

What Cool Schools Can Do

by Tom Yohemas



Unlike government and industry, some schools are making great progress towards meeting or beating the international goal of reducing carbon dioxide (CO₂) emissions below 1990 levels. A study of 161 Alberta schools involved in the Destination Conservation program revealed that energy conservation measures had reduced the schools' emissions of CO₂ by more than 5,576 metric tonnes and had saved \$457,399 in utility expenditures over a one-year period. Clearly, the reduction of greenhouse gases can lead to substantial economic as well as environmental benefits.

The following are activities that students, teachers and staff can undertake to save energy and reduce carbon emissions. Most topics are divided into two parts: no-cost activities that students and staff can undertake, and technical initiatives that need to be implemented by maintenance and custodial staff. As you will discover, the possibilities are limited only by the imagination of your school community.

Electricity

Electricity typically represents about 60 percent of a school's total utility budget.

- ❖ Invite guest speakers from local utility companies to promote conservation at school assemblies.
- ❖ Monitor the school's utility bills to track changes in energy use.
- ❖ Set up a bulletin board display showing the school's energy use and the potential savings through conservation and retrofitting.
- ❖ Start an Electric Police or Powerbusters Club to encourage energy conservation.
- ❖ Have students audit equipment in the school, checking for energy efficiency and proper maintenance.

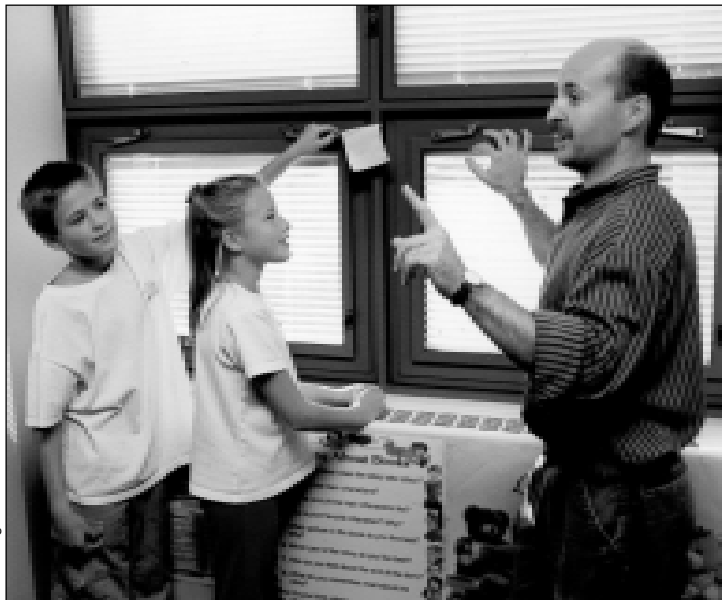
Computers

- ❖ Install energy-efficient screen savers on your computers.
- ❖ Turn off computers during lunch breaks, after school, on weekends and any other time they are not in use.
- ❖ When buying printers or other computer hardware, check their efficiency on the EnergyGuide (Canada) or Green Star (U.S.) labels.

Photocopiers and laminators

Photocopiers and laminators consume large amounts of electricity and produce unwanted heat.

- ❖ Use an overhead master for exam questions.
- ❖ Purchase photocopiers with energy-saver standby functions.
- ❖ Turn off photocopiers at night, on weekends and on holidays.
- ❖ To reduce peak demand loads, use laminators only when other equipment such as kilns and photocopiers are not running. Better yet, try



David Dodge

Toilet paper, tape and a pencil – the only tools needed to perform a draft-proofing audit at school.

to reduce your use of this energy pig.

- ❖ Limit staff to a certain number of photocopies per year to reduce electricity and paper costs. Staff can brainstorm alternatives with their students or environment club members.

Technical controls

- ❖ Reduce peak demand loads by scheduling air handling units to go on when other machinery is inactive.
- ❖ Install control systems that can shed or shift lower priority electrical loads to minimize their effect on peak demand.
- ❖ Install variable speed motors in large fan units that do not always need to run at full output.

Heating systems

- ❖ Examine windows and exterior doors and report drafts to your maintenance department.
- ❖ Encourage the closing of exterior doors by having students make presentations and classroom visits.

- ❖ In the colder months designate a student or staff member to close the curtains at night to conserve heat and to open them during the day for solar warmth and natural light.

- ❖ Launch a “Heat Down” campaign which includes a “Sweater Day” for students and staff.

Technical controls

- ❖ Ensure that the school’s furnaces are computer-controlled for energy efficiency.
- ❖ Insulate hot water pipes and hot water tanks to reduce energy consumption.
- ❖ Ensure that insulation is upgraded to current standards during renovations or retrofits.
- ❖ Install timers on thermostats to turn heat down at night, on weekends or during holidays when the school is closed.
- ❖ Consider installing solar walls on the south side of the building, thus using passive solar energy to heat outside air for use inside the school.
- ❖ Install a building automation system to control the heating. These systems monitor outdoor air temperature and supply heat only as needed. They can also be scheduled to heat only when the building is occupied.

Lighting

Lighting consumes 60 percent of the electricity used in the average school.

- ❖ Keep hall lights off in the morning until students arrive.



- ❖ Put tape over the switches of lights that are not needed.

- ❖ Start a “Lights Off” campaign so that lights are not used during sunny days or in rooms that are not occupied.

Technical controls

- ❖ Reduce lighting in overlit areas. Excessive lighting can cause headaches and is associated with hyperactivity in some children.
- ❖ Replace exit lights with L.E.D. exit panels that use less than two volts.
- ❖ Arrange for a lighting retrofit or include it in modernization plans. New T-8 fluorescent lamps and electronic ballasts are, on average, 24 percent more efficient, provide a more natural light and have a longer life span than standard fluorescent lighting. They are also quieter and have no visible flicker.
- ❖ Install motion sensors in washrooms so that lights, and water pumps on urinals, operate only when there is an occupant.
- ❖ Install skylights as a means of increasing the use of free, natural light.
- ❖ Install switch timers in storage closets. These will automatically turn off the lights after a preset time period.

Transportation

- ❖ Take an annual climate change poll at your school. Ask students and staff how they get to school each day and how far they travel. Graph the results, showing the

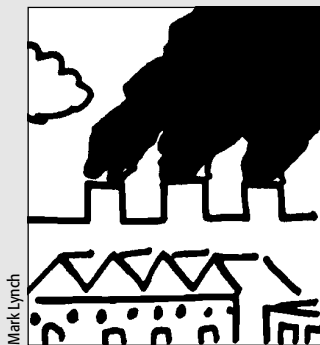


How to calculate your school’s CO₂ emissions (An exercise for the very ambitious)

WHILE IT IS POSSIBLE TO CALCULATE your school’s annual contribution to global warming, it does require a bit of research. Here’s how to get started.

To compare your school’s carbon dioxide (CO₂) emissions in 1990 and 2000, for example, start by obtaining copies of the utility bills for these periods. These should be available from your maintenance department, school board office or local utility company. Both electricity and heating fuel contribute directly to the accumulation of greenhouse gases, so both should be evaluated.

By calculating the total energy or fuel consumed each year and multiplying it by a conversion factor, you will be able to determine the amount of CO₂ produced. For instance, the calculation for natural gas is gigajoules x 0.05916667 = tonnes CO₂. The CO₂ conversion factors must be obtained from your local utility because they are specific to the fuel used and to the units in which consumption is measured (some natural gas bills show consumption as units of energy, others show it as a volume of gas).



Mark Lynch

The conversion factor for electricity depends on the resource that is used for generating it. For example, in Alberta where 85% of electricity is generated from soft coal the conversion equation for electricity is kilowatt-hours x 0.00009838

= tonnes CO₂. The equation will be different in regions where most electricity is produced from nuclear energy, oil or hydroelectric power. You will need to research the sources of your electricity and ask your local utility company to provide the corresponding conversion equation.

More precise results are obtained by normalizing the data for each year, taking into account factors such as weather variations, changes in the size of the school population, and building renovations.

A detailed analysis can become quite complicated and, for most schools, is unnecessary. The main point of initiating action on climate change is not to determine exact emissions levels but to implement day-to-day solutions to reduce our contribution to the problem.

— Tom Yohemas

percentages of people who walk, bike, drive or take public transit. Research the average fuel efficiencies of cars and buses in your area. Using the statistic that vehicles release 2.35 kilograms of carbon dioxide for every liter of gasoline consumed (18.8 pounds per US gallon), determine the total amount of carbon dioxide released by these vehicles in their daily trips to and from school. Graph the emissions of each transport group and post these in the school's main hallway. Repeat this poll each year and make comparisons with previous years.

- ❖ Publicize the environmental benefits of public transit. Make posters comparing the different public space requirements of cars, buses and bicycles. Cooperate with local transit authorities to develop advertisements for public transit.
- ❖ Discourage parents and school bus drivers from idling their engines in front of the school.
- ❖ Encourage carpooling among teachers and older students to save energy and reduce fuel bills and CO₂ emissions.
- ❖ Start a bicycle club. Have older students teach bike maintenance to younger students. Sell bike helmets as a fundraiser.
- ❖ In northern regions where school parking lots have electrical outlets for engine block heaters, use "flip flop" controls that charge only half of the cars at any given moment. Alternatively, vehicles could be plugged in manually by students only when temperatures drop.
- ❖ Charge a small fee for parking in the school lot and use the money for treeplanting and other environmental projects.

Treeplanting

As carbon sinks which take up and store atmospheric carbon, trees play a major role in reducing greenhouse gases.



- ❖ Celebrate Arbor Day or May Day with guest speakers and treeplanting to promote community greening.
- ❖ Research the importance of protecting rainforests as a means of conserving one of the Earth's largest carbon sinks. The burning of rainforests directly releases massive amounts of CO₂, and the replacement of rainforest vegetation with food crops or grass for grazing seriously reduces the planet's carbon storage capacity.
- ❖ Adopt a tree in your community.
- ❖ Plant deciduous trees on the south side of the school to cool the building and reduce the need for air conditioning during warm months.
- ❖ Plant coniferous trees on the north and west sides of the school to reduce the impact of cold winter winds and reduce heating demand.

- ❖ Support wilderness protection, since the vegetation in natural areas absorbs greenhouse gases.

Water Use

Reducing water usage also reduces the energy required for pumping and purifying it.



- ❖ Have students survey how much water is used in the school and brainstorm how it can be conserved.
- ❖ Eliminate lawn watering by landscaping with native species that require little water.
- ❖ Place plastic bottles in toilet tanks to reduce water use.
- ❖ Ask local restaurants to serve water only upon request.

Technical controls

- ❖ Install low-flow shower heads to save water and reduce the amount of energy used to heat water.
- ❖ Retrofit plumbing to reduce inefficiencies in the use and heating of water.
- ❖ Place timers on the boys' urinals to reduce usage of water and electricity. Install water dams in toilets, as they reduce water consumption by 30 percent.

Renewable Energy

Using alternative sources of energy such as wind and solar reduces our use of fossil fuels.



- ❖ Create displays on energy-efficient homes as part of a science fair to educate parents and staff about solar power, insulation, caulking and weatherstripping.
- ❖ Make simple solar cookers and food dryers to demonstrate a sustainable means of preparing food.
- ❖ Install solar water heaters as part of a retrofit or renovation of the school.
- ❖ Contact local renewable energy groups for advice and information.

Recycling

Recycling metal, paper, glass and other materials into new products requires less energy than making the same products from new materials.



- ❖ Purchase school supplies made from recycled materials.
- ❖ Encourage paper recycling to reduce the need to cut carbon-storing trees.
- ❖ Ask school district authorities to agree to return a portion of the money saved in reducing the school's paper use. Use the funds to support environmental projects. ♻️

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