Powering Innovation, Jobs & Economic Growth

Canada’s Largest Infrastructure Project: Providing Low-Cost Electricity to 2064

A joint economic impact analysis from the Provincial Building and Construction Trades Council of Ontario, the Canadian Manufacturers & Exporters and Bruce Power.
This economic impact analysis has been developed using publicly available information that has been quoted throughout the document. It has not used any information that has not been previously disclosed in the public domain. The authors of the document sought to provide a directional sense of economic impacts and, although the figures may vary in the future depending on commercial negotiations to be concluded to turn the Long-Term Energy Plan policy position into action, they will not materially impact either the economic impacts from the investment program or the contribution of this electricity output to stable and affordable electricity rates.
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Ontario’s 2017 Long-Term Energy Plan (LTEP) is focused on the customer while ensuring a reliable, clean and innovative energy system. It’s the balance that many jurisdictions throughout the world are trying to achieve to ensure a clean supply of power and enable investment in infrastructure, while keeping electricity prices affordable and stable over the long term.

This report focuses on Bruce Power’s role within the long-term plan, as it embarks on its journey to refurbish six of its nuclear reactors, starting in 2020.

The report focuses on this source of clean, reliable electricity that provides 30 per cent of the province’s energy in low-cost and flexible way, every day. More importantly, it factually outlines how Bruce Power’s role is a ‘one-two punch’ for our province to achieve balance in generating clean, low-cost, electricity for Ontario families and businesses on the one hand, while securing investment that will be a key source of job creation and economic growth for the province on the other.

The three organizations that have come together to author this report are different in many ways – there’s organized labour, a group of manufacturers and exporters, which drives Ontario’s economy, and Bruce Power, a Canadian-owned supplier of a third of Ontario’s electricity. One thing these groups have in common is a shared desire to see low-cost and stable electricity prices, while securing jobs and economic growth.

Energy policy is often an area of debate and virtually every area of public policy comes into play when discussing what the right mix of electricity supplies should be. There are many views on these issues. However, all these groups agree the role of Bruce Power in Ontario’s Long-Term Energy Plan is a key to the province’s economic and energy future.

Key Source of Stable, Low-cost Rates
As the report outlines, Bruce Power provides more than 30 per cent of Ontario’s electricity at 30 per cent less than the average cost to produce residential power. It does this from the world’s largest operating nuclear facility in rural southwestern Ontario. When looking at the electricity infrastructure for the province, supply sources and demand, Bruce Power is the electricity powerhouse for virtually all of southwestern Ontario, spanning into central and northcentral Ontario. Bruce Power is an essential resource for the most populated area of the province, using existing infrastructure to deliver a third of Ontario’s electricity safely and reliably, 24 hours a day, 365 days a year.

Bruce Power nuclear is also low-cost power that offers long-term price stability, providing the province with electricity at a rate 30 per cent less than the average residential cost to produce power in Ontario. Following the refurbishment of the six remaining units at Bruce Power, nuclear will offer stable prices through 2064. Once the life of the Bruce Power units have been extended, they are not subject to large changes in price due to surrounding market fluctuations or increases in fossil fuel costs.

Jobs and Growth
One of the most important untold economic stories in Canada is the contribution the nuclear industry makes to the economy. Through the LTEP, Bruce Power will provide two-thirds of Ontario’s nuclear power in the decades to come, and it will be a source of jobs, tax revenue and economic growth, while enhancing the skills and knowledge of a generation of workers.
By the Numbers: Securing both low-cost power and growing the economy means:

- Creating and sustaining 22,000 direct and indirect jobs annually.
- $4 billion in annual domestic economic benefit through the direct and indirect spending in operational equipment, supplies, materials and labour income.

Over the next 15 years, as Bruce Power refurbishes its fleet as outlined in Ontario’s LTEP, the following additional annual economic impacts will benefit the region:

- Creating and sustaining over 5,000 direct and indirect jobs annually.
- Investing $980 million to $1.2 billion in labour income into the Ontario economy annually.
- $751 million to $1.07 billion in annual economic benefit through equipment, supplies and materials both directly and indirectly.

There is no single, well-established project, facility or infrastructure project in Canada that will have such a significant economic impact.

In 2017, Top 100 Projects ranked Bruce Power’s Life-Extension Program Number 1 on its Top 100 Canada’s Biggest Infrastructure Projects list.

The jobs, investment and economic impacts will make a significant overall contribution to the economy, and are critical to providing a stable foundation for economic growth in southwestern Ontario. Refurbishing Bruce Power’s six remaining units provides these communities with economic opportunities not seen in decades due to an expected influx of skilled labour and long-term jobs to the areas surrounding the Bruce site.

Most of the manufacturing, engineering and specialty companies that will support the life extension and operation of Bruce Power are also located in Ontario, and many of them in the southwest region.

“Our people are our greatest asset. By working together, we can successfully deliver our nuclear renewal program at Bruce Power, and do so in a way that keeps electricity prices stable and affordable over the long term, while also being a major source of jobs and economic growth for the province.”

MIKE RENCHECK, President & CEO of Bruce Power
An Innovative Economic Engine

Having a vibrant energy sector is crucial for Ontario’s economy, and that is why Bruce Power is proud of its critical role in Canada’s energy supply. The nuclear industry creates expertise and strong levels of employment, and is a key component of maintaining a successful ecosystem of the manufacturing and natural-resource industries.

Bruce Power is a prime example of innovation being generated in Canada and its world-class operations make it a vital player on the global stage. As the world moves increasingly toward de-carbonized sources of energy, Bruce Power plays a significant role in the next generation of nuclear technology and research. Skills and knowledge developed throughout the vast nuclear supply chain will also be deployed into other sectors of the economy, supporting manufacturing and export opportunities now and in the coming decades.

“The current investment and operation program at Bruce Power projects to create and sustain 22,000 jobs yearly and inject $4 billion annually into our economy. This is critical for southwestern Ontario. Not only will Bruce Power create economic activity directly, it will play a key role by providing low-cost electricity to families and businesses across the province.”

PATRICK DILLON
Provincial Building and Construction Trades Council of Ontario
In 2017, Bruce Power became the first Canadian company to win the Nuclear Energy Institute’s (NEI) Innovation Award for its work with Nordion on the production of Cobalt-60 at the organization’s Nuclear Energy Assembly. Since 1994, the TIP Awards have recognized the new and creative ideas and techniques developed by the nuclear industry’s talented workforce, which directly improve the safety and reliability of the nuclear energy industry.

Bruce Power is Canada’s largest public-private partnership. The assets on the Bruce site remain owned by the province and operated by Bruce Power, a private company. Bruce Power’s partners meet all investment requirements, including $10 billion in Asset Management investment since 2001. This means that all the investment required to secure the role of Bruce Power, as outlined in the LTEP, can be achieved without impacting the balance sheet of the taxpayers of Ontario, allowing the government to stay focused on priorities like health care and education.

The Life-Extension Program will also further strengthen the foundation for Ontario’s nuclear suppliers to grow exports of their products and services, while providing a consistent and reliable source of clean power to all Ontarians.

The investment that Bruce Power has made, and continues to make, builds on previous successes and improves the operational performance of each strategic asset, which is good news for the province, and a positive achievement for taxpayers, as Bruce Power takes the responsibility for funding long-term liabilities of the site, including waste and eventual decommissioning.
Since it was formed in 2001, Bruce Power has fostered innovation to become the world’s largest operating nuclear facility, as well as Canada’s largest public-private partnership. While returning four dormant units to service between 2003 and 2012, Bruce Power and its industry partners have engineered and developed first-of-a-kind technology to do what many thought was impossible – breathe new life into reactors that were shut down by the former Ontario Hydro in the 1990s.

This has also provided a significant boost to the economy in southwestern Ontario, the province’s manufacturing sector, and become a reliable source of building trade work, providing well-paid employment and numerous opportunities for skills development and training.

This ability to face challenges and develop ways to safely overcome them has earned Bruce Power recognition as a world leader in the energy industry.

As the company prepares for future refurbishment projects on six of its units, starting in 2020 on Unit 6, this groundbreaking technology will play a key role in infusing more than 30 additional years of life into the reactors – providing low-cost, reliable and carbon-free electricity through 2064.
The Bruce Power site has been, and will continue to be, key to providing both price stability and a long-term source of low-cost power that continues to be significantly less than the average price families and businesses pay for electricity in Ontario.

There is also the perception that large capital requirements for nuclear projects equate to a high price of power for consumers – this is simply not the case. Since nuclear plants generate a large volume of electricity, with a high degree of reliability, the capital requirements of the facility are spread over significant amounts of generation, meaning the cost to ratepayers is quite low. In the case of Bruce Power, the price paid for the electricity covers all costs, including decommissioning of the facility when it reaches its end of life, the management of low-, medium- and high-level waste, and capital investments in the facility.

While there are many comparisons available related to the economics of nuclear plants, the only one that matters to consumers is the price of electricity. The output from Bruce Power is supported by a price established with the Independent Electricity System Operator (IESO) and was 6.6 cents per kilowatt-hour (KWh) in 2017.

As outlined in Figure 1, the price of nuclear in 2017 was more than 30 per cent less than the average cost to produce residential power.

From an overall supply mix perspective, the role of nuclear today and refurbished nuclear in the future will play a critical role in keeping electricity costs low for Ontario families and businesses. Figure 1 (below) compares the relative cost of electricity from all sources as used to determine residential rates by the Ontario Energy Board. As the figure illustrates, the cost of nuclear power remains highly competitive and a key element to keeping electricity costs low and bending forward the price curve.

**Figure 1:**
2017 Electricity Prices (cents/KWh)

- Solar // 4.8
- Gas // 20.5
- Wind // 17.3
- Residential Cost of Power // 11.5
- Combined Ontario Nuclear // 6.9
- Bruce Power Nuclear // 6.6
- Hydro // 5.8
Direct & Secondary Benefits of Operation

Assuming the indicative refurbishment schedule in Ontario’s Long-Term Energy Plan (LTEP), the Bruce Power site will continue to operate until 2064, with its units providing electricity over the next 50 years. The benefits of the continued operation of the site are focused on eight units of operation, supporting activities and sustaining capital investments. The operational costs from Bruce Power are well understood and consist primarily of staffing, operations, maintenance and fuel costs. These expenditures support the safe, reliable operations of the site. The benefits in this section are expressed in the dollar value as of Jan. 1, 2016, which marked the start of the Life-Extension Program and the beginning of the transaction with the IESO.

Employment Estimates

Bruce Power currently has 4,200 permanent employees, in addition to approximately 1,300 staff on a levelized basis that support peaking work on site, such as projects and planned maintenance outages. This corresponds to approximately 500 permanent employees and 150 levelized peaking employees per operating reactor. This number is used in this analysis. This number is consistent with employment levels at other nuclear facilities in North America, which range from 400 to 700 full-time employees per operating reactor, based on industry data.

Operating Cost Estimates

Operating cost estimates have been summarized in Figure 2 to illustrate the cost of fuel, operations, maintenance and administration. A wide variety of technical and operational areas of expertise are required to support the operation of the Bruce Power site. These include but are not limited to:

<table>
<thead>
<tr>
<th>Operations &amp; Support</th>
<th>Engineering &amp; Professionals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuclear Operators</td>
<td>Engineers (Mechanical, Chemical, Civil, Nuclear)</td>
</tr>
<tr>
<td>Control Technicians</td>
<td>Environmental Specialists &amp; Scientists</td>
</tr>
<tr>
<td>Mechanical Maintainers</td>
<td>Employee Wellness (Doctors, Industrial Health Nurses, Physiotherapists, Chiropractors)</td>
</tr>
<tr>
<td>Chemical Technologists</td>
<td></td>
</tr>
<tr>
<td>Radiation Protection Technicians</td>
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<tr>
<td>Safety Technicians</td>
<td>Health Physicists</td>
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<tr>
<td>Boiler Makers</td>
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</tr>
<tr>
<td>Electricians</td>
<td>Financial Analysts</td>
</tr>
<tr>
<td>Sheet Metal Workers</td>
<td>Communications Specialists</td>
</tr>
<tr>
<td>Instrumentation Technicians</td>
<td>Purchasing Specialists</td>
</tr>
<tr>
<td>Welders</td>
<td>Safety Specialists</td>
</tr>
<tr>
<td>Emergency Response &amp; Security Personnel</td>
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<tr>
<td>Information Technology Technicians</td>
<td>Information System Analysts</td>
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</table>

Direct Benefits

The Bruce provides a stable and low-cost electricity source, it is also an economic and innovation engine for the Province of Ontario. In Figure 3, the direct and secondary economic benefits are evaluated with the anticipated operation of the eight nuclear reactor units at the Bruce site from 2016 to 2064, as outlined in the province’s LTEP.

Secondary Benefits

Secondary benefits include the jobs created based on the need to supply the Bruce site, as well as the spending and re-spending by employees. Secondary job creation is calculated using information provided in the 2014 Nuclear Energy Institute evaluation of 100 nuclear facilities in the U.S., which found that for every 100 full-time nuclear jobs, 66 local jobs are created and 236 state jobs are created (state and provincial jobs are considered equivalent).
The annual economic benefits to Ontario summarized in Figure 3 are something that cannot be ignored, including the more than 22,000 highly skilled jobs that are created and sustained annually, and a total overall annual economic benefit of nearly $4 billion. Estimates are conservative and have been developed using modest multipliers for secondary effects. These benefits have been, and will continue to be, occurring annually throughout the operation of the reactors through 2064.

### Total Benefits of Annual Operations

<table>
<thead>
<tr>
<th>Details</th>
<th>Direct Benefit</th>
<th>Secondary Benefit</th>
<th>Total Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontario Employment (1)</td>
<td>5,500</td>
<td>16,610</td>
<td>22,110</td>
</tr>
<tr>
<td>Fuel Cost (2)</td>
<td>$17 million</td>
<td>$128 million</td>
<td>$245 million</td>
</tr>
<tr>
<td>Ontario Purchased Equipment, Materials and Supplies (including staffing costs) (3)</td>
<td>$1.87 billion</td>
<td>$2.05 billion</td>
<td>$3.92 billion</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>$1.98 billion</td>
<td>$2.18 billion</td>
<td>$4.16 billion</td>
</tr>
</tbody>
</table>

Notes:
(1) Bruce Power Annual Review 2013, NEI 2016 Local and State/Provincial Multipliers
(2) Canadian Manufacturers & Exporters 2010 and 2012. It is assumed 50% of the full cost is spent in Ontario because of refining and manufacturing. Secondary benefits are assumed to be 110% of direct spending on fuel is spent and re-spent in Ontario.
(3) Secondary impacts occur when other Ontario industries and businesses supply goods and services to meet the needs of operating the Bruce Power nuclear fleet. It is assumed that 110% of direct spending on equipment, materials and supplies is spent and re-spent in Ontario.

### Sustaining Capital

All nuclear facilities have ongoing annual costs required to maintain their assets, which is outside of operational, maintenance and administration costs. This cost is often referred to as ‘sustaining capital,’ which is money spent to ensure optimal efficiency, production and longevity of the assets. Industry standards indicate that sustaining capital for a single nuclear unit is about $25 million annually. The Bruce Power site has eight nuclear units, as well as support infrastructure, and the facility annually spends about $225 million on sustaining capital projects, leading to another influx of investment in Ontario’s economy.
More than 90% of Bruce Power’s total spending occurs within Ontario
Economic Benefits of Renewing the Bruce Power Fleet

The 2017 Long-Term Energy Plan outlined the Major Component Replacement (MCR) schedule for the Bruce Power site that will generate significant economic impact from now until 2064, related to the renewal of the fleet, in addition to core operations. There will be many more economic benefits of fleet-renewal outside of the Operational Direct and Secondary Benefits, which are over $4 billion annually.

In December 2015, as part of Ontario’s Long-Term Energy Plan (LTEP), Bruce Power was able to reach an agreement with Ontario’s Independent Electricity System Operator (IESO) establishing a commercial framework to advance a long-term investment program to refurbish its nuclear fleet, and to help secure the site’s operation until 2064. This Life-Extension Program, which was re-affirmed as a crucial component of Ontario’s 2017 LTEP, will allow Bruce Power to continue to provide clean, reliable and low-cost electricity to Ontarians for decades.

The purpose of Life Extension is to enable Bruce Power to manage the ongoing operation of our units, including the MCR of Units 3-8, in order to maximize the value of these assets to Bruce Power and Ontario’s electricity system. This program represents a $13 billion investment and consists of an Asset Management Program in addition to the MCR.

This Life-Extension Program, which began on Jan. 1, 2016, will inject jobs and money into our economy, while providing a stable, low-cost and carbon-free supply of electricity to future generations. The analysis estimates that the direct and indirect benefit to Ontario’s manufacturing sector during the nuclear renewal program will be between $200 and $250 million annually. This will primarily be focused in specialized areas of advanced manufacturing, and will keep many of these operations viable for decades.

Figure 4:
Annual Ontario Economic Benefits of Renewing the Bruce Power Nuclear Fleet Starting in 2020 (Unit 6 Refurbishment)

<table>
<thead>
<tr>
<th></th>
<th>Direct Benefit</th>
<th>Secondary Benefit</th>
<th>Total Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment (1)</td>
<td>1,300</td>
<td>3,926</td>
<td>5,226</td>
</tr>
<tr>
<td>Labour Income (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ontario Purchased Equipment, Materials and Supplies (no staffing costs) (3)</td>
<td>$409 to $512 million</td>
<td>$572 to $716 million</td>
<td>$981 million to $1.23 billion</td>
</tr>
<tr>
<td></td>
<td>$358 to $512 million</td>
<td>$393 to $663 million</td>
<td>$751 million to $1.08 billion</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$767 million to $1.02 billion</td>
<td>$966 million to $1.28 billion</td>
<td>$1.73 to $2.3 billion</td>
</tr>
</tbody>
</table>

Notes:
(1) Canadian Manufacturers & Exporters 2012, NEI 2014 Local and State/Provincial Multipliers.
(2) Canadian Manufacturers & Exporters 2010 and 2012. It is assumed 140% of direct labour would be spent and re-spent in Ontario.
(3) Secondary impacts occur when other Ontario industries and businesses supply goods and services to meet the needs of operating the escalated to 2016$ Bruce Power nuclear fleet. It is assumed that 130% of direct spending on equipment, materials and supplies is spent and re-spent in Ontario.
The nuclear energy sector has, for over six decades, provided over 60,000 direct and indirect jobs for engineers, scientists, labourers, miners and others on an average annual basis. The industry has experience building, maintaining and refurbishing reactors for power generation. Operations and renewal of the Bruce Power nuclear fleet has the potential to sustain many high-quality jobs through 2064, once refurbishment of Units 3-8 are complete. Jobs within this industry last five to 50 years, and are well paid and knowledge rich.

Of the 5,500 people working on the Bruce Power site (full-time and levelized/peak staff), almost half are over the age of 46 and eligible to retire within the next 10 years. This means upwards of 2,000 full-time workers will be needed over the next decade to fill this gap, and take part in knowledge-transfer and training to ensure the safe, long-term operation of the site.

Ensuring the next generation of workers is equipped to fill the upcoming years of employment, Bruce Power provides funds to, and partners with, various skilled trades, engineering and science organizations. Bruce Power’s partnerships with the Electric Power Research Institute (EPRI), the Power Workers’ Union, The Society of United Professionals, trade unions and Ontario colleges have increased the number of staff available to Bruce Power, our supplier partners, and in union hiring halls. To improve the skills in the hiring halls, Bruce Power provides a framework that clearly identifies what skills and knowledge the company seeks as an employer, and provides the opportunity to develop and qualify staff to meet its expectations via an internationally recognized program known as the Task Performance Evaluation Program.

The company has 150 registered employees in the apprenticeship program, and they continue to work their way through the program, with significant corporate support in the form of classroom training, job rotations and competency checkouts. These apprenticeship programs include operators, maintainers, millwrights and electricians.

In-house programs provide training for every person who joins the company, both permanently and temporarily. Each year, Bruce Power invests approximately $120 million in training – 38 per cent is the cost to deliver it, while 62 per cent is the cost of staff to attend. There is an average of over 400 regular staff attending training every day. Highly skilled and well-trained employees are key to Bruce Power’s uncompromising focus on safety.
Health & the Low-Carbon Economy

Clean Air

Bruce Power helps ensure low-cost power, jobs, and economic growth, and also assists Ontario in achieving its long-term climate change goals.

In the early-2000s, the Government of Ontario committed to phasing out coal from its energy generating portfolio, which it accomplished in April 2014. The phase out of coal saw a significant reduction in the province’s emission of harmful Greenhouse Gases (GHG), Sulphur Oxides (SOx), Nitrogen Oxides (NOx), and Particulate Matter (PM). The result has seen the number of smog days in Ontario plummet from 53 in 2005 to just one since 2015.

Closing coal-fired power plants has been the single largest GHG reduction initiative in North America.

According to a report released by Asthma Canada, the replacement of coal has eliminated more than 30 megatonnes (MT) of annual GHG emissions, equivalent to taking seven million vehicles off Ontario’s roads. This was made possible by the return to service of four Bruce Power reactors from 2003 to 2012, which added 3,000 megawatts (MW) of carbon-free electricity to Ontario’s grid, providing 70 per cent of the power needed to shut down the province’s coal-fired stations.

In 2005, Ontario’s Ministry of Energy evaluated the health care savings to the province of phasing out coal in the short and long term: It found the coal phase-out, made possible by Bruce Power, avoids 25,000 emergency room visits, 20,000 hospital admissions and 8.1 million minor illness cases, resulting in a financial benefit of $2.6 billion annually.

The transition to clean energy is accelerating around the world, and Canada is part of a growing group of countries that are committed to phasing out traditional coal-fired electricity. In 2018, Canada’s Minister of Environment and Climate Change, Catherine McKenna, announced amendments to existing regulations to phase out traditional coal-fired electricity by 2030, along with new greenhouse gas regulations for natural-gas-fired electricity as part of Canada’s climate action plan, the Pan-Canadian Framework on Clean Growth and Climate Change.

Bruce Power knows a healthy environment and economy go hand-in-hand, and is a vital contributor to helping Canada transition to the next steps in powering a low-carbon economy. The expected benefits from Minister McKenna’s proposed regulations from 2019-55 is $4.9 billion, which includes $3.6 billion in avoided climate change damage and $1.2 billion in health benefits from reduced air pollutant emissions. Bruce Power is proud to play a role in realizing these economic benefits.

Based on the life extension of the Bruce Power site and the estimated $14-$95 per tonne of CO2, Ontario will not only gain over 30 additional years of clean, cap-and-trade free electricity, it will also avoid $12 billion to $63 billion in cap-and-trade costs to Ontario ratepayers, equivalent to $2,700 to $14,000 per household over the next four decades.

Using Bruce Power’s nuclear electricity allows Canada to better achieve its goals for clean, low-cost, reliable energy and meet its international climate change targets.
Life-saving Isotopes

In addition to providing carbon-free electricity, Bruce Power also contributes to the world’s health care system. Bruce Power has a long-term agreement to supply Cobalt-60 to Ottawa-based Nordion so it can use the radioactive isotopes to sterilize 40 per cent of the world’s single-use medical devices and equipment. These supplies include sutures, syringes, gloves, surgical gowns and masks. Cobalt-60 is also used to sterilize pharmaceutical wares and cosmetics, and irradiate spices and other consumer products that include fruit, seafood, poultry and red meat. The World Health Organization (WHO) estimates more than 640,000 major surgeries are performed each day around the world, and sterile disposable medical devices are used in virtually all of these procedures.

Cobalt-60 is supplied to over 200 gamma irradiators in 55 countries around the world. Cobalt is mined like any other mineral. It is removed from the ground and processed into pure Cobalt-59 powder, which is then compressed into slugs and coated with nickel. These slugs are then encapsulated and assembled into adjuster rods, which are used to control the reaction in Bruce Power’s reactors, where the cobalt is activated by absorbing neutrons to become Cobalt-60.

Cobalt-60 harvested from the four Bruce B reactors can also be used to help stop the spread of the Zika virus. Cobalt-60 is the key component of the Sterile Insect Technique (SIT), a process aimed at eliminating or, at a minimum, suppressing the population of insects that spread disease or damage agricultural crops. In early-2016, the International Atomic Energy Association deployed the SIT using gamma radiation from Cobalt-60 to combat the spread of Zika and West Nile viruses, as well as dengue. SIT poses no risk to the environment or to public health and, in fact, is considered one of the most environmentally friendly insect pest control methods ever developed because the insects are not killed, they simply do not self-replicate or become established in the environment.

Bruce Power and Nordion have also expanded their partnership and entered into an agreement to supply High Specific Activity (HSA) Cobalt-60, also referred to as medical-grade Cobalt. HSA applications include non-invasive radiosurgery for the precise treatment of brain tumors as well as other external beam therapies that are used to treat more general cancer tumors in the body. This type of Cobalt-60 is produced in a limited number of nuclear reactors globally and used in radiation-based treatment of cancer and other diseases in Canada and around the world.

What is Gamma Knife?

Gamma Knife radiosurgery is a type of radiation therapy used to treat tumors and other abnormalities in the brain. In Gamma Knife radiosurgery, specialized equipment focuses close to 200 tiny beams of radiation on a tumor or other target. Although each beam has very little effect on the healthy brain tissue it passes through, a strong dose of radiation is delivered to the site where all the beams meet. The precision of Gamma Knife radiosurgery results in minimal damage to healthy tissues surrounding the target.

In some cases, Gamma Knife radiosurgery may have a lower risk of side effects compared with other types of radiation therapy. Also, Gamma Knife radiosurgery is often a safer option than traditional brain surgery. Gamma Knife radiosurgery is usually a one-time therapy completed in a single day.
The Bruce Power site is located on the eastern shore of Lake Huron near Tiverton, ON, within the traditional territory of the Saugeen Ojibway Nation (SON), and the traditional harvesting territories of the Historic Saugeen Métis (HSM) and the Métis Nation of Ontario (MNO).

Bruce Power is committed to providing opportunities for companies to connect with the Indigenous community. We continue to establish a positive working relationship with the SON in the communities of Saugeen and Nawash, while, on a community sponsorship level in 2017, we continued to develop recreational and educational opportunities for children, and supported social and cultural programs, among many other initiatives. We also work closely with the Historic Saugeen Métis and the Métis Nation of Ontario on a variety of topics.

Situated on the traditional territory of the Saugeen Ojibway Nation, Bruce Power has signed Protocol Agreements with its Indigenous communities, and has been an active business partner investing in Aboriginal businesses both locally and provincially.

The combination of corporate and personal support from the Bruce Power site gives an important boost to local initiatives and organizations so they can continue to improve the quality of life for residents along the Lake Huron shoreline, and make our area one of the greatest places to live in Ontario.

Bruce Power has enhanced its procurement process to include recognition for companies which are Indigenous-owned, employ Indigenous peoples, and are active Canadian Council of Aboriginal Business members, encouraging its suppliers to become accredited in the CCAB’s Progressive Aboriginal Relations (PAR) Program. The PAR Program is a certification that confirms corporate performance in Indigenous relations at the gold, silver and bronze levels.

The PAR certification provides a high level of assurance to Indigenous communities as the designation is supported by an independent, third-party verification of company reports and demonstrates that Bruce Power is committed to prosperity in Indigenous communities.

In 2017, Bruce Power was awarded its second gold designation for PAR by the CCAB. This is highest level of recognition handed out by the CCAB, and Bruce Power is one of just 17 companies in Canada to receive the prestigious award.

Bruce Power and its supplier partners have also created an Indigenous Relations Supplier Network (IRSN) as they look to further strengthen their relationships with local Indigenous communities. The IRSN, which has been under development since June 2017, is focused on a coordinated and collaborative approach to community investment, training, education and employment.

This will be a key vehicle to ensure that Indigenous communities have the opportunity to actively participate in the company’s ongoing investment program in the area of employment, business partnerships and procurement. Through the Indigenous Relations Supplier Network, Bruce Power can collaborate on projects enabled through work on site to help grow Indigenous business communities, create long-term jobs, and identify areas to focus on for collective social investment.
“The Indigenous Relations Supplier Network consists of all our major suppliers and will assist with our efforts to increase employment from Indigenous communities, and to leverage business development opportunities as a way to create new – and support existing – Indigenous-owned businesses.”

MIKE RENCHECK, President & CEO of Bruce Power
Local Economic Development

“The CME shares a long history working closely with Bruce Power to create economic opportunities for our manufacturers across the province. With the continued investments we make not only into our people, but our surrounding community, the direct and indirect benefits are felt across the entire province which translates into an export opportunity for skills and manufacturing for our country.”

DENNIS DARBY, Canadian Manufacturers and Exporters

Our local communities which include the Bruce, Grey and Huron Counties are a nuclear energy economic hub, able to support and advance Bruce Power as a world leader in the nuclear sector. With the largest single infrastructure project in Canada underway, the jobs, investment and economic impacts that will result from this project will make a significant contribution to not only the economic prosperity of Ontario, but add further profound economic impact across Canada and its nuclear supply chain.

The local communities in the surrounding region are an important part in helping us realize many of these benefits locally. As such, we established the Nuclear Industry Regional Advisory Committee to help provide direction, insight and guidance as we move forward and collectively work toward achieving a common vision for the nuclear sector in the region.

Bruce Power’s multi-billion dollar, multi-year investment program will see significant contracts secured with its nuclear supply chain companies – and new partnerships formed with these companies – across Ontario and around the world. The level of investment that will be made in its life extension program will require long term partnerships with its supply chain companies – working closely, hand-in-hand to deliver the project on time and on budget.

Building on these relationships and emphasizing the importance of establishing a local presence to achieve long term success starts with Bruce Power. Bruce Power has adopted a leadership role in working with its supply chain companies to emphasize the importance of establishing a local presence and supporting the regional economy in which it operates. By bringing more investment and economic benefit to the region, Bruce Power is building a strong, sustainable local economy, able to support its operations in the long-term.
“The Bruce, Grey and Huron region is very quickly being recognized globally as a nuclear industry centre of excellence, and, by working together our region will not only be a source of low-cost electricity for decades but will be a source of good jobs and a bright future for our entire region.”

MIKE RENCHECK, President & CEO of Bruce Power
Summary of Benefits

The Bruce Power site is an economic engine and one of the main energy sources for southern Ontario.

This site provides long-term, high-paying jobs in the area of skilled trades, engineering and professionals, realized through both direct and secondary benefits.

There is no other single infrastructure investment in Canada of this scale that will have a sustained economic benefit of this nature, while it will also contribute to stable and low-cost electricity prices over the long term. Although the economic benefit impacts the entire province, it is particularly important for southwestern Ontario and will be a stable source of jobs and investment. Figure 5 outlines the combined annual economic benefit that would be realized from 2020 to 2035, with the renewal and operation of the Bruce Power site.

**Figure 5**
Combined Annual Ontario Economic benefit of Refurbishment and Operations from 2020 to 2035

<table>
<thead>
<tr>
<th></th>
<th>Total Operational Benefits</th>
<th>Total Nuclear Fleet Renewal Benefits</th>
<th>Total Overall Economic Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontario Employment (1)</td>
<td>22,110</td>
<td>5,226</td>
<td>27,336</td>
</tr>
<tr>
<td>Fuel Cost (2)</td>
<td>$245 million</td>
<td>Not Applicable</td>
<td>$245 million</td>
</tr>
<tr>
<td>Ontario Purchased Equipment, Materials and Supplies (includes staffing costs) (3)</td>
<td>$3.92 billion</td>
<td>$1.73 to $2.3 billion</td>
<td>$5.65 to $6.22 billion</td>
</tr>
<tr>
<td><strong>TOTAL (4)</strong></td>
<td>$4.16 billion</td>
<td>$1.73 to $2.3 billion</td>
<td>$5.9 to $6.47 billion</td>
</tr>
</tbody>
</table>

Notes:
(1) Total benefit Figure 5 and Figure 6.
(2) Benefit of fuel purchase to Ontario economy based on numbers from Figure 5.
(3) Figure 5 total Ontario Purchased Equipment, Materials and Supplies (includes staffing costs) and Figure 6 overall total benefit.
(4) Total does not include benefits from sustaining capital.
References


[R12] Bruce Power (2010). Year in Review


