



CANADIAN NUCLEAR WORKERS' COUNCIL

Canada's Nuclear Industry Delivers Significant Economic Benefits

Key Points:

- Canada's nuclear industry—uranium mining to decommissioning of nuclear facilities and everything in between, is a mixture of private and public sector participants. Most of the industry is in Ontario, with a presence in Saskatchewan, Quebec and New Brunswick.
- In 2015, nuclear power provided over 16 percent of Canada's electricity. In Ontario, nuclear power provided about 60 percent of the province's electricity, and nuclear power supplied 40 plus percent of New Brunswick's electricity.
- In Ontario, only hydroelectric generation has a lower cost per kilowatt-hour than nuclear generation. Natural gas and wind power cost twice as much as nuclear and solar seven times more.¹
- The nuclear industry generates over \$6 billion per annum in revenue not including health and environmental benefits.²
- Canada is the world's second largest supplier of uranium with exports representing an annual value of about \$1 billion.³
- Canada's nuclear industry supports about 60,000 direct and indirect jobs and 200 supply chain companies.
- Annual uranium exports contain energy equivalent to about 1 billion barrels of oil, comparable to Canada's oil exports in 2015.⁴
- In total, Canada has exported 34 CANDU reactors (30 are still in operation) to Argentina, China, India, Pakistan, Romania and South Korea.
- Canada's nuclear industry generates Federal and Provincial revenues through taxes of approximately \$1.5 billion.⁵

Ontario's Nuclear Investments

The following provides information about the economic and environmental benefits associated with planned nuclear fleet investments by Ontario over the coming decades. Each reactor refurbishment investment will ensure these units provide reliable, low-carbon, affordable and safe electricity for another 30 years.

¹ Canadian Nuclear Factbook, 2017, pg. 57

² Natural Resources Canada www.nrcan.gc.ca/energy/uranium-nuclear/7715

³ Ibid

⁴ Ibid

⁵ Ibid

Bruce Power

Between 2016 and 2020, Bruce Power will invest about \$2.3 billion (\$2014) in life-extension activities for Units 3 to 8 in support of the refurbishment program. The six refurbishments are expected to cost \$8 billion (\$2014). This is in addition to another \$5 billion (\$2014) for a range of other life-extension activities between 2016 and 2053. The refurbishment of the first reactor, Unit 6, will commence in 2020. A series of off-ramps consistent with the province's Long-Term Energy Plan related to refurbishment performance and changes in market conditions, have been built into the agreement.

Bruce Power's investments will optimize the operational life of the site by decades and generate significant ratepayer, electricity system, and economic benefits. Last October, Bruce Power released an economic impact study www.brucepower.ca that described these benefits in detail.

Bruce Power's investments will secure an estimated 18,000 jobs directly and indirectly and create an additional 3,000-5,000 jobs annually throughout the refurbishment program. The "*Affordable Power. Jobs & Growth*" report was jointly authored by the: Provincial Building and Construction Trades Council of Ontario; Southwest Economic Alliance; Canadian Manufacturers & Exporters; The Society of Energy Professionals; the Power Workers' Union; and, Bruce Power.

Since 2001 the company and its partners have invested \$7 billion in the eight publicly owned reactors at the Bruce site. The Bruce complex provides about 30 percent of Ontario's electricity at 30 percent below the average residential cost of power.

Ontario Power Generation

Darlington Nuclear Station

In October 2016, Ontario Power Generation (OPG) released a report undertaken by the Conference Board of Canada assessing the potential benefits (www.opg.com) of refurbishing the station.

The total investment for the project is estimated to be \$12.8 billion, which includes interest and escalation. The "expected yield" will generate \$14.9 billion in economic benefits for Ontario. Between 2010 and 2023, an average of 8,800 jobs are expected to be created annually. Housing revenues are anticipated to increase by \$8.5 billion, government revenues (all three levels) will be about \$5.4 billion and \$94 million in exports. Over the extended 30 plus year operating life, the Darlington station is expected to contribute another \$50 billion in economic benefits. About 96 percent of OPG's suppliers are based in Ontario and more than 50 companies from about 25 communities are directly engaged in the project.

A 2016 environmental report prepared by Intrinsik Environmental Sciences Inc. indicated that the continued operations of the Darlington Station would remove the GHG equivalent of 2 million cars from Ontario's roads each year.

4 Year Extended Operation of Pickering Nuclear Generating Station (PNGS)

A 2016 assessment shows that extending the operation of the 3100 MW Pickering Station beyond its scheduled closing date in 2020 to 2024 can deliver significant economic and environmental benefits. The study, prepared by Strategic Policy Economics (Strapolec), demonstrated that extending the operation of PNGS would address the province's pending reliability reserve capacity shortfall, keep electricity prices affordable, create jobs, grow the economy, and substantially reduce Ontario's GHG emissions.

It would help Ontario's Independent Electricity System Operator (IESO) to fill a projected 2,000 to 3,000 MW electricity supply short fall and help bring the province in compliance with North American reliability requirements. To the benefit of industrial and residential consumers, electricity system costs would be reduced by over \$1.5 billion dollars. The extended operation of the plant would also preserve 40,000 person years of employment and inject \$7 billion into Ontario's economy. By displacing natural gas generation, the extended operations would avoid over 18 million tonnes of carbon dioxide (GHG gases). The Canadian Nuclear Workers Council is actively supporting this project. The full report can be found at www.pwu.ca.

Research and Development

According to Canada's Ministry of Natural Resources, nuclear related research and development is undertaken in nine provinces and 37 institutions. There are twelve major research centres with the largest being the Chalk River Laboratories. This facility is owned by Atomic Energy of Canada Limited and is operated by Canadian Nuclear Laboratories. More information can be found at www.cna.ca.

Innovation

Canada's nuclear technology and expertise play broad and important roles in technological areas across the country. These include: advanced electronics and material development; aerospace and automotive; earth science and archaeology; environment; food processing; mining and natural resources; nuclear medicine; and pharmaceutical and medical devices. For example, Canada supplies 75 percent of the world's Cobalt-60, which is used to sterilize 45 percent of the world's single-use medical supplies.⁶ The production of isotopes used for medical procedures contributes about \$200 million a year to the economy.⁷

⁶ Natural Resources Canada, www.nrcan.gc.ca/energy/uranium-nuclear/7713

⁷ Canadian Nuclear Factbook 2015