

# Clean Air: Yours. Mine. Ours.

## Exploring How to Use Energy Wisely to Protect the Air We Share

### A Guide for Teachers and Educators

## Introduction

We can make wise choices now and throughout our lives when we understand the connection between the air we breathe and the energy we use. Conserving energy and being energy efficient are practical ways of protecting local air quality. Energy efficiency and energy conservation may be familiar concepts but the difference between them may not be clearly understood. “Efficiency” means using less energy in a given application (e.g., driving a small car to work or school rather than an SUV) while “conservation” means avoiding the use of energy (e.g., walking to school instead of driving). We each have a responsibility to be aware of the impact of our energy choices and take action where we can.

## Curriculum Connections

Prescribed Learning Outcomes for K-7 Science and Social Studies

Grade	Sciences	Social Studies
K-1	Physical Science: Changes	Applications of Social Studies, Environment (all criteria)
2-3	Applications of Science (most criteria), Physical Science (Energy in our Lives), Physical Science (Properties of Matter)	Applications of Social Studies (all criteria), Economy and Technology (describe how technology affects individuals and communities), Environment (demonstrate understanding of their responsibility to local and global environments)
4	Applications of Science (all criteria), Physical Science (Electricity)	Applications of Social Studies (most criteria), Environment (analyze how people interact with their environment, in the past and in the present)
5	Applications of Science (most criteria), Earth and Space Science (Atmosphere and Weather), Earth and Space Science (BC’s Non-Living Resources)	Applications of Social Studies (all criteria), Environment (demonstrate understanding of sustainability, stewardship, and renewable versus non-renewable natural resources; and, assess effects of lifestyles and industries on local and global environments)
6	Applications of Science (several criteria), Physical Science (Chemical and Physical Changes)	Applications of Social Studies (all criteria), Economy and Technology (assess effects of urbanization and technology on lifestyles and environments)
7	Application of Science (several criteria), Physical Science (Energy Sources and Options)	Applications of Social Studies (all criteria); Environment (analyze ways that people’s interactions with their physical environments change over time; and evaluate the impact of natural processes and human-induced changes on communities)

## Background

Energy use has a direct impact on the air we breathe. For instance, a wood stove that doesn’t burn efficiently produces small particles that move through the air and into people’s lungs. Driving a car burns fossil fuel, which releases fine particulates into the air that can contribute to a variety of respiratory illnesses. Asthma is now the number one reason that Canadian children are admitted to hospital. Air pollution is the greatest contributing factor in respiratory disease.

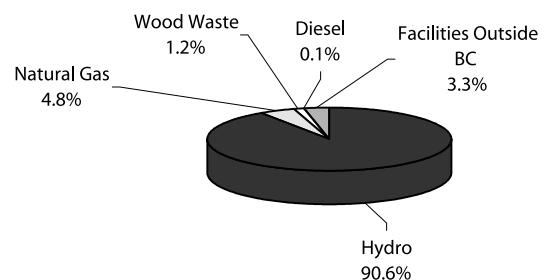
Vehicle emissions are one of the leading contributors to urban smog, acid rain, local fine particulate levels and climate change. In the Lower Mainland, for example, light-duty vehicles are responsible for approximately 54% of air pollution. Most cars and trucks manufactured today are more fuel-efficient and pollute less per kilometer driven than those built 25 years ago. However, some vehicles such as vans, light duty trucks and sport utility vehicles (SUVs) are less efficient. As well, the number of registered vehicles is increasing rapidly, outweighing any clean technology benefits. As a result, emissions from transportation sources are growing faster than any other sector. Whether we live in an urban centre or smaller community, there are things we can do to conserve and be energy efficient in our transportation activities; choosing alternatives to driving alone when practical, maintaining proper tire pressure and keeping our vehicles well-maintained can all contribute to reducing our consumption of energy for transportation.

Most of British Columbia’s electricity comes from hydro, a relatively clean energy source in terms of air quality (but still not without other environmental impacts). However, the demand for electrical energy is increasing at nearly 2% a year. Given the current and predicted future demand, BC Hydro will need to find new sources of energy before the end of the decade. “Green” energy sources such as solar power, wind power, small-scale hydro, biomass and wood waste, and fuel cells are some

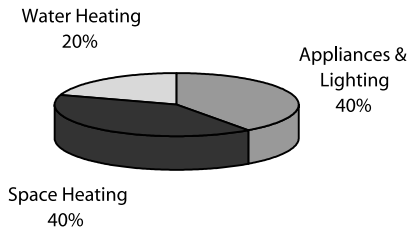
ways of generating power with less harm to the environment than fossil fuels such as oil and gas. Unfortunately, they’re not always suitable because of their small scale, cost or requirements for specific conditions, such as constant wind.

While it’s important for governments and energy suppliers to continue to pursue alternative energy sources, the most immediate solution is simply to use less. Over the next ten years, BC Hydro is counting on everyone, through its Power Smart program, to be energy efficient and conserve, in order to offset more than a third of the anticipated demand for new energy. In addition, we can all become more energy-wise in our transportation choices.

### BC Hydro System Power Supply (2002/2003) from BC Hydro or Independent Power Producer Facilities in BC (Source: BC Hydro)

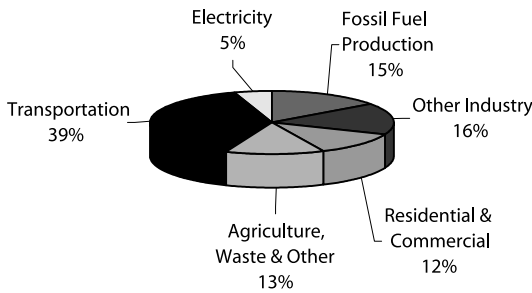


## Typical Energy Use in House Heated with Electricity (Source: BC Hydro)



## BC Greenhouse Gas Emissions, 2001

(Source: Environment Canada, provided by Ministry of Water, Land and Air Protection)



## Key Concepts

- We depend on energy every day to run our home appliances, power our vehicles, provide heat and light and sustain businesses and industry.
- Most homes and offices use significantly more electricity now than 20 years ago.
- Demand for energy in BC is continuing to grow.
- Conserving energy and being energy efficient are practical ways to save energy and protect air quality at the same time.

## Activity 1 - Energy Efficiency & Conservation: What can I do?

1. Have students divide into small groups and brainstorm examples of efficiency and conservation of various energy sources including electricity, fossil fuels and wood. Here are a few ideas to get them started:

### Energy Efficiency

- Wash clothes in cold water (saves energy heating hot water).
- Carpool (one vehicle uses less energy than several for the same trip).
- Replace an incandescent light bulb with a compact fluorescent one.

### Energy Conservation

- Turn off the lights when you leave a room.
- Hang clothes on the clothesline to dry instead of using the dryer.
- Use a push lawn mower rather than an electric or gas one.

For more ideas, see the Natural Resources Canada, Office of Energy Efficiency document “350 Energy- and Money- Saving Tips” at <http://oee.nrcan.gc.ca/tips/tips.pdf>

2. Have the groups share their lists with the rest of the class.
3. Conduct some analysis of all the ideas on the list according to variables like ease of implementation, who will be involved, etc. Help students set some criteria for their analysis.
4. Have them create a plan of action for themselves, their families or the school based upon their analysis. (see also “Take the One Tonne Challenge”)
5. Implement plans and evaluate success.
6. Adjust plans as necessary and continue.

## Take the One Tonne Challenge

Everything we do as individuals to reduce our greenhouse gas emissions also makes a contribution to cleaner air. That means more livable and sustainable communities. The federal government is challenging each of us to reduce our greenhouse gas emissions by one tonne, or about 20% per year. Join the challenge at [www.climatechange.gc.ca/onetonne/english](http://www.climatechange.gc.ca/onetonne/english)

## Join the SEEDS Foundation One Tonne Challenge for Students

This simple take-home activity is designed for students of all grade levels; to engage them, with the help of their family, in some simple energy-saving measures they can undertake to make a difference. Program materials, including take-home activity sheets are available from SEEDS at [www.greenschools.ca/seeds/challenges.html](http://www.greenschools.ca/seeds/challenges.html)

## Activity 2 - What if you had to leave your car at home?

Did you know that in Mexico City people must take turns leaving their car at home one day a week in order to reduce smog? What if your city or town implemented a similar plan?

Step 1. Describe the scene/situation to students.

Step 2. Discuss and prepare answers to the following questions: How would this impact you and your family? How would it impact everyone else? Outline the pros and cons of such a plan. If you had the chance to propose an action to reduce vehicle use in order to avoid such a law, what would you suggest? How do you think others would respond to your idea?

### Did you know....

*that decreasing your highway cruising speed from 120 km/h to 100 km/h will save fuel by about 20%.*

## Activity 3 - Could you share your car?

Car sharing is gaining popularity, even though the number of newly registered vehicles is still increasing. Have students do the following exercise:

1. Describe what you think “car sharing” is all about.
2. Explore the world of car sharing by finding out how this is done in various cities around the world. The Co-operative Auto Network in Vancouver is the second oldest car-share co-op in North America. It has a partner auto co-op in Victoria. The following web sites talk about how car co-ops work:  
[www.gvrd.bc.ca/sustainability/casestudies/coopautonet.htm](http://www.gvrd.bc.ca/sustainability/casestudies/coopautonet.htm)  
[www.victoriacarshare.ca/resources.htm](http://www.victoriacarshare.ca/resources.htm)
3. Compare car sharing to car ownership. List the benefits and the costs.
4. Discuss the following questions: What did you learn? How do you feel about car sharing now? Car ownership? What did you discover that was the most surprising? What makes car ownership so attractive? What makes car sharing so attractive? Who might be interested in car sharing? Why? How might we make car sharing more attractive to more people? How well would your family do with a car sharing situation? What would it take for your family to consider car sharing?

### Did you know....

*that compact fluorescent light bulbs use 75% less energy and last up to 8 times as long as incandescent light bulbs.*

## Did you know....

that if you combined all the "heat leaks" in an average Canadian home, you would have a hole the size of a basketball!

## RESOURCES LIST

Every year we try to find new sources of information. To see activities and resources listed on previous posters, relating to air quality issues, see the Ministry of Water, Land and Air Protection web site at <http://wlapwww.gov.bc.ca/air/cad/index.html>

### Energy Information

**Canadian Energy Efficiency Centre** - Information on best practices for saving energy. <http://www.energyefficiency.org>

**Canadian Electrical Association** - Information on the past, present, and future of the electric power industry in Canada. [www.canelect.ca](http://www.canelect.ca)

**Terassen Gas** - Information about natural gas, including how to save energy at home and work. <http://gas1.terassen.com>

**Centre For Energy** - Information about energy in Canada, both traditional energy sources and renewable ones. [www.centreforenergy.com](http://www.centreforenergy.com)

**Canadian Association for Renewable Energies** - Information about the benefits of renewable energies to Canada's economy, environment and society. [www.renewables.ca](http://www.renewables.ca)

**Climate Change Calculator** - Information on how to determine household energy use and ways to conserve and be more energy efficient, using an interactive web-based tool. [www.climcalc.net/eng/Calculator/Start.html#emissions](http://www.climcalc.net/eng/Calculator/Start.html#emissions)

**Better Environmentally Sound Transportation** - Information on sustainable transportation and its benefits to communities. [www.best.bc.ca](http://www.best.bc.ca)

**Aircare** - Information about the Vehicle Emissions Testing Program for Greater Vancouver and the Fraser Valley, including the relationship between vehicles and air pollution. [www.aircare.ca](http://www.aircare.ca)

**BC Transit** - Information on bus routes and schedules in communities across the province outside the Lower Mainland. [www.transitbc.com](http://www.transitbc.com)

**Translink** - Information on public transit and alternative transportation services available in the Greater Vancouver Regional District. [www.translink.bc.ca](http://www.translink.bc.ca)

**David Suzuki Foundation** - Information on simple ways to conserve energy and use energy more efficiently in order to slow climate change; "The Nature Challenge: Ten simple things you can do to protect nature," and resources for teachers and students. [www.davidsuzuki.org](http://www.davidsuzuki.org)

**BC Ministry of Energy and Mines** - Information and facts about current energy supplies in BC, trends on use, and challenges for future supply, as well as "Energy for our Future: A Plan for BC." [www.gov.bc.ca/em/popt/energyplan.htm](http://www.gov.bc.ca/em/popt/energyplan.htm)

**BC Hydro** - General information about power production in BC. <http://www.bchydro.com> See the Power Smart at Home section for energy-saving tips, and also the home appliance energy calculator at <https://ewb.bchydro.com/hea>

### Teaching Resources

**Re-energy.ca** - Information about solar electricity, solar heat, water power, wind power, biomass energy and other clean energy technologies with lesson plans and instructions for building your own renewable energy projects such as a solar oven and wind turbine. [www.re-energy.ca](http://www.re-energy.ca)

**BC Hydro Power Smart at School** - Activities for students with modules about energy use and conservation for students in grades K-12. [www.bchydro.com/education](http://www.bchydro.com/education)

**Learning for a Sustainable Future** - Classroom and on-line activities about energy, climate change and related topics; resources for teachers and students. [www.schoolnet.ca/future/content.htm](http://www.schoolnet.ca/future/content.htm)

**Alliance to Save Energy** - Lesson plans about energy, sources and energy efficiency; students learn math, science, language and computer skills. [www.ase.org/educators](http://www.ase.org/educators)

**Planet Pals** - Activities, crafts, games, puzzles, and lesson plans, including an overview of the site for teachers and parents. [www.planetpals.com/index.html](http://www.planetpals.com/index.html)

**Passion for Action One Tonne Challenge** - Program designed to explore the relative impacts of energy use of specific household appliances, tools and vehicles using an interactive tool. Students apply their discoveries by developing a household plan to reduce the greenhouse gases associated with their energy use, complete with a calculation of how much energy they'll save. [www.virescens.com](http://www.virescens.com)

### Self-Learning Resources (Web sites designed for students)

**Ecokids** - On-line games and quizzes about energy (Part of the Earth Day Canada web site). [http://ecokids.earthday.ca/pub/eco\\_info/browse\\_topics/energy.cfm](http://ecokids.earthday.ca/pub/eco_info/browse_topics/energy.cfm)

**Smog City** - Interactive air pollution simulator that shows how our choices, environmental factors, and land use contribute to air pollution (Web site of the Sacramento Metropolitan Air quality Management District). [www.smogcity.com/welcome.htm](http://www.smogcity.com/welcome.htm)

**Children of the Earth United** - On-line videos made by students about energy conservation, recycling and other environmental topics. [www.childrenoftheearth.org](http://www.childrenoftheearth.org)

**Natural Resources Canada, Office of Energy Efficiency, Calendar Club for kids** - Interactive activities for students and resources for teachers. <http://oee.nrcan.gc.ca/calendarclub>

### Action Programs

**Way to Go** - Information to promote awareness of traffic safety and to increase opportunities for students to walk, cycle, rideshare or take transit to school. <http://www.waytogo.icbc.bc.ca>

**Flight for Life** - Fly a kite or throw a frisbee on Clean Air Day. Students each write a personal commitment on their kite or frisbee to show how they will conserve energy or be more energy efficient. [www.flightforlifeonline.com](http://www.flightforlifeonline.com)

**Clean Air Day National Partners Web Site** - Find out what activities are going on in your community for Clean Air Day that you can participate in all year long. [www.cleanairday.com](http://www.cleanairday.com)

### Acknowledgements

This poster has been produced with input from the following agencies:

- BC Ministry of Water, Land and Air Protection  
(To order posters, email [air@victoria1.gov.bc.ca](mailto:air@victoria1.gov.bc.ca))
- Greater Vancouver Regional District  
(To order posters, email [comm\\_ed@gvr.d.bc.ca](mailto:comm_ed@gvr.d.bc.ca))
- BC Ministry of Energy and Mines
- BC Hydro
- BC Transit
- Environment Canada

We welcome your feedback. If you have any comments on the content of this poster, or previous years' posters on the Ministry of Water, Land and Air Protection web site, please send them to [air@victoria1.gov.bc.ca](mailto:air@victoria1.gov.bc.ca)