

# Canada's Nuclear Technology Delivers Clean Energy and More



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The federal government recently released the results of a June 2017 public survey on energy and resource development. Results suggest that public support for nuclear energy still occupies the basement at 45% compared with solar and hydro, with numbers more than double that of nuclear. Wind is next at 86%, followed by oil at 63%. The same survey showed about one third of the people surveyed support making greenhouse gas reductions a guiding principle for natural resource development. Other principles include keeping energy affordable at 25%, ensuring safe production and transportation at 20%, and creating more energy jobs at 10%.

The facts suggest Canada's nuclear technology meets these principles.

On a lifecycle basis, nuclear generated electricity emissions are slightly more than hydro and wind but less than solar. Intermittent wind and solar generation require back up about seventy percent of the time. In Ontario, this backup generation is typically provided by carbon emitting natural gas plants. By comparison, nuclear plants produce "baseload", low-carbon electricity twenty-four seven.

Over the last 30 years, Canada's reactor technology and uranium exports have helped avoid about one billion tonnes of carbon dioxide (CO<sub>2</sub>) globally. Ontario's nuclear fleet helps avoid about 45 million tonnes of CO<sub>2</sub> annually, the equivalent of taking ten million combustion engine vehicles off the road. With next year's \$20/tonne federal carbon tax, this represents a value of \$900,000,000 to Ontarians. The province's reactors also help Quebec maximize its low-carbon hydropower production and electricity exports. In the future, climate change impacts on electricity production will make this nuclear/hydropower relationship more important.

Ontario became a leader developing Canada's nuclear technology partly because the province doesn't have vast hydropower resources like Quebec and Manitoba. CANDU nuclear reactors are the electricity workhorses in Ontario, meeting about 60% of the province's electricity needs. In New Brunswick, for similar reasons, nuclear provides a third of its electricity.

Analyses show that nuclear power is today's best low-cost power source and will continue to be in the future. The current average per kw/h cost of nuclear in Ontario is 6.6 cents compared to solar at 48.1 cents and wind at 13.3 cents. Nonetheless, advocates of wind, solar and emerging distributed energy technologies (DER e.g., battery storage and microgrids) call for increased investments citing environmental benefits, customer choice and declining costs.

The costs of nuclear are well known but the same cannot be said for solar, wind and DER.

Ontario Power Generation's nuclear fleet is regulated by the Ontario Energy Board—the only generator subject to such oversight in the province. The regulatory framework, including the process to be followed for analyzing DER costs and benefits, is yet to be determined. To date, most of Ontario's DER investments have been demonstration projects paid for largely by electricity consumers.

DER technologies make consumers producers of electricity or "prosumers". The resulting two-way flows of electricity generate massive amounts of data that

must be managed to ensure reliability. This requires significant expenditures on information technology. And unlike nuclear, the decommissioning and waste management costs for DER have not been addressed. Solar panels and batteries contain toxic chemicals that must be managed. While DER may facilitate Integrated Regional Resource Planning to the benefit of local consumers and economies, it will create a range of electricity rates across Ontario. The bottom line – Ontarians will not know DER's impacts on electricity rates for some time.

Canada's nuclear technology has been safely and reliably operating for decades. The economy benefits from a five billion dollar a year, 50,000 plus job industry. Making nuclear the baseload foundation for Canada's low-carbon energy future means even more environmental and economic benefits, including: low-carbon electricity exports; electrification of the economy; powering zero emission vehicles; hydrogen production; and, cancer-fighting, productivity improving, space exploring innovations. Canada's nuclear technology is our "ace" in the hole.

## Nuclear: A Proven Canadian Energy Advantage

International authorities say nuclear energy is needed to help fight climate change.

For more than five decades, Canada's world-leading reactors have safely, reliably and affordably provided electricity to Canadians. In fact, these reactors are Ontario's and New Brunswick's low-carbon, low-cost electricity workhorses.

Canadian reactors have helped other countries lower their greenhouse gas and smog-producing emissions too. Plus, there have been substantial economic benefits – more jobs, taxes, new businesses, and research and development.

Unlike for other generating technologies, transparent, well-funded, highly regulated, world leading waste management practices are in place.

Today's nuclear investments secure more for Canada's future:

- A baseload energy foundation
- A hedge against climate vulnerable wind, solar and hydroelectric production
- Continued Canadian nuclear technology leadership
- Low-carbon electricity exports to our fossil fuel dependent U.S. neighbours
- Innovations that save lives, improve safety and productivity and advance space exploration
- Clean electrification of our daily transportation, buildings and industries

Ontario's nuclear advantage is a low-carbon energy workhorse in Ontario's economy.

For more information please go to [www.pwu.ca](http://www.pwu.ca)

**FROM THE PEOPLE WHO HELP KEEP THE LIGHTS ON.**

