

# NUCLEAR *facts*

## *Is nuclear energy a good choice for the environment?*

ELECTRICITY CAN BE GENERATED IN MANY DIFFERENT WAYS. HOWEVER, TO PROVIDE THE ELECTRICITY NEEDED TO SUPPLY OUR HOMES AND INDUSTRIES IN CANADA WITH LARGE AMOUNTS OF RELIABLE AND CONTINUOUS ELECTRICITY, ONLY THREE ENERGY SOURCES CAN DO THE JOB TODAY.

These are:

- nuclear energy - the energy released by splitting atoms;
- fossil fuels - the burning of coal, oil and natural gas; and
- hydroelectric power - the use of falling or running water.

“Renewable” sources such as wind and solar power only operate when the wind blows or the sun shines, and therefore they need backup generation. When all factors are considered, nuclear power is the best choice from an environmental point of view.

### **Nuclear = clean air**

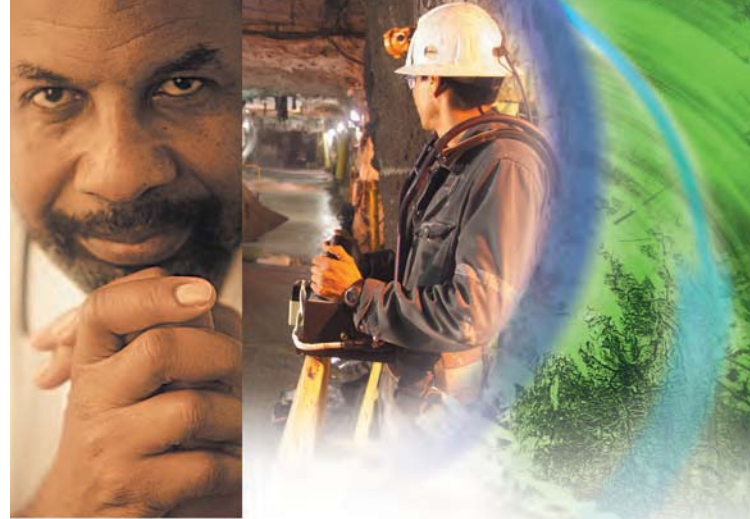
Nuclear power reactors have a major environmental benefit - they do not emit the gases that contribute to global warming, acid rain, or urban smog. Canada's existing nuclear plants avoid the emission of about 90 million tonnes of CO<sub>2</sub> each year that would result if their electricity were produced by coal-fired plants, the most economical available alternative source of electricity generation. Canada's greenhouse gas emissions would be up to 12% higher without the nuclear stations. In addition, nuclear plants

also do not emit any nitrous oxides or sulphur dioxide, major contributors to smog and acid rain.

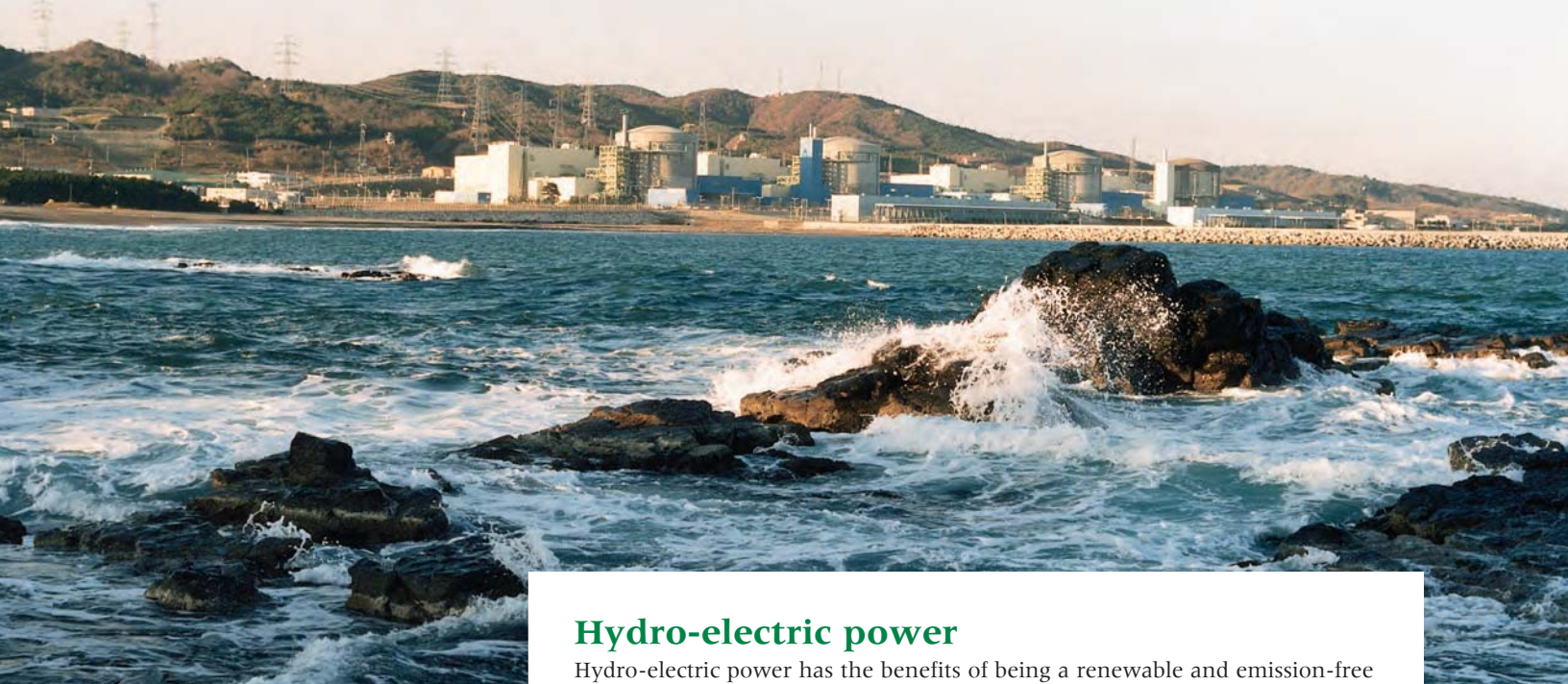
Nuclear stations also require only a relatively small amount of land, in contrast to the large areas required by solar or wind generating systems. The Darlington nuclear station, which can supply all of the electricity needs of Toronto, sits on 2 sq. km of land. Unlike hydroelectric generation, nuclear plants can be built quite close to where the electricity is needed, eliminating the need for long transmission lines.

### **Very small amounts of waste by comparison**

Because uranium contains many thousands of times more energy per unit of weight than fossil fuels, the waste from a nuclear power station is very small in volume and is fully managed and extremely secure at the nuclear sites. The federal Nuclear Waste Management Organization ([www.nwmo.ca](http://www.nwmo.ca)) is heading the process for long-term management of used nuclear fuel in Canada.



*Electricity can be a clean form of energy when produced from nuclear power stations such as the Bruce Power nuclear facilities in Ontario.*



*Shown above are the four CANDU nuclear reactors in Wolsong, South Korea. Each nuclear reactor avoids producing, on average, about 5 million tonnes of carbon dioxide each year.*

## Fossil fuels

Electricity generating plants using fossil fuels emit large quantities of carbon dioxide (CO<sub>2</sub>) into the atmosphere. CO<sub>2</sub> is the major contributor to “climate change”, according to the Intergovernmental Panel on Climate Change (IPCC) that was set up by the United Nations Environmental Program and the World Meteorological Organization in 1988. Many scientists from around the world have contributed to the work of the IPCC. Their studies indicate that the increasing amount of CO<sub>2</sub> in the atmosphere could result in a rise in global temperature and melting of the polar ice caps. This, in turn, could result in flooding of highly populated and fertile coastal areas around the world. The increase in severe weather events in recent years has also been attributed by many scientists to this escalating environmental problem. For these reasons nations around the world agreed to reduce their emissions of CO<sub>2</sub> through the Kyoto Protocol of 1997.

The burning of coal also produces nitrous oxide and sulphur dioxide, major contributors to smog and acid rain.

## Hydro-electric power

Hydro-electric power has the benefits of being a renewable and emission-free energy source. However, all the major hydro-electric sources near Canada's main population centres have already been harnessed. New hydro-electric generating stations located far from the consumer require very long transmission lines. Most of Canada's remaining hydro-electric potential will require the flooding of large areas above a hydro dam. Flooding can often have serious environmental and social consequences such as the loss of large areas of forest, and the displacement of people from the flooded areas.

## Solar and wind energy

Solar and wind energy are also used to produce electricity, and they also have the benefit of being free of emissions. However, they are not without their own environmental problems. Both require large areas and both are intermittent, producing electricity only when the sun is shining or the wind blowing. For wind generators to produce all the electricity needed to supply a city of 3 million people, such as Toronto, the land required would be about 40 times the area of Metropolitan Toronto. Apart from the vast land requirement, and the visual and noise effects of the wind turbines themselves, there would be considerable environmental impact. If Toronto's electricity were to be supplied by solar collectors, a land area twice the size of Metropolitan Toronto would be needed. In each case, backup generation systems would be required to generate electricity during those periods of little wind or no sun (often natural gas generation, which emits greenhouse gases).

## Conclusion

Nuclear power is an excellent choice to meet our current and our future electricity needs without contributing to climate change or pollution.

*See also:*

*Nuclear Facts - What about nuclear waste?*

*Nuclear Facts - How do we protect the environment from uranium mining?*

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