

## The C-Train

The C-train is Calgary's light rail transit system. Every day, thousands of commuters hop on board to go to school, to work, shopping, and more. The C-Train runs on electricity, which is carried above the tracks by overhead wires. Powerful electric motors propel the C-train down polished steel tracks, giving the train a quiet, smooth ride. Electric motors are far more efficient than automotive engines, and produce no harmful exhaust emissions.

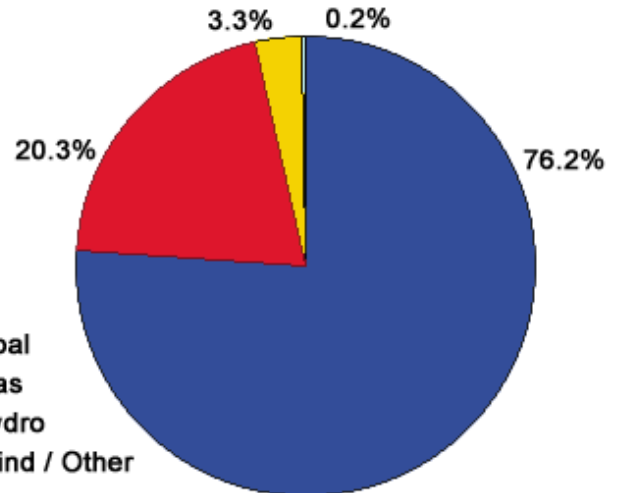


The Calgary light rail transit system is powered by electricity.

By giving commuters a fast, reliable transportation alternative, the C-Train helps to solve traffic problems. Each day, riders board the C-Train 189,000 times. If each commuter had traveled alone in his or her car instead of on the C-Train, the daily mileage would have amounted to 1.2 million kilometres. These car commuters would have used 107,000 litres of fuel, and produced some 270,000 kg of carbon dioxide, nitrous oxide, carbon monoxide, and other pollutants. The C-train is not only a convenient form of alternative transportation, it is an environmentally friendly one too!

## Alberta's Electrical Supply

The C-Train system uses 21,000 MWh of electricity each year, enough to wash over nine million loads of laundry! In Alberta, most of that electricity is pro-



Alberta's Electricity Supply

The vast majority of Alberta's electricity comes from burning coal. *Power Pool of Alberta*

duced at coal-fired generating stations. Coal is used because it is cheap and plentiful in Alberta. The downside of using coal for making electricity is that it cannot be used as efficiently as other fuels, and it produces far more air pollution than natural gas or hydroelectricity, the other two main sources of electrical power in Alberta.

## Wind Energy in Alberta

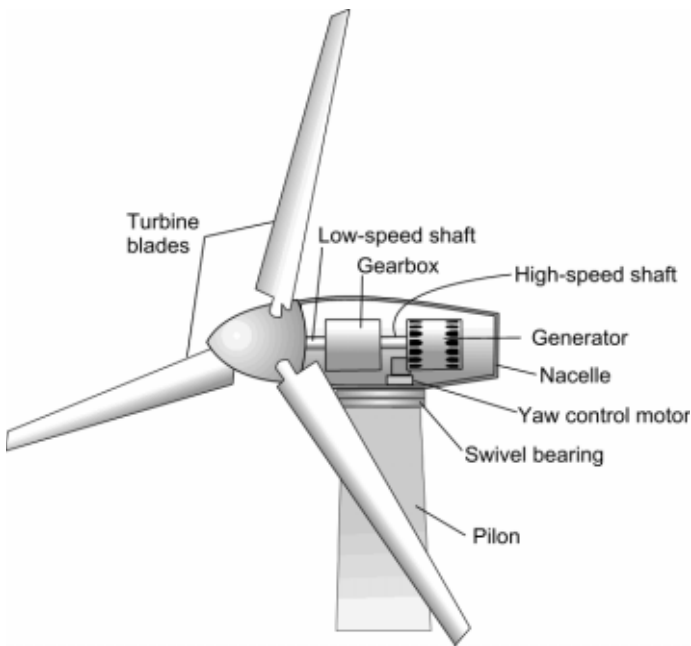
Southern Alberta is a windy place, ideal for setting up electricity-generating wind turbines. To take advantage of the strong, steady winds, commercial-scale wind turbines are being installed south of Calgary in ever-greater numbers. The turbines are located on the tops of hills facing the Rockies, where strong westerly winds pour through mountain passes. The newest turbines installed in southern Alberta have impressive statistics. Each is mounted on a tubular steel tower 40 metres tall, and is equipped with three propeller-like blades sweeping a circle 44 metres across. Each turbine can produce more than 600 kilowatts of electricity, or 1.3 million kilowatt-hours of electricity annually - enough to meet the total yearly needs of nearly 250 average Alberta



Wind is a good source of energy in Southern Alberta.

homes. Each turbine blade is built like a high-performance aircraft wing. Air blowing past the blades generates an aerodynamic force called “lift,” which turns the entire turbine. A generator inside the head of the turbine uses this turning motion to produce electricity. This electricity is sent through the power lines and added to Alberta’s electrical grid.

Wind energy is an excellent source of electricity. Unlike fossil fuels, wind energy is pollution free, and virtually limitless. As well, wind turbines have become incredibly efficient and reliable. Nonethe-



The internal workings of a commercial wind turbine.  
*Photo courtesy of Vision Quest Wind Electric*



Calgary's C-Trains now run on wind-generated electricity.  
*Photo courtesy of the City of Calgary*

less, there are times when winds are too light to produce electricity. For this reason, it is not possible to rely on wind power alone to meet all our electricity needs. Imagine your frustration if your computer game turned off every time the wind stopped blowing! Fortunately, other energy sources, like hydro-power and fossil fuels are available for producing electricity when winds are calm.

Despite occasional periods when winds are too light for making electricity, it is reasonable to expect that as much as 20% of our electricity can come from wind turbines like those in southern Alberta. However, less than 0.3% of Alberta’s total electrical supply presently comes from wind power.

## ***Ride the Wind!!***

In September 2001 the City of Calgary announced its decision to use commercial wind energy as the primary source of the C-train’s electricity. The program is called Ride the Wind! because people using the C-Train would actually be traveling with the help of energy captured from the wind.

Before the switch to wind power, the C-Train’s energy supply accounted for about 20,000 tonnes of greenhouse gases and other air pollution every year, less than 1/10 of the pollution that would have resulted if all C-Train passengers had driven in their own cars. Under the Ride the Wind! program, these

emissions are reduced to practically zero. The reduction in greenhouse gas emissions resulting from this change is like taking another 4,000 cars off the road for a year. This makes the C-train one of the most environmentally friendly forms of transportation you can use.

Wind energy is rapidly gaining popularity in Alberta. For the City of Calgary, wind energy is helping the city reduce air pollution and the emissions of climate-altering greenhouse gases. Recent changes in the regulations that govern the sale of electricity in Alberta allow anyone to buy electricity from companies producing wind power. As more and more customers buy wind power, wind electric companies will be able to slowly increase the share of Alberta's electricity produced from this clean and endless energy source.

Contact us at: [education@pembina.org](mailto:education@pembina.org)

### Questions

1. List several ways C-Trains powered by wind energy in Calgary help protect the environment.
2. What are the advantages and disadvantages of using wind as an energy source?
3. Explain why Calgary's wind-powered C-Trains can run continuously, even when there is no wind.
4. What are some other forms of renewable energy, and how could they be used to reduce Calgary's greenhouse gas and air pollution levels even further? Describe some of the services the City provides that could utilize these forms of renewable energy.

### Notes