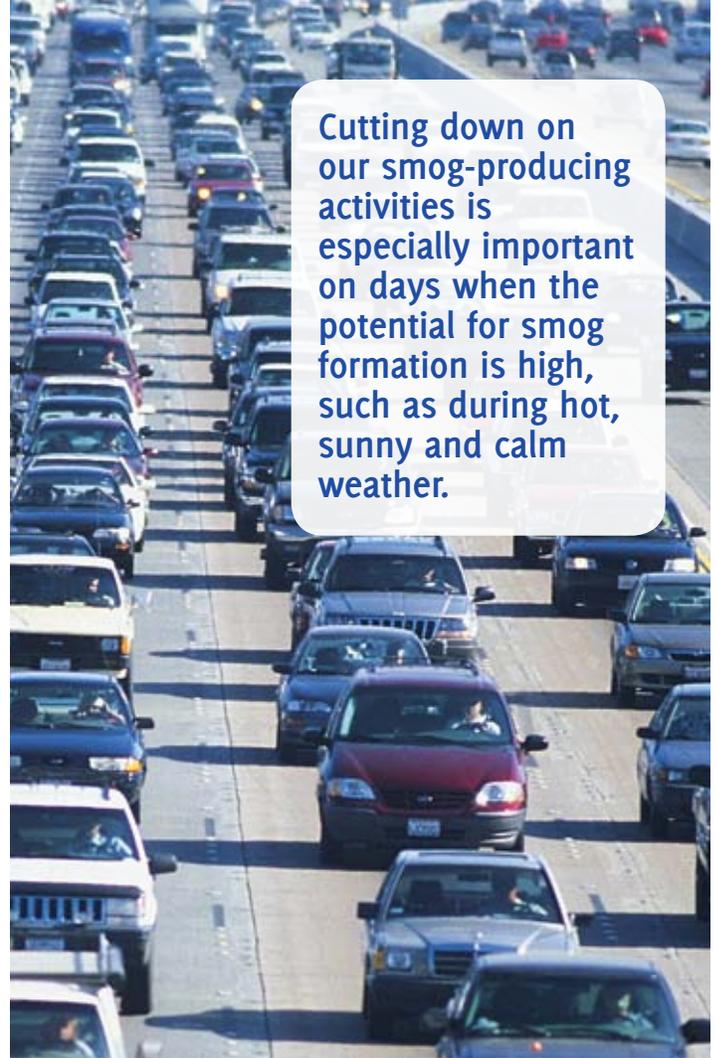
**GROUND LEVEL OZONE (GLO)** is an important example of a secondary pollutant and is one of the two most serious air pollutants to health in British Columbia.

Nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs) react in sunlight to create ozone (O<sub>3</sub>). There are many sources of NO<sub>x</sub> and VOCs in urban areas, and GLO contributes to the layer of smog that forms over cities. Because of its light diffusing properties, ozone is also responsible for much of the haze effect of urban smog.

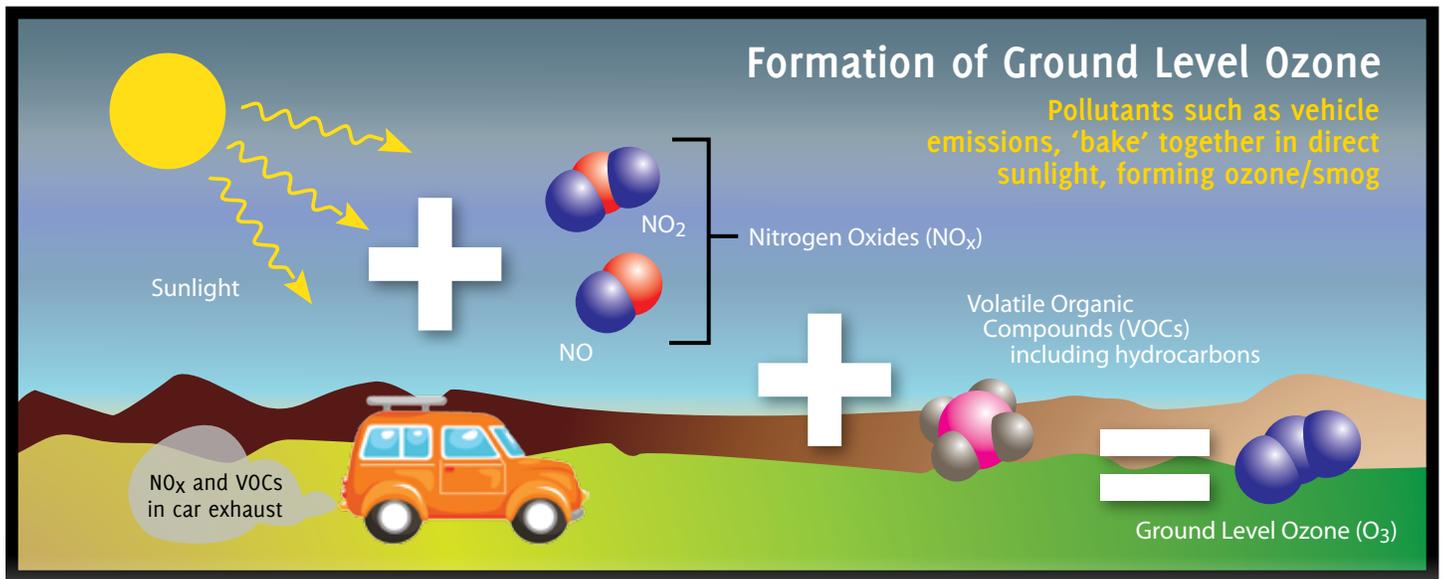
These chemical reactions that create ground level ozone depend upon a number of conditions, such as temperature, humidity, and the presence of other gases. Because of this, GLO levels tend to peak in the afternoon and early evening, dropping to lower levels overnight.

Small amounts of GLO also occur naturally (ie: from plants and soil). It is important that we reduce the amount of pollutants we put into the air (see list of Common Air Pollutants on page 12) because even small amounts can have a big impact.

**NOTE:** GLO should not be confused with the ozone layer in the stratosphere that protects the Earth from radiation. GLO does not provide this benefit – It contributes to air pollution.



Cutting down on our smog-producing activities is especially important on days when the potential for smog formation is high, such as during hot, sunny and calm weather.



**Ground level ozone and smog is accelerated in areas with more sunlight and higher temperatures – such as in the Okanagan and Similkameen Valleys.**

## HEALTH AND GROUND LEVEL OZONE

Exposure to ground level ozone for 6-7 hours, even at low concentrations, significantly reduces lung function and can cause respiratory inflammation in healthy people during periods of moderate exercise.

Impacts on persons with heart or respiratory conditions can be very serious. Prolonged exposure can damage lung tissue, cause premature aging of the lungs, and contribute to chronic lung disease.

In low concentrations, it can irritate a person's eyes, nose and throat. In high concentrations, ozone can damage or kill plants and trees, as well as reduce crop yield.

## ELEMENTS OF GROUND LEVEL OZONE

**NITRIC OXIDE** is formed as a by-product in the combustion of gasoline in automobile engines. Sunlight causes the nitric oxide in the troposphere to react with oxygen to form ground level ozone, one of the harmful pollutants in smog.

Supersonic airplanes produce nitric oxide in the atmospheric layer above where we live – the stratosphere – where the chemical compound can act as a catalyst for the decomposition of upper ozone. Upper ozone (or what is sometimes referred to as 'good ozone') benefits humans, animals and plants by shielding the Earth from harmful ultraviolet light.

Nitrogen dioxide and nitric oxide are often referred to together as **OXIDES OF NITROGEN (NO<sub>x</sub>)**. NO<sub>x</sub> is formed when fuel is burned, and so is a very common air contaminant, particularly in urban areas. Key sources include combustion of fossil fuel for heat (including natural gas), transportation, and industrial uses, residential and industrial wood burning, as well as other biomass combustion sources such as agriculture burning and forest fires.

From a health perspective, nitrogen dioxide (NO<sub>2</sub>) is of concern because it can irritate lung tissue and cause other respiratory problems. NO<sub>x</sub> is also of concern because of its involvement in photochemical reactions in the air to form the harmful pollutants in smog, such as ground level ozone.

**VOLATILE ORGANIC COMPOUNDS (VOCs)** are compounds that contain hydrogen and carbon and have a high vapour pressure, meaning they evaporate easily. VOCs often have a strong odour, and can be toxic on their own or through reactions with other air pollutants. Trees and other vegetation also produce VOCs.

In the presence of sunlight and NO<sub>x</sub>, VOCs react to form ground level ozone. Man-made sources of VOCs include gasoline and diesel emissions from transportation, the burning of industrial fossil fuel, incomplete combustion of petroleum products at mobile and industrial sources and solvent evaporation from products like paints, stains, varnishes, solvents, and thinners. Trees and other vegetation also produce VOCs that contribute to ground level ozone formation.



*Upper ozone layer in the Stratosphere is not the same as ground level ozone.*

Household paints that contain VOCs take approximately 30 days to emit their gases. Research is ongoing and low VOC or no VOC paints are now available for purchase.

### ***Health effects of VOCs are similar to those of ground level ozone.***

**HYDROCARBONS (HC)** are an important class of organic compounds (VOCs). Hydrocarbons contain only the elements hydrogen and carbon. They occur naturally in petroleum and natural gas, coal tar and coal gas. Hydrocarbons are the building blocks of the petro-chemical industry. Chemical companies use hydrocarbons from crude oil and natural gas to manufacture solvents, plastics, and synthetic fibers and rubbers. Commercial petroleum products such as gasoline, kerosene, airplane fuel, lubricating oils, and paraffin are mixtures of hydrocarbons.

Hydrocarbons can be divided into three classes. 1) aliphatics, 2) alicyclics, and 3) aromatics. Aliphatics are further divided into the paraffin, olefin and acetylenic series. These are used to produce methane, ethane, propane, halogens or hydroxyls and polyethylene, which is used in plastics. Benzene is the most important aromatic hydrocarbon. It is a colorless liquid cancer-causing material used in the production of plastics, styrofoam, synthetic rubber, nylon, synthetic detergents and pesticides, to name a few.

Hydrocarbon emissions consist primarily of unburned gasoline. Higher than acceptable levels of carbon monoxide or hydrocarbon emissions may be caused by fuel/air mixture problems or by malfunctioning emissions control systems.

The term **SMOG** was first used to describe the combination of smoke and fog that sometimes hangs over London and other cities with high humidity. Heavy concentrations of smog are poisonous. About 4000 Londoners died within five days as a result of thick smog in 1952.

Today, smog also refers to a condition caused by the action of sunlight on the exhaust gases from automobiles, homes, and factories. This type of smog is called photochemical smog.

# Common Air Pollutants

POLLUTANT	DESCRIPTION	PRIMARY SOURCES	HEALTH EFFECTS
<b>Particulate Matter (Airborne particles)</b>	Tiny, suspended dust and liquid particles, also known as PM <sub>10</sub> (particulate matter 10 microns or less in diameter) and PM <sub>2.5</sub> (particulate matter less than 2.5 microns in diameter)	Smoke, dust and diesel and gasoline exhaust	Respiratory health, cardiovascular health, visibility, immune system
<b>Carbon Dioxide (CO<sub>2</sub>)</b>	Gas that traps heat in the atmosphere	Burning fossil fuels (like coal, oil and gas)	Major contributor to climate change
<b>Carbon Monoxide (CO)</b>	Odourless, tasteless, colourless poisonous gas	Burning fossil fuels (like coal, oil and gas) Incomplete combustion of fuel in engines (mainly from cars) Also produced in homes by wood burning and natural gas heating	Interferes with the blood's ability to carry oxygen to the brain, heart and other tissues. Depending on the amount inhaled, CO can slow reflexes and cause fatigue, headache, confusion, nausea, and dizziness and in large amounts can cause death by suffocation
<b>Nitrogen Oxides (NO<sub>x</sub>)</b>	Gas that contributes to smog and traps heat in the atmosphere	Burning fuel	Respiratory health, climate, water ecosystems
<b>Sulphur Dioxides (SO<sub>2</sub>)</b>	Gas that dissolves easily in water	Burning fuel, gasoline and metal extraction	Respiratory health, Buildings, visibility, natural lakes and water ways,
<b>Volatile Organic Compounds (VOCs)</b>	Gases that react with nitrogen oxides to form ground-level ozone, the main ingredient in smog	Gases in the vapours of gasoline, solvents, oil-based paint	Eye, nose and throat irritation, headaches, loss of coordination, nausea
<b>Smog</b>	The chemical reaction of ozone, NO <sub>x</sub> and VOCs in sunlight	Motor vehicles, chemical solvents, industrial emissions	Respiratory health, cardiovascular health
<b>Sulphur Oxides (SO<sub>x</sub>)</b>	Emissions created when sulfur-containing fuel is burned	Petroleum refineries, pulp and paper mills, electric generating plants, smelters and metal refineries	Irritation of the upper respiratory tract, eye irritation and shortness of breath

Did you know that transportation causes about one-third of Canada's air pollution?

*What is in car exhaust?*

Carbon monoxide Benzene Nitrogen dioxide PM<sub>10</sub>  
Polycyclic hydrocarbons Formaldehyde Sulphur dioxide

# Monitoring Air Pollution

## AIRSHEDS

Airsheds are areas where local topography and meteorology result in a relatively predictable movement of air and air pollutants. Mountain valleys are natural airsheds because surrounding mountains and weather conditions can cause air pollution to get trapped at the valley bottom (see page 6).

For the purposes of managing and improving air quality, airsheds can be defined on the basis of political boundaries, the location of significant sources of air pollution, natural landscape features or a combination of all three.

The Okanagan Valley is a great example of a large natural airshed. Nonetheless, each of the three Regional Districts in the valley has developed its own airshed management plan based on district political boundaries and local air quality issues and concerns. A valley wide plan has also been created.

Because air knows no political boundaries, improving local or regional air quality often demands a collective approach that involves a variety of organizations, individuals, local and provincial government officials.

## HOT SPOTS

Local air quality hot spots are much smaller, more localized zones that frequently experience higher concentrations of air pollution because of nearby emission sources, landscape features, and/or local wind patterns.

For example, the air quality of all or part of a local neighbourhood can be significantly impacted by just one residential wood-burner using a non-certified stove and/or poor burning techniques, or one person idling an older diesel vehicle for extended periods of time. This diminishment of neighbourhood air quality wouldn't be identified at an airshed level, yet it can have serious health implications for nearby residents.

Recent studies have also shown how levels of PM<sub>2.5</sub> will double near highways and busy roads. In response, Vancouver now has a website that allows cyclists to search for routes that will minimize their exposure to traffic-related air pollution ([www.cyclevanancouver.ubc.ca](http://www.cyclevanancouver.ubc.ca))

In summary, the science of clean air may be complex, but the conclusions are simple; whatever is in the air will end up in someone's lungs and create health concerns. For this reason, identifying and minimizing local hot spots must become a focal point for local residents and stakeholders if health is to be adequately protected at a neighbourhood level.

**DID YOU KNOW?** People living within about 30 metres of highways and major roadways are likely to receive much higher exposure to traffic-related air pollutants compared to residents living more than 150 metres from highways.

AIR QUALITY ADVISORIES ARE ISSUED BY THE B.C. MINISTRY OF ENVIRONMENT AND METRO VANCOUVER TO INFORM THE PUBLIC OF DEGRADED AIR QUALITY AND TO TRIGGER ACTIONS (E.G., BURN BANS, REDUCTION IN WOOD STOVE USE) TO PREVENT OR REDUCE EMISSIONS.

For monitoring purposes, Air Pollution has been categorized by the Ministry of Environment into the following categories:

### NATURAL SOURCE

Air pollution produced from nature includes windblown particulate from soil, pollen, spores etc., as well as a biogenic haze from Pine trees.

### POINT SOURCE

Point source air pollution can be identified as coming from a fixed location and is attributable primarily to industrial sources, such as sawmills, manufacturing and processing plants.



### AREA SOURCE

Area sources of air pollution are generated throughout an area. They include pollution from wood burning appliances, backyard burning, agricultural burning, natural gas furnaces, vehicle and machinery exhaust, lawnmowers, and road dust, slash and forestry burns etc.

### MOBILE SOURCE

Mobile source pollution results primarily from transportation emissions.

After defining the source, Air Pollution is categorized into how it affects the Airshed. The categories are **AIRSHED LEVEL** and **LOCAL LEVEL**.

In the Okanagan, vehicles and forest fires have an airshed level effect. Other sources of pollution (smoke and dust) generally occur at a local level. Because monitoring stations do not record local level emissions, the Ministry of Environment cannot be relied on to take action to reduce this type of pollution. For example, if your neighbor is misusing a wood burning appliance (or burning garbage) and your home is enveloped in smoke (toxic PM<sub>2.5</sub>), there is a major pollution effect and health exposure to you and your family; but this will never be detected by any of the area monitoring stations and regionally, no problem will be identified. As a result, it is up to local, rather than provincial, governments to identify and control **LOCAL LEVEL** pollution.

# Health and Air Pollution

Medical science has confirmed that air pollutants such as wood smoke and diesel exhaust can have a range of effects on human health.

Those most vulnerable to the effects of air pollution are children ages 0-5, the elderly, pregnant women, diabetics and individuals with respiratory disease, cardiovascular disease or weakened immune systems. However, science now tells us that even healthy individuals are being affected. Children breathe more air per body weight than adults. Lungs are still developing in infants and small children. Air pollutants can affect the growth and function of their lungs.

The BC Air Action Plan identifies **FINE PARTICULATE (PM<sub>2.5</sub>)** and **GROUND LEVEL OZONE** as the two most harmful contributors to air pollution in BC.

When we breathe, air and pollution travel into our respiratory system. PM<sub>2.5</sub> travels deeper into the lungs than larger particles such as PM<sub>10</sub> (see page 9) AND because PM<sub>2.5</sub> is made up of things that are more toxic (like heavy metals and cancer-causing organic compounds), it can have far worse health effects than the bigger particles. PM<sub>2.5</sub> can collect in the air sacs (alveoli) where oxygen enters the bloodstream.

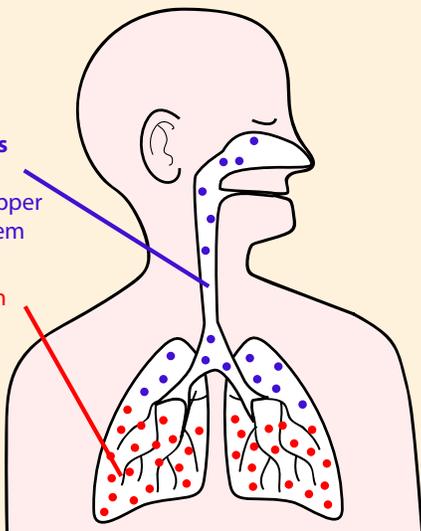
## HEALTH EFFECTS INCLUDE THE FOLLOWING:

- Coughing, wheezing, shortness of breath
- Aggravated asthma
- Lung damage (including decreased lung function and lifelong respiratory disease)
- Premature death in individuals with existing heart or lung diseases

*Smaller fine particles (PM<sub>2.5</sub>) travel deeper into the lungs than PM<sub>10</sub>.*

**coarse particles**  
**PM<sub>10</sub>** (found in dust) settle in upper respiratory system

**fine particles**  
**PM<sub>2.5</sub>** (found in wood smoke) settle in lower respiratory system



*Remember... what we put into the air ends up in our lungs.*



PM<sub>10</sub> can travel as little as 100 yards or as much as 30 miles.

PM<sub>2.5</sub> can travel many hundreds of miles through the air to neighbouring communities and is small enough to seep into homes.

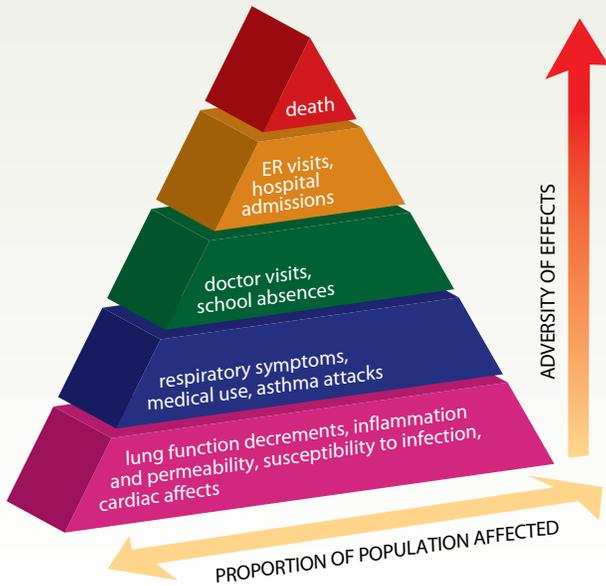
## DID YOU KNOW?

Your lungs contain about 600 million teeny tiny air sacs called 'alveoli.' If you stretched them out, their combined surface area would cover an entire tennis court.

The health and economic impacts of air pollution in BC are significant. The Canadian Medical Association predicted air pollution to cause two and a half million minor illnesses in BC in 2008 alone, along with 306 premature deaths and increased emergency-room visits, hospital admissions and doctor's office visits, at an estimated economic cost to the province approaching one billion dollars (\$1B).<sup>1</sup>

<sup>1</sup> "No Breathing Room: National Illness Costs of Air Pollution," Canadian Medical Association, 2008.

# Health Impacts from Breathing Wood Smoke and Smog:



## Are you a chimney smoker?

Visible smoke means an inefficient burn, creating unnecessary pollution.

**SENSITIVE POPULATIONS** are those who are most vulnerable to the effects of air pollution, which include:

- children, especially ages 0-5
- the elderly
- pregnant women
- diabetics
- individuals with respiratory disease, cardiovascular disease or weakened immune systems

Consider that these people may be your neighbours.

We all share the air. Be aware of the pollution you are creating in your neighbourhood. It may not create a serious risk for you, but it could harm those living near by.

Even one poorly burning wood stove can make a difference to someone's quality of life.



“Long-term exposure to air pollutants can lead to cardiovascular and respiratory effects. In addition, exposures as brief as hours or days can precipitate sudden respiratory and cardiac illnesses or even death. Air pollutant exposure has also been linked to pre-term birth, low birth weight, acute respiratory infections and otitis media in children.

Health is protected over both the long and the short term by living in a community with low levels of air pollution, working and living away from local sources (including traffic), and having clean air indoors.”

Source: BC Lung; BC Physician's Primer



**TAKE CARE OF THE AIR for everyone's health.**

Airways are the tubes in your lungs that carry the air in and out of your lungs. If you connected all your airways end-to-end, about how far would they go?

Answer: 2400 km

# Understanding the sources of pollution

The following major sources of air pollution have been identified in BC:

- Engine Emissions
- Wood Smoke
- Garbage Burning
- Yard Waste Burning
- Dust
- Chemical Spray

By learning more about these sources, you can learn to reduce their contributions to air pollution.

Look for alternatives. Seek solutions that put less pollutants into the air.

Share your knowledge. The more people who do a small part, the larger the overall impact will be on improving air quality.



*Take responsibility.*



## WHAT CAN YOU DO?

### Simple Actions to Improve the Quality of our Air

- Turn off your vehicle engine when you are stopped and/or waiting
- Use active transportation (biking, walking) for short trips
- Use public transportation whenever feasible
- DO NOT BURN yard waste – Compost it instead or take it to the landfill for composting
- Trade your gas mower for a push-mower or electric mower
- Minimize wood smoke by burning small hot fires in wood-stoves, backyard fire pits and outdoor fireplaces
- Avoid backyard fire pits in residential communities
- Burn only dry wood in campfires
- Upgrade old, inefficient wood-burning appliances for low or zero emissions heating appliances

*One person can make a difference!*

# Engine Emissions

What's the best way to make a difference when you use your vehicle?

- Pay more attention to how you drive and to the upkeep of your vehicle. Through simple vehicle maintenance and driving habits, we can all help improve air quality and quality of life, especially for those with respiratory conditions. Poorly maintained vehicles contribute to particle pollution and ozone. (See [Particulate Matter, pg.9](#) and [Ground Level Ozone, pg.10](#))
- Encourage your community to be idle-free.
- Idling a vehicle not only wastes fuel, it is also hard on your engine. When driving, oil pressure is kept high by a working engine, this lubricates the engine well. A low-revving (idling) engine can only produce a small amount of oil pressure to lubricate itself with. This means an idling engine is excessively wearing itself down.
- Keep winter warm-ups brief (1-3 mins).
- In extremely cold conditions, use a block heater with an automatic timer and turn it on for no more than two hours before you plan to drive.

## TRUTH ABOUT VEHICLE IDLING:

- Turning off your engine when parked or when stopped for more than 10 seconds plays a huge role in improving local air quality.
- Idling for over 10 seconds uses more fuel than restarting.
- Idling will lead to more rapid engine oil contamination, due to increased residue in the engine, resulting in an incomplete combustion cycle and condensation of unburned fuel on cylinder walls; the unburned fuel residue can damage the engine, and can result in more frequent servicing and repairs of vital parts of the vehicle.
- Idling decreases the operating life of engine oil by 75%.
- With today's engines the best way to warm up a vehicle is to drive it slowly for the first few minutes while your car warms up.

## SMALL ENGINES POLLUTE TOO

Most people do not associate mowing the lawn with air pollution. Yet, emissions from lawn mowers and other small gas powered engines are a significant source of air pollution. In fact, operating a gas-powered mower for one hour emits as much pollution as driving a car approximately 90 km (60 miles).

- Hold off using a gas-powered yard equipment until evening.
- Consider electric or manual-powered yard and garden tools when it's

time to replace your gas powered equipment.

- Use a gas can that is easy to handle and use a funnel spout with a stop device to prevent overfilling.
- Store gasoline in a tightly-closed container, in a cool, dark place such as a garage.
- Keep at ground level to reduce the risk of falling or spilling.

The Mow Down Air Pollution program was created to address the negative

environmental impact of small-engine emissions and has become Canada's largest gas lawnmower and trimmer exchange, recycling and rebate program.

This program is only offered at certain times of the year.

FOR INFORMATION AND DATES search 'Mow Down Air Pollution Canada' online or see [www.mowdownpollution.ca](http://www.mowdownpollution.ca).



**MYTH:** Turning off my vehicle when stopping or parking for a minute or two causes more wear and tear.



**TRUTH:** Turning off my vehicle prolongs the life of the engine.



**TRUTH:** Turning off also ensures better air quality and cleaner air to breathe.



# Engine Emissions

## SCHOOL – PARENTS, TEACHERS, BUS DRIVES, DAY CARE GIVERS

- When dropping or picking up children from school, remember the rule – **NO IDLING AT SCHOOL.**



- It is Important for the health of our children that parents get in the habit of always turning the vehicle off when stopped – or parked.
- Children are lower to the ground (where the exhaust is). If you leave a vehicle idling during drop-off, children exiting vehicles and those walking past are breathing in that exhaust.
- Children’s lungs are still developing, therefore they are more susceptible than adults to the negative health effects caused by pollutants in the air. Children with asthma are at particular risk.
- Adopt a **“CLEAN AIR – WE ALL SHARE THE AIR”** slogan for your school.
- Encourage your Parent Advisory Committee and Principal to adopt an Idle-Free School Zone. Get the message out to parents by handing out idle-free literature in the parking lots, and send monthly reminders in school newsletters.
- Extend the rule to after school activities. Do not idle the vehicle at the hockey arena, library, sports field or anywhere you are dropping off or picking up children.



## POST OFFICE, GROCERY STORE, BANKS

Often vehicles are seen idling at these locations. Even if you are just ‘running in’ for a second, remember that everyone is affected by air pollution. Turn off your engine.

## DRIVE-THRU

If you go through a drive-thru, make it a habit to turn your engine off when ordering and when picking up your order. Turning off ensures better air quality and cleaner air for those working at these locations. High concentrations of air pollutants from idling can build inside the businesses and spread throughout the neighbourhood, impacting the health of the residents.



## ROAD CONSTRUCTION

Vehicles should be turned off immediately at road construction waits.



## CELL PHONES

When pulling over to talk on cell phones, turn off your engine, even for a quick chat.

## TRUCK DRIVERS

Idling wastes fuel and money. A typical truck burns approximately 4 litres of diesel fuel for each hour it idles.

**DO NOT IDLE YOUR VEHICLE  
WHEN DROPPING OFF  
CHILDREN.**

## HERE'S HOW EASY IT CAN BE TO HELP THE AIR

- Keep your vehicle tuned up – Keeping an engine properly tuned and changing oil regularly can improve gas mileage up to 40% and it creates less air pollution.
- Keep your car's tires properly inflated:
  - Under-inflated tires use more fuel and decreases tire life – make it a habit to check tire pressure in all four tires every two weeks or at least once a month.
  - Properly inflated tires can improve mileage up to 20% and are also safer.
- Service your car when the "Check Engine" light comes on.
- Change the vehicle's air filter – replacing a clogged air filter can improve gas mileage by 10%.
- Stop at the click when filling your car's gas tank (the fuel added after the click is wasted).
- Refuel in the mornings or evenings when the air is cooler (fuel vapors when filling the tank mix with sunlight and create ground level ozone, a respiratory irritant).
- Close the gas cap until the 'click' is heard.
- Plan ahead, combine errands and listen to traffic reports.
- Reduce unnecessary loads in your vehicle.
- Drive smoothly to avoid abrupt starts and stops.
- Avoid idling
- Turn vehicles off when stopped at road construction



A well-maintained vehicle burns less gas and creates less air pollution.

## DID YOU KNOW?

500 hrs of idling = 100,000 kilometers of wear

### CONSOLIDATE TRIPS:

Combining errands into one trip saves time and money. Several short trips taken from a cold start can use twice as much fuel as a longer multipurpose trip covering the same distance when the engine is warm. Trip planning ensures that traveling is done when the engine is warmed-up and efficient.

### MINIMIZE DRAG:

Drag reduces fuel efficiency. A roof rack or carrier provides additional cargo space but can decrease fuel economy by 5%. Reduce aerodynamic drag and improve fuel economy by using a removable rack and placing items inside the trunk whenever possible.

Avoid carrying unneeded items, especially heavy ones. An extra 100lbs in the trunk reduces a typical car's fuel economy by 1-2%.

### RIDE SHARE:

- Coordinate rides to and from school
- Coordinate rides with after school activities
- Coordinate rides to work

### ALTERNATE FORMS OF TRANSPORTATION:

- Walking, biking, taking Transit
- alternative fuel vehicles



## WHAT CAN YOU DO?

# Wood Smoke

High-efficiency wood stoves and fireplace inserts are certified as “low emission” by the U.S. Environmental Protection Agency (EPA) – a standard accepted in British Columbia and by the CSA International.

Modern wood heating appliances emit less pollution and reduce creosote buildup. They also use up to 1/3 less wood.

### UPGRADE THE OLD TECHNOLOGY WOOD STOVE

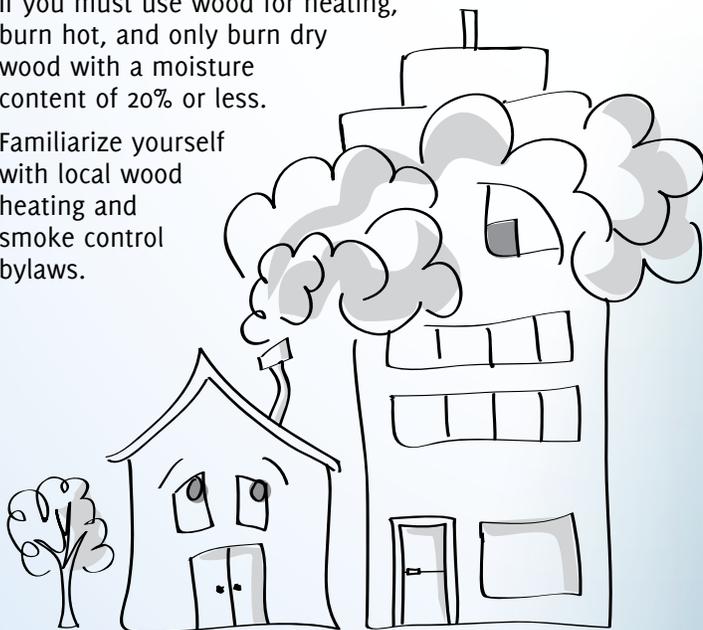
- Trade in old technology wood heating appliances for new EPA approved ones. New improved technology wood stoves force smoke back into the firebox and re-burn it, creating less air pollution from your chimney stack.
- When trading in, look for an EPA emission rating of 4.5 grams per hour or less. The lower the emission rate, the less air pollutants released from the chimney into the air.
- Be sure to render the old stove unusable and take it to the landfill or salvage yard, where the metal is recycled.
- Ensure the new wood stove is the correct size for your home and that it is installed in an appropriate location for effective heating. Buying a wood stove that is too large for the area to be heated will require it to be dampered down to maintain a comfortable temperature, which will create smoke and increase air pollution

Some communities will issue local air quality advisories asking people not to burn wood during certain times. Please respect those advisories.

### BE A GOOD NEIGHBOR WHEN HEATING WITH WOOD

Wood smoke from chimneys in residential areas create particles so small they can enter neighboring homes.

- Minimize pollution and only heat with wood when necessary.
- If you must use wood for heating, burn hot, and only burn dry wood with a moisture content of 20% or less.
- Familiarize yourself with local wood heating and smoke control bylaws.

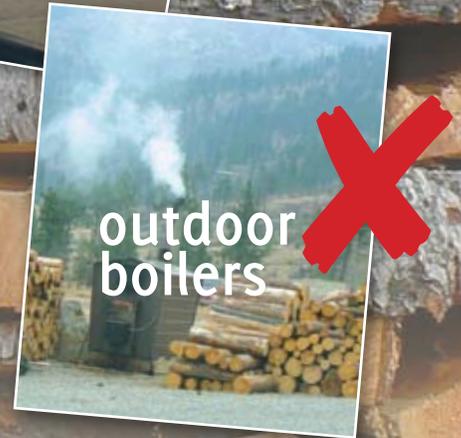


**44%** of Canadians living in communities of less than **10,000**, report having a **wood stove, pellet stove or fireplace**, and **70%** of those Canadians say they use it daily or almost every day during the winter.



- Modern wood heating appliances emit less pollution and reduce creosote buildup.
- Change out old technology wood stoves for new EPA approved ones.
- Even with a new appliance, burning correctly is still the most important factor in reducing air pollution

inefficient  
burn



**It is possible to burn throughout the day and night without the smoke. If you cannot find the solution to a smokeless burn, wood heating retailers are happy to help.**

## When heating with wood, follow these simple rules:

- Burn only clean, dry untreated wood that has been seasoned and split.
- Start a fire with only clean, dry kindling or black and white newsprint.
- Never burn colored or white paper, box board, treated wood, varnished or painted wood etc.
- Make a small hot fire.
- Maintain a good air supply into the wood stove to allow more efficient combustion.
- Watch for smoke signals! Go outside and check your chimney. Smoke billowing out indicates a poor burn and dampers or air inlets need to be adjusted to let in more air.
- If there is still smoke, firewood may be too wet or the size too large.
- Never turn the air control down so much that the fire smoulders.
- Wood should be flaming brightly until it is reduced to charcoal.
- Do not install/reuse old technology stoves in a cottage or workshop as the pollution levels are too high.
- Do not install outdoor boilers, as they emit very high levels of smoke pollution (In some communities outdoor boilers are banned).
- The chimney must be installed up through the warm space of a house – do not install a chimney through the wall and up the outside of the house.
- The venting system (flue pipe and chimney) should be as straight as possible.
- When remodeling or building a new home, insure that the chimney is not positioned where the emissions will enter the home next to you.
- If homes are close together, consider alternative heating to wood heating.

# Firewood

The four main factors that influence how firewood burns are moisture content, piece size, wood condition and tree species.

The moisture content of the wood affects the rate at which it burns and the efficiency of combustions. As much as half the weight of freshly cut logs can be water.

This water must be reduced to achieve correct moisture content for fire wood, which is 16 – 20%. Burning wood with a higher moisture content will produce more smoke.

How the wood is processed and stored for drying to achieve this moisture reduction goal is critical.

Wood should be cut to the right length, split to a variety of sizes about 3 to 6 inches across. Stack your wood off the ground on rails or in a wood shed with the sides open so air can circulate between the pieces. Cover the tops of the stacks to prevent rain from soaking down through the wood. Do not store wood inside the house or garage as it could create mold.

During the summer, when the weather is hotter, the moisture content of the wood will fall to about 20% or less.

## DIFFERENT TYPES OF WOOD REQUIRE DIFFERENT DRYING TIMES:

- **SPRUCE/PINE** – split first – and then dry at least 6 months (April – September)
- **FIR** – at least a year
- **HARDWOODS** – fruit, birch, maple need to dry 2-3 years
- **FRUIT** – at least six months

It is important that wood is covered to keep rain and snow off. A roof with open walls works well as it provides lots of ventilation.

There are now reasonably priced moisture meters on the market to test your firewood for correct dryness.

If purchasing firewood, and before it is unloaded in your yard, ensure that it is the correct moisture content and cut to the right size.

Wet firewood not only produces more air pollution but it also creates more creosote buildup – a common cause of house fires.

Firewood length should not exceed 40 cm (16”), or 30 cm (12”) for smaller fireboxes. Split wood into a variety of sizes for convenient fire building and maintenance. 8-15 cm (3”-6”) in diameter is recommended. Fires burn better with more wood surface area exposed to the flame.

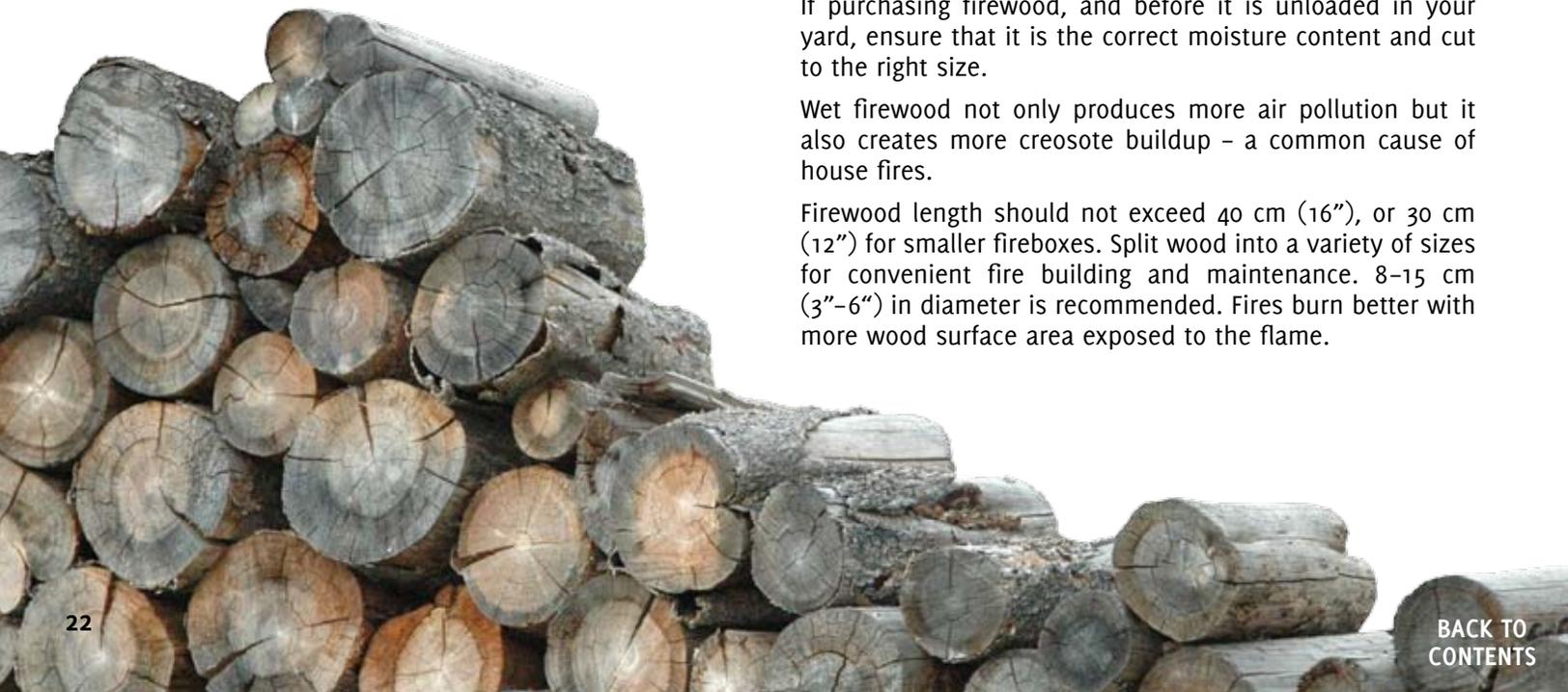


STORE DRYING KINDLING IN BOXES FOR USE THROUGHOUT WINTER



## BURN ONLY CLEAN DRY (SEASONED) WOOD

Burning green (wet) wood produces more air pollution. Burning seasoned wood reduces wood consumption by 25%.

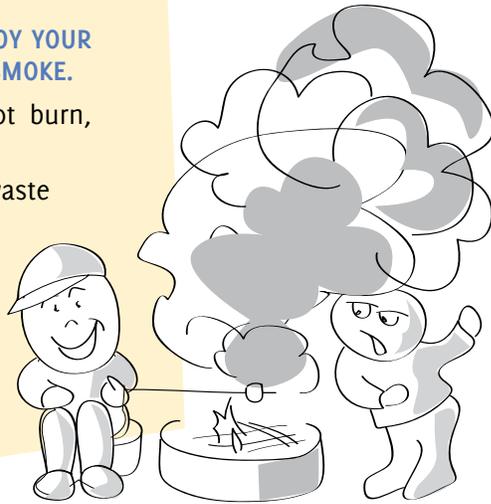




- Keep camp fires to campgrounds.
- Avoid residential recreational backyard camp fires especially when living in close proximity to other households.
- Those with respiratory conditions, heart conditions and children have a right to fresh air.
- Many municipalities do not allow backyard campfires or burning in enclosed fire pits, check local bylaws.

### CAMPFIRES ARE FUN. ENJOY YOUR CAMPFIRE WITHOUT THE SMOKE.

- Pile wood to get a hot burn, not a smoldering fire.
- NEVER burn camping waste such as:
  - marshmallow bags
  - boxes
  - paper(recycle these items)



- Whether your firewood is for indoors or out, burn fires hot and adjust your burning technique to eliminate smoke and pollution
- Consider the amount of smoke you are putting into the air when you burn.
- Smoke is a sign of an inefficient burn
- Remember the simple rule: Burn only clean, dry wood... and nothing else.

Firewood used for heating or used in a camp fire should be split, stacked and dried for at least six months before burning.



*Burn only clean, dry wood that has been seasoned and split.*

# Burning Wood Waste

- **BEFORE BURNING** check local municipal, regional, and provincial bylaws and regulations to see if burning is permitted in your area, and if so, check restrictions/requirements (see pg.25).
- Valley communities have poor wind dispersion and temperature inversions, which cause pollutants such as smoke to collect in the valley bottoms.
- If you choose to burn, make sure the pile only contains clean, dry, untreated wood. **NEVER BURN** painted or treated wood, PVC pipe or garbage.
- Remove most soil and rock from the roots (soil left in the roots will create more smoke pollution).
- Pile tree wood waste piles for sufficient airflow in order to achieve a hot burn with little smoke. Ensure fire is out by sunset.
- Dry wood waste before burning (wet wood creates more smoke pollution). Stumps take longer to dry.
- Burning wood waste is a major contributor to air pollution, a waste of a valuable natural resource, and kills soil under the burn site... consider alternatives.
- Alternatives include chipping, seasoning the material, milling (ie: for flooring) or taking to the landfill where it is chipped (some landfills do not charge a tipping fee on agricultural tree waste). See [bcairquality.ca/topics/rcbc-alternatives.html](http://bcairquality.ca/topics/rcbc-alternatives.html)



**DO NOT BURN FRESHLY REMOVED STUMPS/ROOTS - IT CAUSES TOO MUCH SMOKE POLLUTION.**



**Check your local bylaws to see if burning is allowed, and for required wood drying time in your area.**



This resident is hauling sorted demolition wood waste to the landfill where it will be chipped for compost.

*When there is a will there is a way!*

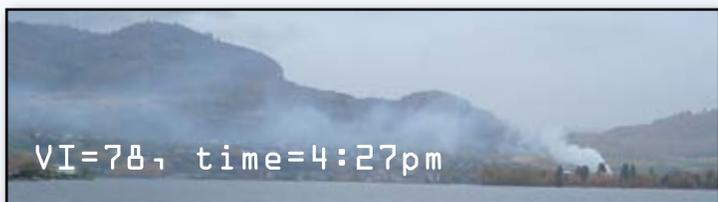
**REMEMBER:** hotter burn = less smoke = less pollution  
**Burn only dry, clean, untreated, unpainted wood.**



**NEVER** add forbidden material to the burn pile. Treated wood, painted wood, PVC pipes, garbage, etc. are illegal to burn. Burning these materials releases chemicals into the air that are hazardous to health and they can pollute the soil and water.

## VENTILATION INDEX (VI)

- **BEFORE BURNING**, check local bylaws for burning restrictions and Ventilation Index requirements.
- A Ventilation Index is an estimate of how well smoke SHOULD be carried away from the surface (the valley bottom).
- Because it is an estimate, the reported VI is a general forecast. Specific venting forecasts are available for a fee if detailed data on your location is required.
- Use the VI as a tool, but do not rely solely on its forecast, as many other factors are involved in determining whether conditions are good for burning.
- The Provincial Open Burning Smoke Control Regulation states that the Ventilation Index must be “good” to conduct an open burn. Some local bylaws burning requirements are more stringent.
- **It is recommended that open burns are conducted on days when the Ventilation Index forecast is 65 or greater.**
- In some areas, the VI and Air Quality forecast must both be good in order to burn. Check your local bylaws before burning.
- The higher the Ventilation Index, the better the smoke will disperse.
- The VI is generally higher in the afternoons than in the mornings. Venting is better in the afternoons.
- The key to minimize smoke is to burn small, hot fires, build piles to ensure good air flow, and be sure the fire is out by sunset.
- Clear, cold, calm winter days are poor venting days, as there are no up-drafts to carry smoke away from the surface.
- For burning season, mid March and April and mid October have the highest number of good venting days.
- Poor burning practices produce smoke.



### OPEN BURN CHECKLIST

#### 1. CONSIDER THE ALTERNATIVES

#### 2. FOLLOW LOCAL AND PROVINCIAL BYLAWS

Call your local government for information on local burning, smoke or fire safety bylaws and to **obtain burning permits**.

The Provincial Open Burning Smoke Control Regulations (OBSCR) apply to all areas.

In BC, offenders of the OBSCR can be reported to the toll free hotline (24hr) at 1-877-952-7277 or online at [www.env.gov.bc.ca/cos/rapp/rapp.html](http://www.env.gov.bc.ca/cos/rapp/rapp.html)

#### 3. CHECK THE VENTILATION INDEX (VI)

Environment Canada maintains and reports a daily Smoke Control Forecast. It is a Burn Advisory, which uses the regions Venting Index to help prevent open burning when conditions for smoke dispersion are not good. It is available in BC toll free at 1-250-861-7405

0 - 33 = POOR (Burning is not acceptable, or permitted by some by-laws)

34 - 54 = FAIR (Burning is not acceptable)

55 - 100 = GOOD (Conditions are acceptable for burning)

#### 4. REPORT BURNING PERMIT NUMBER

Before starting your burn, you must call in your burning permit number to activate it. The number to call will be on your permit.

Areas without a local government burning bylaw may require a burn registration number from the Ministry of Forests, Lands and Natural Resource Operations. Call Toll Free: 1-888-797-1717

#### 5. CONDUCT A SMALL TEST BURN

**Even though the VI is good on the day you are conducting a burn, it is important to test local conditions to ensure the smoke is not travelling along the ground through residential or school areas.**

#### 6. BURN ACCORDING TO BEST MANAGEMENT PRACTICES

**JUST BECAUSE VI IS GOOD, IT MAY NOT BE AN IDEAL TIME TO BURN. MANY FACTORS ARE INVOLVED.**



This photo demonstrates poor wind dispersion and poor burning practices, creating a smoke load on the valley bottom and releasing a large amount of pollutants into the air. (See [About Valley Communities](#), pg 6)

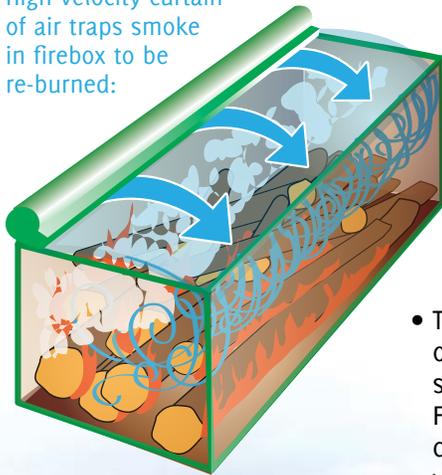
# Air Curtain Burners

Before using an Air Curtain Burner or conducting any type of open air burn, consult the Provincial Open Burning Smoke Control Regulation and local burning bylaws

- The operating principle of the air curtain burner is the introduction of controlled high velocity air across the upper portion of a combustion chamber in which clean wood (ie. wood waste from land clearing) is loaded. The powerful curtain of air created in this process traps unburned particles (smoke) under the curtain where it is re-burned.
- The burner is a large ceramic-lined metal firebox that sits on the ground. Some require set up, while others are completely self-contained.
- A diesel operated fan mounted outside the box blows air along a tube running along the top of the burner. (see diagram) The air is directed at high velocity across and then down into the firebox, creating higher temperatures for a much faster and cleaner burn. The curtain of air acts like a lid trapping and forcing smoke and particulate back into the firebox.
- A puff of smoke is produced as wood waste is loaded inside the box due to the air curtain being broken, then quickly, the smoke stops as the air curtain closes trapping most of the particulate and smoke below.



High velocity curtain of air traps smoke in firebox to be re-burned:



- To keep the fire burning smoke-free, fuel loaded into the firebox needs to be controlled carefully.
- Curtain burners should be operated by an experienced operator to ensure a smoke-free burn. When a curtain burner is operated correctly, all that is visible is hot gas escaping through the air curtain.
- To view air curtain burners in operation, visit [YouTube](#) online and search for "air curtain burners". For additional resources on land clearing alternatives to open burning, view YouTube videos on trench burners, forestry tillers, soil stabilizer attachments, mulchers and rock and stone crushers.



## Land Clearing

- Before removing trees, research bylaws and provincial/federal regulations on removal, then CREATE A DISPOSAL PLAN.
- Research various disposal options; salvaging, chipping (see pg. 27), full tree mulching, local saw mills and/or log home builders.
- Check with your local composting facility, many accept wood waste whole or chipped for composting.
- If burning is the only option and is permitted in your area, consider using a curtain burner, but first check local bylaws and Provincial Open Burning Smoke Control Regulations.

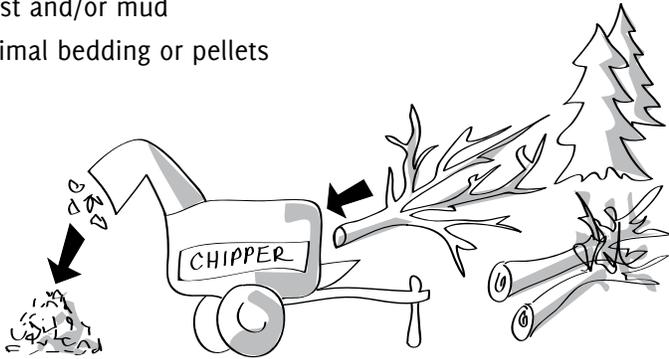


# Chipping or Salvaging

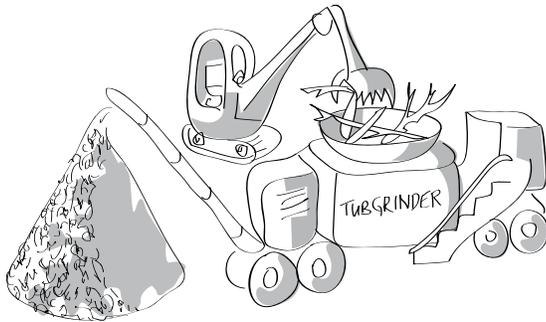
CHIPPING is an alternative to burning wood waste (wood from prunings and/or tree removal). Chipping is a good utilization of a natural resource, while burning in the open air is a waste and it creates unnecessary air pollution that is harmful to health.

Wood chips can be used for:

- mulch (1-2 inches long): weed control, pest control, water retention, prevents soil erosion
- adding to compost (smaller chips, easier to break down): provides soil nutrition.
- soil conditioner (very small chips, or partially decomposed) break down and reintroduce organic matter (carbon) into the soil
- landscaping (can be larger): use on pathways and roads to reduce dust and/or mud
- animal bedding or pellets



Many landfills now chip wood waste and use it to make compost.



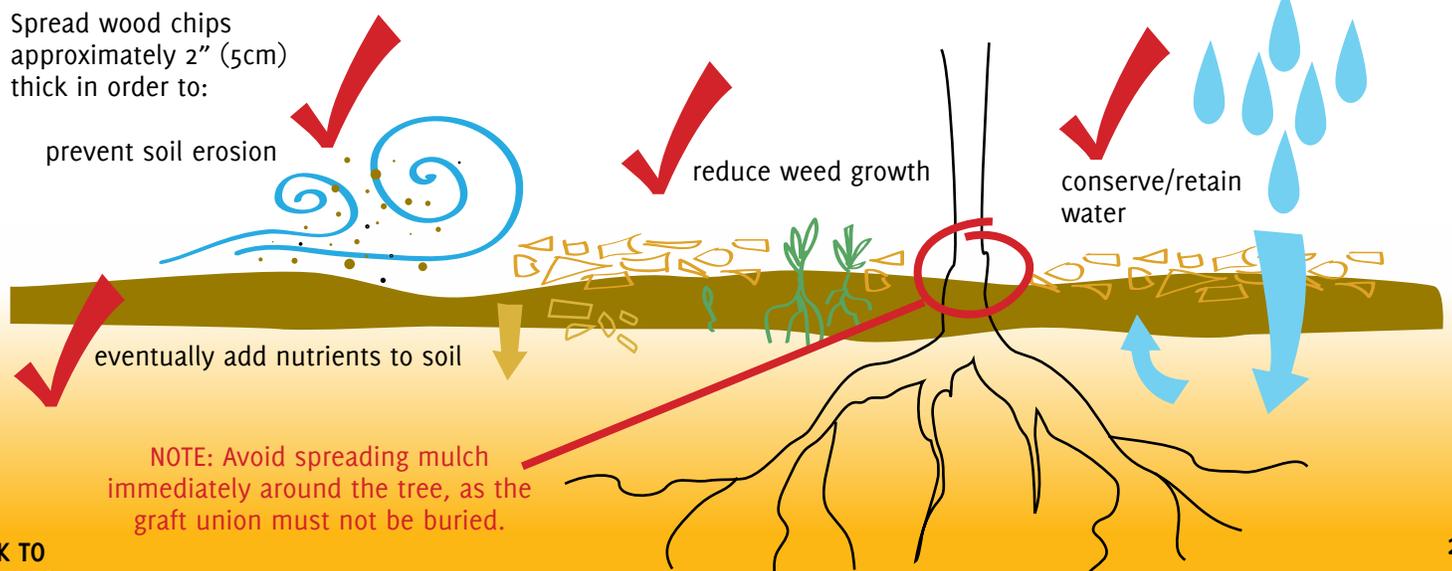
## WHAT CAN SALVAGED WOOD BE USED FOR?

- fueling wood burning ovens, stoves and fireplaces
- smoking or barbequing food
- craftsmen use fruit wood to create furniture and household items
- larger trees can be milled for flooring



## UTILIZING WOOD CHIPS as a mulch

Spread wood chips approximately 2" (5cm) thick in order to:



## WHAT CAN YOU DO?

# Eliminate Garbage Burning

Unlike seasoned firewood, household garbage contains a wide range of materials and chemicals. Burning garbage does not destroy those chemicals – it just changes their form, causing unpredictable and harmful chemical reactions.

Burning garbage is harmful to your health, your wood heating system and the environment.

Dioxin is just one of the many pollutants produced by burning garbage. This highly toxic cancer-causing agent does not break down. Airborne dioxin settles in soils, water and vegetation, where livestock and fish can eat it.

Even burning paper products can be risky because of the chemical contamination. Diapers, coated cardboard, box board and magazines typically all contain plastics.

Most paper and plastic products can be recycled. Recycling provides more raw material for new products.

Wood stoves, fireplaces, and furnaces are designed and certified to burn untreated, clean, dry wood with just enough plain (black and white) newspaper to get fires started.

Burning garbage at home, the cottage or camping is the fifth-largest known source of dioxins in Canada. When you are camping, always take home your garbage and recycle what you can. NEVER burn your camping garbage.

Remember, the ONLY type of paper to use for a starter paper is black and white newsprint.

Never use colored flyers, glossy or white paper. These create toxic chemicals when burned. White paper is bleached. When it is burned in a home fire, campfire or wood stove, the heat reacts with the bleaching agents creating dioxin.



### WORRIED ABOUT IDENTITY THEFT?

Some people burn their invoices and important documents to prevent the information from getting into the wrong hands.

Burning these creates a chemical reaction, causing the bleaching agents in the white paper to release dioxins.

**TIP: DON'T BURN papers.** Cut off your personal information such as account numbers, name and address from invoices, bills etc. before recycling.

Tear up the personal information into tiny bits or shred and toss into the garbage.



**DID YOU KNOW?** Many communities have banned burn barrels.

With the awareness of the hazards of burning garbage rural area community residents are discontinuing the practice of burning garbage and are now taking their burn barrels to the landfills metal recycling pile.

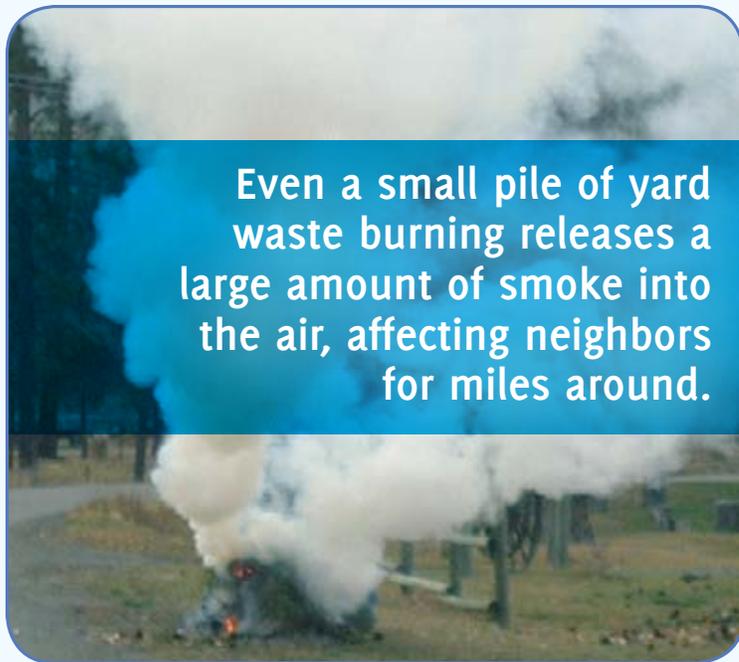


**PAINTED WOOD** is illegal to burn. It should be taken to the landfill.



**NEVER BURN GARBAGE** in your campfire.

# Do Not Burn Yard Waste



## DO NOT BURN YARD WASTE. IT CREATES UNNECESSARY POLLUTION.

Many communities prohibit the burning of yard and garden waste. Burning these materials create unnecessary air pollutants.

These materials are a valuable resource if used for composting. Compost builds healthy, and nutrient rich food for plants. Healthier plants are more resistant to disease and pests.

If you do not have a compost pile, bag your yard waste and haul to the landfill, where it will be composted.

Open air burning (in a pile or burn barrel) of leaves, prunings, grass or weeds is no longer an acceptable form of disposal.

Tree and shrub prunings can be chipped and added to the compost too. Many equipment rental companies now have portable chippers that homeowners can rent.

**TIP:** Encourage other residents in your neighborhood to chip at the same time, and share the costs of the chipper.

In areas where burning yard and garden waste is allowed, please don't. One small pile can pollutant for many miles.

## NEVER burn leaves or grass.

NEVER burn wet wood, as it smolders and creates more unnecessary smoke pollution than dry wood waste.

Burning IS NOT a suitable control option for invasive plants because:

- fire creates a pulse of nutrients that feeds any existing plants – so if weeds are present, they will be fertilized
- fire typically does not destroy seeds, as least those with a hard coat; instead a suitable seed bed is created
- our most aggressive invasives are deep rooted perennials and the growing tissue is not affected by a surface fire; the roots remain intact and the nutrients released from the fire create amazing growing opportunities so the perennials flourish post-fire

## DO NOT burn weeds.



# WHAT CAN YOU DO? Composting

COMPOSTING is an excellent alternative to burning waste.

- Yard waste, such as leaves, grass and garden waste can be composted or hauled to the landfill for composting.
- Compost is food for the soil and reduces reliance on petroleum-based fertilizers, pesticides and herbicides

## RESIDENTIAL COMPOST BIN:



Fruit and vegetable scraps, tea, coffee grinds, egg shells

Layer dried leaves and table scraps. Water and aerate as needed to keep moist and odour free.



Leaves



Learn how to compost at local programs, such as this one at the community gardens in Penticton.



There are various types of compost bins available on the market, or you can make your own. In-home worm composting is another option.

## WHAT GOES INTO COMPOST?



Check with local government and colleges for courses on composting.

## WHAT CAN YOU DO?

# Reduce Dust

Road dust consists of:

- Loose materials such as silt and sand
- Vehicle exhaust, tire and brake wear
- Sand and other aggregate residues applied to roadways in the winter
- Road salts applied to roadways in the winter
- Iron filings from winter snow removal blades

To reduce exposure to dust many municipalities mechanically sweep clean roads with water.

The timing and frequency of road surface cleaning is critical to ensure that winter traction materials do not remain on the roadways where they may lead to air quality and visibility concerns.

Before using road salts on roads or other impervious surfaces such as sidewalks, it is necessary to consider the impacts on local aquatic environments, plants and animals, wells.

Construction sites, land clearing operations, unpaved parking lots and work areas with heavy equipment should water sites or use environmentally friendly dust suppressants especially when working close to residential areas, schools or care homes.



*Efforts to reduce dust include paving roads and parking lots, and watering dust-producing surfaces.*

# Avoid Chemical Spraying



**PESTICIDES** drift and they can unwittingly be tracked indoors by family members, pets or drift in through cracks and small openings. Once pesticides enter your home, they can stay there for a long time. Pesticide residue last much longer inside since there is limited sunlight, air, wind or rain to break them down or wash them away. The highest levels are in house dust, especially carpets. Think twice before using chemical sprays.

The drift of spray and dust from pesticide applications can expose people, wildlife, and the environment to pesticide residues that can cause health and environmental effects and property

Pesticides are substances intended to kill weeds, insects, fungi or pests and are inherently toxic. They are specifically designed to kill, hence they end with-“cide” e.g. herbicide. Chemical pesticides are indiscriminate, and can kill beneficial insects (e.g., lady bugs, honey bees) and earthworms.

Pesticides contain “active” ingredients (the chemicals intended to kill), and “inert” ingredients. The “inert” ingredients which are protected as trade secrets may be even more toxic than the “active” ingredients.

## WHAT ARE COSMETIC PESTICIDES?

Cosmetic pesticides are generally defined as pesticides used for “non – essential” or aesthetic reasons. They are pesticides that are used to improve appearance of lawns, gardens, ornamental trees and shrubs, parks, sports fields, and other elements of landscaping. These pesticides are used on pests that do not constitute a danger to human beings.

Many health organizations such as the Canadian Cancer Society advocate for a ban cosmetic pesticides as the potential threats to human health out weighs the aesthetic benefits. The precautionary principal states “when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause-and-effect relationships are not fully established scientifically.” Or more simply put “better safe than sorry.”

## WHAT YOU CAN DO

- **GROW FOOD ORGANICALLY** - Organic food is generally defined as plants and animals grown without the use of synthetic pesticides, herbicides, fertilizers, and do not contain genetically modified organisms. Organic practices follow essential principles of soil building, conservation, pest management and heirloom variety preservation.  
[www.certifiedorganic.bc.ca](http://www.certifiedorganic.bc.ca)  
[www.ofibc.org](http://www.ofibc.org)
- **UTILIZE COMPOST** to build the health of your lawn and gardens soil to reduce dependency on synthetic pesticides, herbicides and fertilizers.
- **PULL WEEDS BY HAND.**
- Soil health is key to healthy lawns and gardens.  
[www.organiclawncares101.com](http://www.organiclawncares101.com)
- **PREVENT PEST PROBLEMS** by maintaining a clean house, yard and garden to remove places where pests can live. Keep pests outdoors by blocking their way in.
- **USE NON-TOXIC ALTERNATIVES** in and around the home
- Always consider your neighbours and **DON'T SPRAY WHEN IT IS WINDY**
- For safe disposal of unused chemicals, contact your local government for advice

Chemical sprays also include paint and autobody shops, fumes from other industrial facilities within communities and personal use spray cans.



# The Future

The Okanagan is predicted to have the highest rate of population growth in the Province of BC. With this rapid growth, Air Quality is expected to deteriorate unless actions are taken to mitigate the rise in air pollutants that result with increased populations.

It is important that all air quality partners and stakeholders take a role in not only preserving the quality of air that we have today but in also improving it.

A number of communities across the Province are implementing **AIR POLLUTANT REDUCTION PROGRAMS** along with education as a way of taking action to reduce pollutants.

While the nature of air pollution is such that its control and management frequently crosses jurisdictional boundaries, common sources of air pollutants, such as those found in wood smoke from residential heating or backyard burning, are well suited to be regulated locally through general bylaws and purpose specific bylaws. Local bylaws cannot be less stringent than Provincial Regulations but they can be more strict.

**LOCAL AND REGIONAL GOVERNMENT LAND USE DECISIONS** can also have significant and direct impacts not only on air quality, but also on water quality, biodiversity, energy consumption and nearly every other aspect of sustainability.

While land use planning may at first glance appear to have little or no relationship to air quality, informed choices in this area can significantly reduce air pollutants and minimize the associated human health impacts.

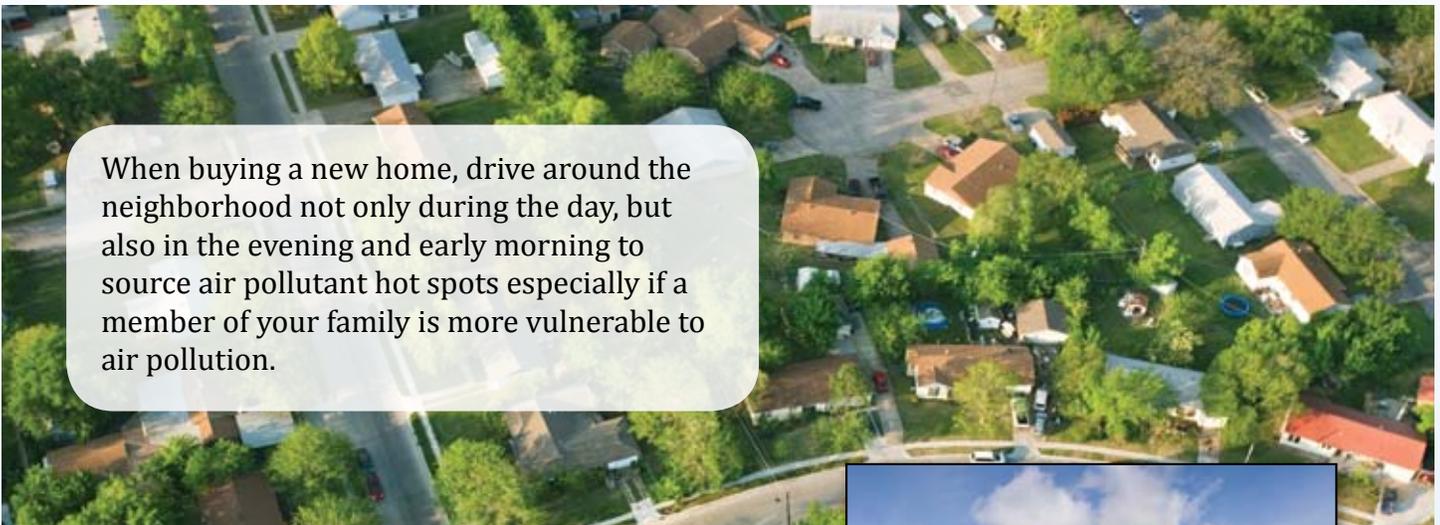
However, land use planning decisions to reduce air pollutants need not be dramatic or costly. Often all that will be required

for better planning decisions is a heightened awareness of pollutant sources, how air pollutants are dispersed, how they are influenced by local meteorology and topography, by urban structures and by identifying areas and populations that could be impacted by air pollutants.

Several **LOCAL GOVERNMENT PLANNING** mechanisms also provide important opportunities to ensure the protection of local air quality. Those include Airshed Plans, Official Community Plans, Regional Growth Strategies, Transportation Management Plans, Solid Waste Management Plans, Integrated Community Sustainability Plans, Community Energy Plans, and Climate Change Action Plans.

Once these plans are created, communities can be faced with a number of challenges in building and implementing them, including insufficient staff, budgets, competing priorities, or lack of political will. It is therefore critical that measures be put in place to regularly review the implementation of these plans against clearly stated objectives – including air quality – and adjust them to reflect a community's evolving needs and priorities.

**Local governments have the authority to expand building bylaws and other bylaws to specifically address wood smoke and related environmental issues. Renovation permits could require that outdated old wood heating units are replaced with more efficient units.**



When buying a new home, drive around the neighborhood not only during the day, but also in the evening and early morning to source air pollutant hot spots especially if a member of your family is more vulnerable to air pollution.

**When building a home or renovating, and if installing a wood heating system. Ensure the positioning of the chimney is not so close to your neighbors home that the emissions will be seeping into their homes.**



## Climate Change Action Plans

As part of BC's efforts to address climate change, considerable planning has been undertaken by local and regional governments to identify opportunities for greenhouse gas reductions.

Many of the planning tools that are currently in place for reduction of greenhouse gas emissions can also provide a great opportunity for improving air quality.

However, it is important that communities carefully take into account any consequences to air quality that may result from efforts to reduce greenhouse gas emissions.

Example: Because the burning of wood is considered carbon neutral under the Kyoto Accord, there is a potential for policies and actions encouraging more wood-burning. Wood decomposing on the forest floor is considered carbon neutral, however when wood is burned, the carbon it releases is at a much faster rate and burning it also has an affect on local air quality and on health.

Indeed, one must exercise caution to ensure that actions targeted to reducing greenhouse gas emissions do not result in deterioration of community or neighborhood air quality.

Scientists are warning that the warmer temperatures associated with climate change are likely to result in higher levels of ground-level ozone. Background levels of ozone have been steadily increasing since the 1980s, and this trend is expected to continue.

## Community Energy Plans

Community energy plans, just as climate change plans, can provide an opportunity for improving and protecting local air quality. It is important that energy plans identify wood smoke as a public health risk and that the objectives and goals of the energy plan do not result in decisions that reduce local air quality.



### AIR POLLUTION

Smog is made when pollutants, such as vehicle emissions, mix with sunlight on warm sunny days. Particle pollution comes from burning fuels like wood and diesel.

Some air pollutants are also greenhouse gases.

### CLIMATE CHANGE

Greenhouse gases come from burning fossil fuels, industry, land clearing and agriculture. These gases trap heat which can lead to climate change.

Climate change can make air pollution worse.

greenhouse gases trap heat

hotter conditions can create more smog

drier conditions can cause more particle pollution (from fires and dust storms)



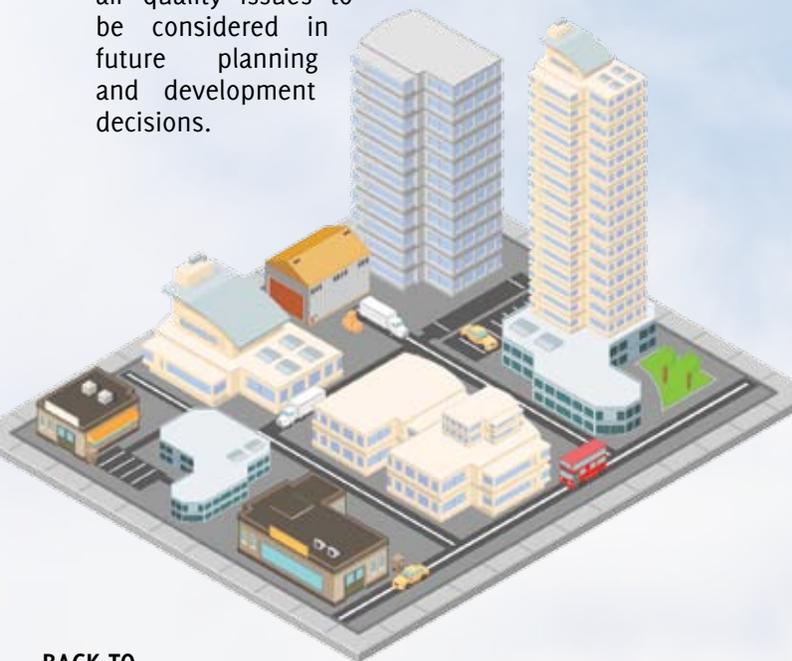
## Agriculture Area Plans

An agricultural area plan focuses a community's farm areas to develop practical solutions to issues and identify opportunities to strengthen farming in a manner that ultimately contributes to local agriculture and the community's long-term sustainability. Agriculture waste management can be identified in agriculture area plans as a broader strategy to reduce air pollutants associated with open burning of wood waste. Safe disposal of agricultural plastics, treated wood, wire and chemical containers should also be identified.



## Official Community Plans (OCP's)

It is desirable that when OCP's are adopted or reviewed, they be amended to include air pollutant reduction measures. Public input should be sought to help identify sensitive areas within the community, such as those areas experiencing wood smoke or high traffic. Topography and wind patterns should also be factored in, as well as the location of sensitive populations – hospitals, care homes, schools and day cares. The OCP can also incorporate objectives and policies on air quality issues to be considered in future planning and development decisions.



## Airshed Management Plans



While airshed planning is not mandatory, local and regional governments in BC are encouraged to develop Airshed Management Plans (also referred to as Air Quality Management Plans) to address air quality issues in their area (see page 13). Local and regional governments in 14 airsheds in BC have developed air quality management plans to date.

Given the many dimensions of air quality management planning (land use, transportation planning, energy, industrial emissions, solid waste management, greenhouse gas mitigation, and more) it is valuable for Airshed Plans to make direct links with the local government planning mechanisms and departments related to those dimensions. Where Airshed Plans have not yet made those links, this would constitute an important next step to increase the effectiveness of the Airshed Plans, while at the same time taking steps to incorporate air quality objectives and measures into other planning documents.

Air quality protection can be a driver for economic development and for diversification of an existing economy.

## Solid Waste Management Plans

How local and regional governments deal with solid waste in their communities can have a negative or a positive impact on the environment and local air quality; therefore, air quality is also a solid waste issue.

The Solid Waste Management Planning process can help address burning or unsafe disposal of garbage, yard waste or other materials. Adjusting tipping fees, sponsoring chipping programs and providing recycling opportunities positively impacts local air quality.



# Resources

BC Air Quality [www.bcairquality.ca](http://www.bcairquality.ca)

Clean Air Champions [www.cleanairchampions.ca](http://www.cleanairchampions.ca)

Composting Council of Canada [www.compost.org](http://www.compost.org)

Mow Down Pollution: Lawn Mower Exchange  
[www.mowdownpollution.ca](http://www.mowdownpollution.ca)

Idle Free BC [www.idlefreebc.ca](http://www.idlefreebc.ca)

Natural Resource Canada Idle Free  
[oee.nrcan.gc.ca/idling/idling.cfm](http://oee.nrcan.gc.ca/idling/idling.cfm)

Report heavy-duty diesel trucks or buses that are smoking  
excessively by calling toll free 1-888-775-8785.

Guide to Open Burning Smoke Control Regulation  
[www.env.gov.bc.ca/epd/bcairquality/reports/agttobsc.html](http://www.env.gov.bc.ca/epd/bcairquality/reports/agttobsc.html)

Ministry of Health - Outdoor Air Quality  
[www.health.gov.bc.ca](http://www.health.gov.bc.ca) (click on Health Protection > Air Quality)

Environment Canada - Air  
[www.ec.gc.ca](http://www.ec.gc.ca) (click on Topics > Air)

Canada's Clean Air Act [www.ec.gc.ca/air/default.asp?lang=En&xml=6EBBF05D-CEFo-4E40-AE34-BD07AE56E3DD](http://www.ec.gc.ca/air/default.asp?lang=En&xml=6EBBF05D-CEFo-4E40-AE34-BD07AE56E3DD)

BC Lung Association > Air Quality  
[www.bc.lung.ca](http://www.bc.lung.ca) (click on Air Quality)

Smoke Forecast [www.bcairquality.ca/bluesky](http://www.bcairquality.ca/bluesky)

BC Clean Air Committee [www.bctransit.com/clean\\_air](http://www.bctransit.com/clean_air)

Wikipedia – Air Pollution in BC  
[en.wikipedia.org/wiki/Air\\_pollution\\_in\\_British\\_Columbia](http://en.wikipedia.org/wiki/Air_pollution_in_British_Columbia)

EPA, United States Environmental Protection Agency  
[www.epa.gov](http://www.epa.gov)

Provincial Regulations [www.bclaws.ca](http://www.bclaws.ca)  
(Select 'Laws' tab from menu. Acts are listed alphabetically,  
Regulations fall under the specified Act)

Environmental Management Act

- Agricultural Waste Control Regulation
- Open Burning Smoke Control Regulation
- Organic Matter Recycling Regulation
- Solid Fuel Burning Domestic Appliance Regulation
- Waste Discharge Regulation

Health Act

Public Health Act

Wildfire Act

Air Quality Health Index (AQHI)

[www.airhealthbc.ca](http://www.airhealthbc.ca) or [www.ec.gc.ca/cas-aqhi](http://www.ec.gc.ca/cas-aqhi)

A tool that indicates the immediate risk to health of current and near-future levels of monitored air pollutants. The B.C. Ministry of Environment and Metro Vancouver issue advisories when individual air pollutants reach threshold levels of concern.



BC Conservation Officer Service  
Report All Poachers and Polluters (RAPP) 24 hour hotline  
Dial Toll Free 1-877-952-7277 (RAPP) Cellular Dial #7277  
or [www.env.gov.bc.ca/cos/rapp/rapp.html](http://www.env.gov.bc.ca/cos/rapp/rapp.html)

You do not have to give your name or appear as a witness. However, it is often helpful to an investigation if a Conservation Officer can follow-up on your report in order to verify essential facts. Your personal information is kept strictly confidential. Anonymity is guaranteed.

## We all share the air.