

# NUCLEAR *facts*

## *What does nuclear energy mean to Canada?*

ELECTRICITY FROM NUCLEAR POWER WAS FIRST PRODUCED IN CANADA BY A REACTOR AT ROLPHTON, ONTARIO, IN 1962.

Canada has 22 CANDU nuclear reactors. In 2009, 17 operating reactors produced 14.8 % of Canada's electricity (including 53% of Ontario's electricity supply).

As of 2009 there were 17 operating CANDU nuclear power reactors in Ontario and Quebec and three reactors being refurbished, two in Ontario (Bruce A Units 1 & 2) and one at Point Lepreau in New Brunswick (entering refurbishment on April 1). In addition, the Pickering A Units 2 and 3 reactors remain in a safe shutdown state.

Nuclear power is an important contributor in helping Canada to meet its international commitment to reduce greenhouse gas emissions. Nuclear energy has meant a cleaner environment and enhanced economic activity for Canadians.

### **Cleaner air**

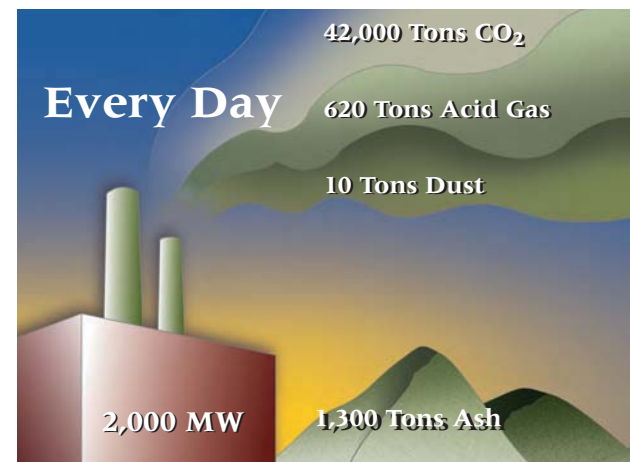
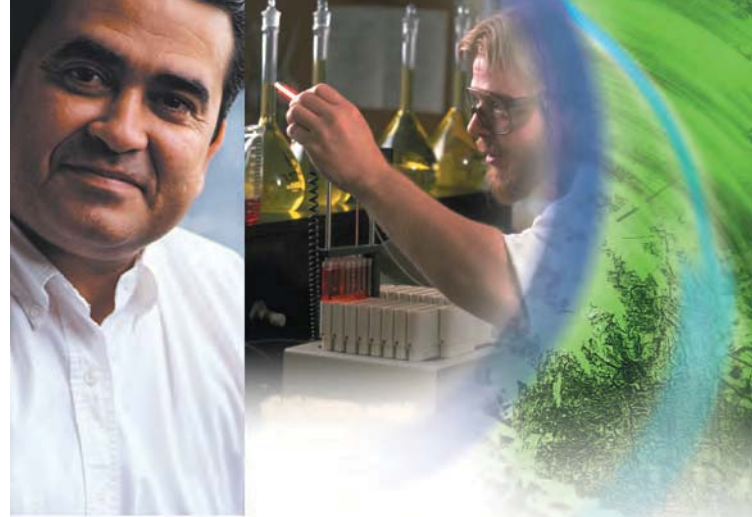
Much of Canada's electricity is produced by generating stations using fossil fuels, coal, oil and gas. When fossil fuels are burned they release combustion products to the environment, mainly carbon dioxide (CO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>), nitrous oxides (NO<sub>x</sub>) and ash. CO<sub>2</sub> is considered the major contributor to climate change while SO<sub>2</sub> and NO<sub>x</sub> cause acid rain and smog.

Nuclear power plants use uranium in a controlled nuclear reaction. No

pollution from combustion products results from this reaction. By using nuclear energy to produce electricity in Canada, we avoid the emission of about 90 million tonnes of greenhouse gases per year (compared to the major alternative of coal-fired generation). This is equivalent to avoiding the greenhouse gases produced by 18 million cars or trucks - about 12% of Canada's total greenhouse gas emissions. Our use of nuclear energy also avoids the emission of an additional 10% of smog and acid rain producing gases that would otherwise be emitted by coal-fired generation.

### **Jobs for Canadians**

Canada's nuclear industry contributes to many sectors of the economy, including the mining of uranium in Saskatchewan, the production of reactor fuel, the manufacturing of equipment, the generation of electricity and the production of radioactive isotopes for use in medicine, research and development and agriculture. More than 21,000 Canadians are employed directly in the nuclear power industry, including scientists, engineers, miners, technicians and support staff. The industry provides another 10,000 indirect jobs for Canadians, plus another 40,000 spin-off jobs in supplies and services.



*Typical emissions from a 2,000 megawatt coal-fired generating station*

Canada is the world's leading producer of uranium. Canada's uranium reserves contain about four times more energy than all known Canadian conventional oil reserves (not including the oil sands). Almost 5,000 Canadians are employed in the uranium industry.

In addition, around the world 50,000 nuclear medicine procedures are conducted daily to diagnose and treat disease using isotopes produced in Canada. Canada's nuclear infrastructure is essential to the global medical isotope supply. MDS Nordion processes materials from Atomic Energy of Canada Limited at the Chalk River Laboratories to produce 50% of the world's medical isotopes.

## Economic growth

Canada's nuclear industry makes a large contribution to the nation's economy. According to a 2008 study by the Canadian Energy Research Institute, Canada's nuclear power stations contribute about \$6.6 billion each year to our Gross Domestic Product, and uranium exports contribute an additional \$381 million. Governments receive almost \$1.5 billion in revenues from nuclear power plant operations, and another \$100 million from Canadian uranium exports.

In addition, exports of CANDU reactors to countries such as China, Romania and South Korea have also made major contribution to Canada's economy while supporting many well-paid jobs in the Canadian manufacturing and engineering consulting industries.

## Nuclear can play a big part in ensuring our future energy supply

Nuclear power as part of Canada's energy mix continues to enjoy good levels of support, especially in Ontario. Ipsos Reid's public opinion polling for the Canadian Nuclear Association (August 2009) shows that Canadians understand that the major benefits associated with nuclear power are that it is "clean energy", "cost effective", "environmentally friendly" and "less harmful to the environment".

In Ontario, which hosts most of Canada's nuclear power industry, 62% support nuclear energy, and 58% support the building of new nuclear reactors.

## Future potential

Nuclear reactors continue to evolve in their design. New CANDUs built in the future will offer greater safety and efficiency, in smaller, modular, compact designs. Canada is a member of Generation IV, an international Forum formed in 2001 to develop a new generation of nuclear power reactors for deployment in 2030. The main goals are sustainability, economics, safety, reliability, proliferation resistance and physical protection. The Charter for collaborative research and design was signed in 2001 by 10 countries: Argentina, Brazil, Canada, France, Japan, The Republic of South Korea, South Africa, Switzerland, the United Kingdom and the United States. EURATOM signed the charter on behalf of the European Union. In November 2006, China and Russia joined the forum.

See also the following Web sites:

[www.cna.ca](http://www.cna.ca)

[www.brucepowers.com](http://www.brucepowers.com)

[www.aecl.ca](http://www.aecl.ca)

[www.nbpowers.com](http://www.nbpowers.com)

[www.hydroquebec.com](http://www.hydroquebec.com)

[www.opg.com](http://www.opg.com)

[www.nrcan-rncan.gc.ca](http://www.nrcan-rncan.gc.ca)

*Canadian Nuclear Association*

*Bruce Power*

*Atomic Energy of Canada Limited*

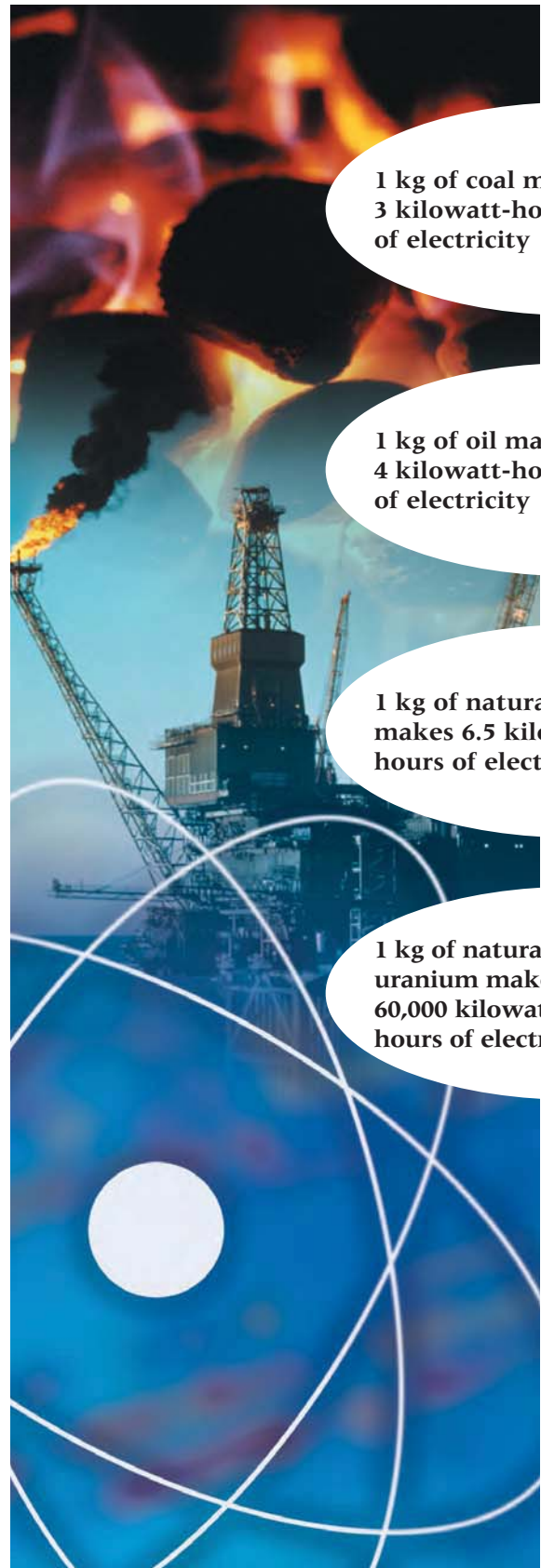
*New Brunswick Power*

*Hydro Quebec*

*Ontario Power Generation Inc.*

*Natural Resources Canada*

Updated: May 2011



1 kg of coal makes  
3 kilowatt-hours  
of electricity

1 kg of oil makes  
4 kilowatt-hours  
of electricity

1 kg of natural gas  
makes 6.5 kilowatt-  
hours of electricity

1 kg of natural  
uranium makes  
60,000 kilowatt-  
hours of electricity



Canadian Nuclear Association

130 Albert Street, Suite 1610  
Ottawa, Ontario K1P 5G4  
Tel. (613) 237-4262  
Fax (613) 237-0989  
[www.cna.ca](http://www.cna.ca)

