

# Clear Thinking on **Clean Energy**



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# Introduction

We all count on reliable electricity, whether it's to flip a light switch or keep an MRI machine running. And the need will continue to grow. With our economic and population growth, together with the electrification of transportation and industry, Canada's demand for power is expected to triple over the next 30 years. And Ontario's is projected to increase by approximately 15% over the next decade.

For decades, the world relied on fossil fuels; but it has exacted a heavy price on the health of our people and our planet. As the threat and pace of climate change accelerates, it is essential to replace traditional energy sources with clean power.

Collaboration among zero-carbon generation technologies, including nuclear, hydrogen and renewables, can significantly reduce greenhouse gas emissions. But the window for success is closing. While people are increasingly aware of nuclear's vital contribution, a mountain of misinformation still obscures the issue.

By rebutting the myths, we can exchange the ominous image of mushroom clouds for an uplifting picture of clear skies.

**While people are increasingly aware of nuclear's vital contribution, a mountain of misinformation still obscures the issue.**





# Nuclear Needs Support

The key message to our citizens and government representatives is: “Nuclear needs you.” Without nuclear, what would our future look like? Fewer treatments for cancer. Economic opportunities sparked by new technologies relinquished to other countries. Failure to reach our net zero targets. When we are armed with the facts, we can turn skeptics into believers.

Here are just two of the primary misconceptions we can disprove:

 **Myth**

*Nuclear power isn’t safe.*

 **Fact**

Through lessons learned, we have developed multiple layers of protection, closely monitored by our regulators, with stringent safety training for our nuclear professionals.

 **Myth**

*Nuclear waste will contaminate the environment.*

 **Fact**

Unlike other forms of energy, all nuclear waste is safely managed in storage facilities, with a responsible plan for long-term management and the protection of people and the environment.

This playbook can amplify the message of our nuclear advantage through testimonials, statistics, resources and guidance on how to educate the public and inspire political confidence. By empowering a voter base of advocates with clear answers to their questions, we can motivate endorsement by government decision makers.



**Our industry’s success is critical to our stakeholders, critical to our nation, and critical to our world.** It is our responsibility to activate support with a unified story substantiated by clear thinking.



# The Real Picture: Facts and Figures

## Reliable Electricity



Nuclear power is one of the most reliable energy sources, operating 24 hours a day, 7 days a week.



**60%**

of Ontario's electricity comes from nuclear power.<sup>1</sup>



**15%**

of Canada's electricity comes from nuclear power.

## Medical Isotopes

CANDU reactors provide unmatched reliability and scale of isotope production, helping meet the ever-growing demand for medical isotopes to fight deadly diseases. Every year, there are 40 million nuclear medicine procedures performed worldwide using isotopes.



Cobalt-60 is an essential isotope used to treat cancer and sterilize medical devices.

jobs supported by medical isotopes in the nuclear industry across Canada<sup>2</sup>

**8.5k**

**70%**

of the world's supply of cobalt-60 produced at Canadian power plants<sup>2</sup>

**40%**

of all global single-use medical devices sterilized by cobalt-60<sup>1</sup>

<sup>1</sup>Source: OPG/Bruce Power Collaboration Report 2022

<sup>2</sup>Source: Canadian Nuclear Association/Medical Isotopes

# Clean Air

Nuclear provided approximately **90%** of the energy required to remove coal from the Ontario grid, one of the **world's largest greenhouse gas reduction initiatives**.



As a result of the coal phase-out, **smog days in Ontario declined** from **53** days in 2005 to **0** in 2022.\*

According to Canada's Office of the Minister of Environment and Climate Change, accelerating the phase-out of coal will result in

**260** avoided premature mortalities

**40,000** fewer asthma episodes

**190,000** fewer days of breathing difficulty and reduced activity in Canada by 2055

Nuclear is critical to **meeting net zero targets**, avoiding

**80,000,000** tonnes of **CO<sub>2</sub>** each year,\*

the equivalent of **removing**

**15,000,000** cars from the road.



\*Source: OPG/Bruce Power Collaboration Report 2022



// Nuclear energy not only *produces clean, green, zero emissions power*, but it also creates stable, good-paying jobs in our communities.

– **Todd Smith**, Ontario's Minister of Energy, at the CNA 2023 Conference hosted in Ottawa on Feb 24, 2023

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// Ontario is fortunate to have one of the cleanest electricity grids in the world, over 90% emissions-free, and there's one reason why: Our nuclear sector provided the emissions-free electricity to phase out coal-fired generation in Ontario, one of the largest greenhouse gas reductions ever. In fact, Bruce Power provided 70% of that electricity.

– **Rick Byers**, Member of Provincial Parliament, Grey-Bruce-Owen Sound

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// The Canadian 2023 Budget underlines government support for nuclear. Inclusion of nuclear in the clean energy investment tax credit and making it eligible for a range of other tax incentives shows the *Government of Canada's clear and strong support* for nuclear's indispensable role in the clean-energy transition, according to the Canadian Nuclear Association (CNA).

– World Nuclear News: Canadian Government Support

# Economic Growth

Canada's nuclear industry promotes economic growth and creates meaningful jobs.

**\$17,000,000,000** GDP annually in Canada

**\$650,000,000** estimated value of Canadian medical isotope market

**\$1,170,000,000** projected value of Canadian medical isotope market by 2032

**\$1B** Annual Canadian uranium exports

**2<sup>nd</sup>** Largest uranium producer worldwide



**96%** of the CANDU supply chain is Canadian

 **76,000**

direct and indirect jobs supporting the nuclear industry in Canada



High-quality career opportunities in trades, technical and professional fields

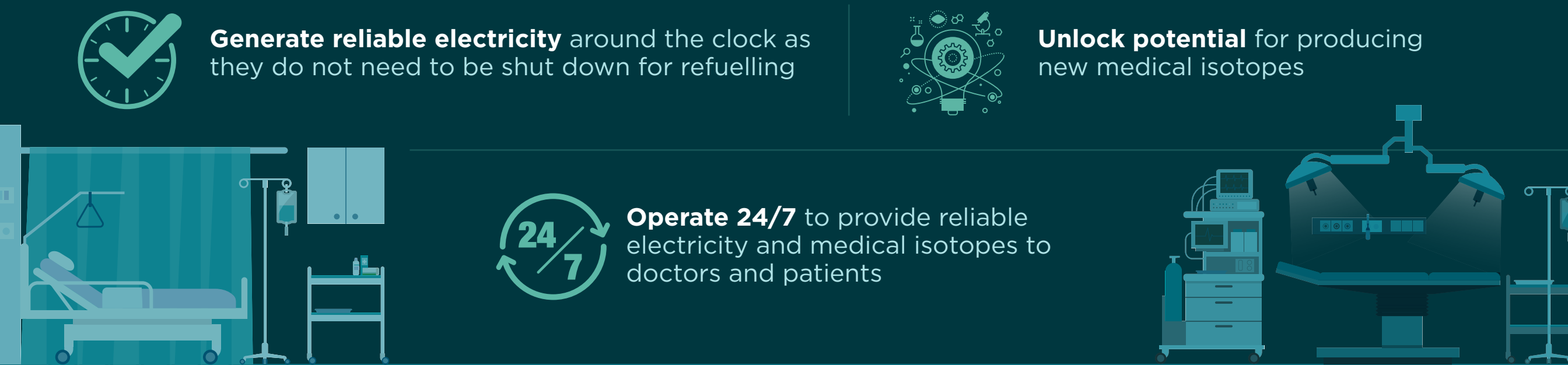


# Innovation

Many provinces are exploring the deployment of small modular reactors. SMRs support domestic energy needs:



## CANDU reactors



# Managing Waste: A Responsible Plan

Every energy source emits waste, but the nuclear industry is the only source that manages it through the entire lifecycle.

Nuclear waste is classified by its level of radioactivity:

## Low-level materials

*tools, clothing, cleaning supplies*  
contain very short-lived radioactivity.

## Intermediate-level materials

*used reactor components, resins, filters*  
are more radioactive.

## High-level materials

*used fuel bundles*  
require careful containment and management.

Currently, nuclear waste and used fuel are safely contained above ground in licensed facilities; but a responsible, science-based plan is needed to isolate radioactive materials over the long term. The Nuclear Waste Management Organization (NWMO) has developed such a plan, fully funded by the power-producing utilities, to be implemented following federal government approval.

Canada will adopt international best practices by storing used nuclear fuel in deep geological repositories (DGRs), shielded by rock in a site with no groundwater or valuable minerals. Deep geologic storage involves multiple layers of barriers. Solid ceramic used-fuel pellets are housed inside a zircaloy fuel bundle in a steel container, surrounded by a corrosion-resistant copper coating. This is protected by a box made of bentonite clay (a powerful barrier to water flow) and then encased in rock half a kilometre deep.

**Environmental monitoring is a primary focus for the nuclear industry, ensuring protection of people and lands.** The DGR project will be subject to thorough regulatory review, including environmental assessment and licensing review to ensure its safety, followed by extended monitoring once placed in the repository.

**Canada will adopt international best practices by storing used nuclear fuel in deep geological repositories (DGRs), shielded by rock in a site with no groundwater or valuable minerals.**





# Improving Lives with Isotopes: The Health of our People

## Medical Isotopes

Medical isotopes are a cornerstone of nuclear medicine, contributing to the fight against cancer and transforming patient outcomes. Through our world-class nuclear expertise and achievements, Canada is a global leader in medical isotope research, development and production, for use in medical imaging, cancer therapy, disease prevention and device sterilization.

For decades, Canada has provided reliable access to medical isotopes like cobalt-60, yttrium-90, xenon-133, irridium-192 and iodine-125; and the Canadian government continues to invest in research and facilities, positioning us as an innovative and reliable supplier in the international landscape.

## Government Support for ‘Made in Ontario’ Isotopes

In March 2023, the Ontario government announced \$6.8 million to boost research capacity at the McMaster University Nuclear Reactor, Canada’s largest research reactor and leading supplier of medical isotopes used in breakthrough cancer treatments. [View article](#)

“As Canada’s nuclear university, we are *committed to advancing nuclear medicine*, developing life-saving treatments and creating high-paying jobs in this important field.”  
-David Farrar, McMaster President

## How Are Isotopes Used?

**Industry, Agriculture, Medical:** These sectors rely on the power of isotopes to improve human health and safety.



### Nuclear Medicine

Isotopes sterilize medical equipment and diagnose and treat deadly diseases such as cancer.



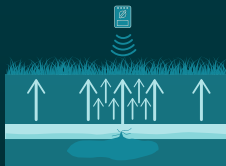
### Food Production

Irradiating food kills disease-causing bacteria, reduces spoilage and increases shelf life.



### Crop Protection

Isotopes can play an important role in the agricultural sector by replacing chemical fertilizers.



### Industry

Radiation can act as tracers to check for pipe leaks or structural defects in manufactured parts.



### Pest Control

Irradiation can reduce the population of insects carrying viruses such as Zika or West Nile by sterilizing the males.

## How Does Ontario Contribute?

**Together, OPG and Bruce Power produce more than half of the world's supply of cobalt-60 (Co-60).** Co-60 is extracted from reactors at OPG Pickering and Bruce Power's Bruce B station every 24 to 30 months. About 40 percent of the world's single-use medical devices, such as syringes, gloves, implants, and surgical instruments, are irradiated and sterilized with Co-60; it is also used in the treatment of brain tumours for millions of patients worldwide.

40% 

**of the world's single-use medical devices, such as syringes, gloves, implants, and surgical instruments, are irradiated and sterilized with Co-60**

40M

**diagnostic and medical imaging treatments around the world**

An innovative collaboration between OPG's wholly owned subsidiary, Laurentis Energy Partners, and BWXT Medical (BWXT) will see molybdenum-99 (Mo-99) harvested from reactors at Darlington Nuclear. Mo-99 is used in over 40 million diagnostic and medical imaging treatments around the world each year, helping to detect illnesses like cancer and heart disease. The production of Mo-99 at Darlington will be a world first from a commercial power reactor, ensuring a stable domestic supply of this critical product without interrupting the station's generation of clean energy.

Bruce Power is the first commercial power reactor in the world to use an Isotope Production System (IPS) to produce lutetium-177 (Lu-177), a short-lived medical isotope currently used to treat neuroendocrine tumours, with applications for prostate and breast cancer treatments. The Lu-177 IPS leverages Bruce Power's continual operations 24-hours a day, seven-days a week to provide a consistent and scalable supply of cancer-fighting isotopes that will be used by doctors to treat patients around the world.

## Ontario Legislative support of medical isotope production in Ontario

Now-retired MPP Bill Walker rose in the Ontario Legislative Assembly to champion a Private Members Motion in support of medical isotope production in Ontario. His motion was widely successful and received support from all parties present in the Legislature. The motion was a major win for the medical isotope industry and represented a major step forward in Ontario.

”

The Government of Ontario should recognize the supply of medical isotopes used to diagnose and treat cancer and sterilize medical equipment as a key strategic priority for the Province in its health, economic, export, inter-provincial, energy, research and infrastructure planning and policies as Ontario recovers from the COVID-19 pandemic, leveraging its existing strong foundation in nuclear technology, isotope production and supply chain, and cancer and health research to *position itself as a global leader* in supply of 'Made in Ontario' life-saving medical isotopes.

– **Bill Walker**, Former MMP





*“Ontario is a leader in the fight against cancer, and this report lays out how we can continue to grow our industry and export life-saving nuclear isotopes around the world!”*

– **Minister Todd Smith**, commenting on the CNIC Isotopes for Hope Report

*“Canada has been a pioneer in the development of radionuclides, saving millions of lives in more than 80 countries for over six decades. We have demonstrated world-class nuclear expertise and achievements, leading to significant advancements in medical imaging, cancer therapy, sterilization, food and water safety, and disease prevention.”*

– **Pam Damoff**, Member of Parliament



[View Full Statement Video](#)



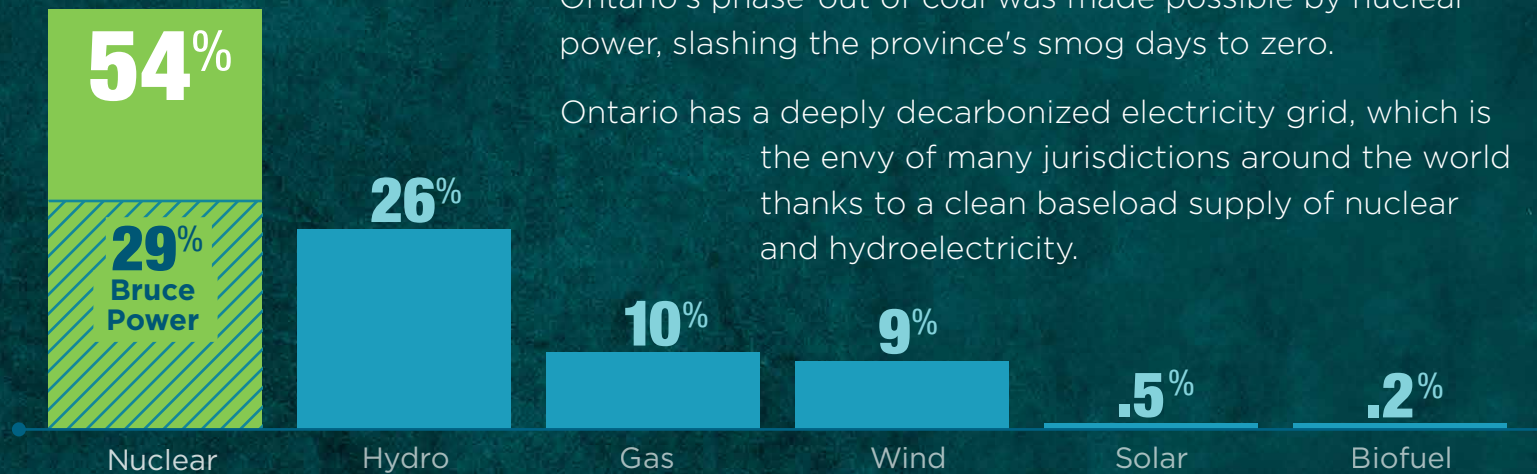
# Fighting Climate Change: The Health of our Planet

There is wide acknowledgement of the pressing need to mitigate the catastrophic global damages of climate change, but not sufficient recognition that nuclear must be part of the solution. Canada has targeted 2050 for net-zero emissions, with an intermediate goal of cutting them by 40% to 45% below 2005 levels by 2030, despite a projection that the demand for energy will be tripled. Nuclear has a key role to play in leaving a legacy of clean air to the next generations.

## How Does Nuclear Fight Climate Change?

The nuclear industry delivers low-carbon energy to Canada. The World Nuclear Association indicates that, over its life cycle, nuclear produces approximately the same amount of carbon dioxide-equivalent emissions per unit of electricity as wind, and just one-third of the emissions from solar electricity generation. As one of the world's most successful climate-change reductions over the last decade, Ontario's phase-out of coal was made possible by nuclear power, slashing the province's smog days to zero.

### Ontario Energy Usage



Ontario has a deeply decarbonized electricity grid, which is the envy of many jurisdictions around the world thanks to a clean baseload supply of nuclear and hydroelectricity.

// In order to achieve a net zero future in Ontario and Canada, we need to *continue expanding the amount of clean electricity produced* by our existing facilities, and a focus on further innovation.

– **Mike Rencheck**, President and CEO of Bruce Power





# Why Is Nuclear Necessary?

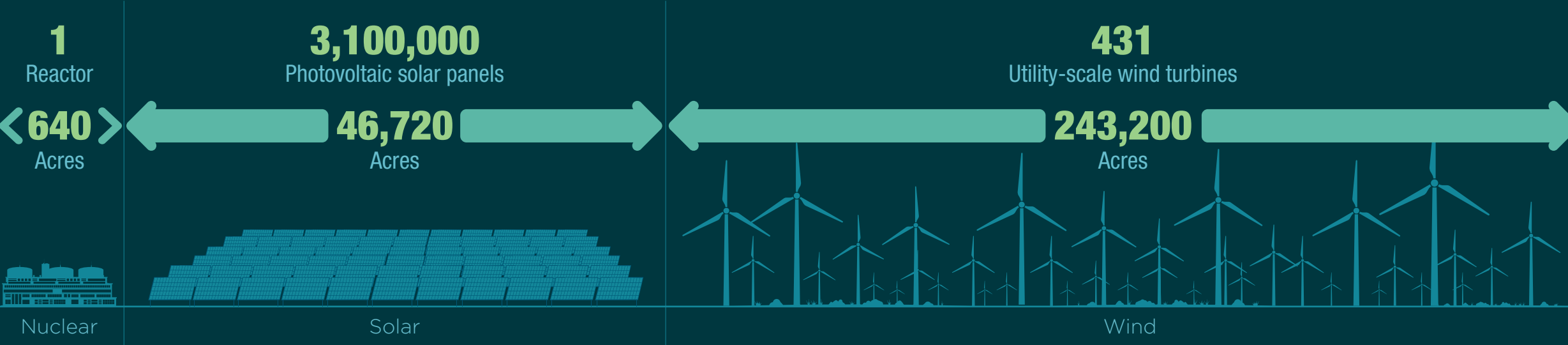
Fossil fuels currently provide 80% of Canada’s energy but are responsible for most of our emissions. Scientists, governments and environmental experts around the world accept that net zero is not attainable without nuclear. Nuclear is one of the largest international producers of clean electricity, and it accounts for approximately 15% of Canada’s needs and 60% of Ontario’s. However, it can do much more.

Because nuclear is energy-dense, it generates enormous amounts of electricity with little waste. With the highest standards of safety and planning for storing that waste, nuclear is cost-effective and reliable, with a small environmental footprint. And, unlike solar and wind, it is land-efficient and free from geographical and weather challenges.

# What Is the Solution?

We need a blended system of all of our clean-energy technologies, including hydro and renewables. Solar and wind alone are not enough, and they lack 24/7 reliability. Nuclear can replace fossil fuels as the catalyst in producing hydrogen, which can produce emissions-free fuel for vehicles. With supplier collaboration, governmental backing and public advocacy, Canada can achieve its goals, leveraging nuclear power as a vital player in the fight against climate change.

## Generating 1 Gigawatt of electricity comparison





// We are [investing in nuclear power] because nuclear energy – as a non-emitting source of energy – *is critical to the achievement of Canada's and the world's climate goals.*

– **Jonathan Wilkinson**, Minister of Natural Resources of Canada

// *Energy experts say there is no path to bringing the world's carbon emissions to zero by 2050 without nuclear.* The CIB's \$970 million investment will help OPG construct Canada's first small modular reactor. As our largest clean-power investment, we are supporting technology which can accelerate the reduction in greenhouse gases while also paving the way for Canada becoming a global SMR technology hub.

– **Ehren Cory**, CEO, Canada Infrastructure Bank



# Creating Meaningful Jobs: The Health of our Economy

The nuclear industry helps to drive our nation's economy, not only through exporting products and stimulating vendor profitability, but also by creating thousands of long-term jobs in a robust and growing field.

## What Is Nuclear's Economic Impact?

The nuclear industry contributes \$17 billion per year to the Canadian economy, representing 76,000 jobs. New careers are opening up with nuclear fleet refurbishments (Canada's largest infrastructure project), the development of small modular reactors, and the long-term waste strategy for the safe storage and management of used fuel.

**76,000 JOBS**



Medical isotope production is a multi-billion-dollar global industry, and Canada has historically been a world leader in its supply, supporting approximately 8,500 jobs. Canadian nuclear plants provide over 70% of the world's cobalt-60 isotopes, and new isotopes and applications will substantially broaden the market.

Canada leads in nuclear technology, with six other countries using our CANDU reactors. And, with our enormous reserves, we are the second largest producer and fourth largest exporter of high-quality uranium.

Nuclear is an economic powerhouse  
Ontario's nuclear industry **contributes**  
**\$17,000,000,000**  
per year to the **Canadian economy**

## How Is the Industry Growing?

Canada's investment in nuclear innovation will continue to advance a wealth of interesting possibilities, building the industry and offering fulfilling careers.

Ongoing refurbishment programs will be critical to generating decades more clean and reliable energy to help meet the growing needs of our future, while helping Ontario achieve a balanced, reliable and affordable electricity system.

As the world more actively addresses solutions to climate change, Canada is an early leader in small modular reactors (SMRs), with an annual global **export potential of \$150 billion** and **domestic market value of \$5.3 billion between 2025 and 2040**.<sup>1</sup> The construction and 60-year operation of one 300 MWe SMR facility would result in approximately 700 jobs in project development, 1,600 jobs during manufacturing and construction, 200 jobs during operations and 160 jobs for decommissioning. The estimated impact on GDP could exceed \$2.5 billion with an increase in provincial revenues of over \$870 million.<sup>2</sup>

In 2018, the value of the Canadian medical isotope market was estimated at approximately \$650 million, with a projected increase to \$1.17 billion by the year 2032, due to doctor and patient demand, new and emerging markets and improved insurance coverage.

Global export potential of SMRs  
**\$150,000,000,000**

Estimated impact of SMRs on GDP could exceed  
**\$2,500,000,000**

<sup>1</sup> SMR Roadmap

<sup>2</sup> World Nuclear News



# Accelerating our Vision: Innovation at Work

Consider our progress over the past couple of decades: computer evolution from mainframe to laptop; the rise of the Internet; the shift from landlines to smartphones. Then imagine what the next couple of decades can bring, with the best scientific minds working on nuclear innovation.

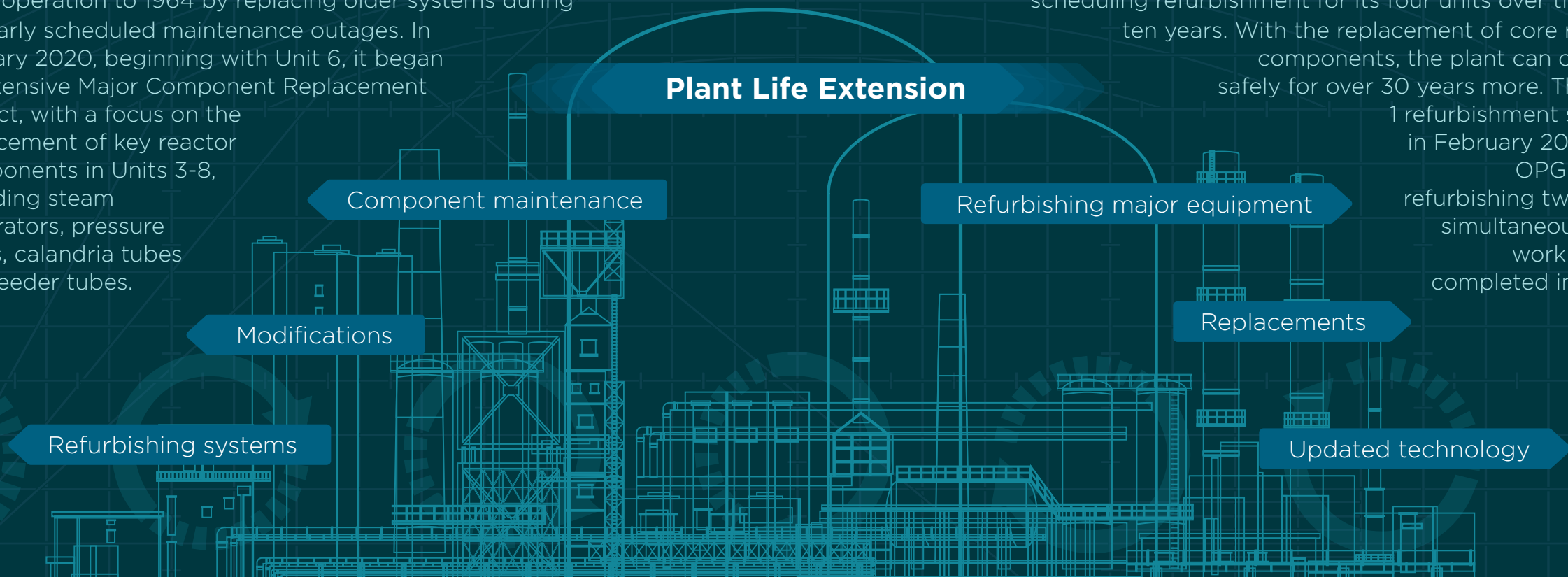
Our industry is transforming how we live and work: progressive life-extension programs for CANDU power plants; small modular reactors (SMRs) providing clean energy in remote regions; low-carbon hydrogen for industry and transportation; medical isotopes making a profound difference in treating disease.

## Life-Extension Programs

The nuclear plants at Bruce Power and Darlington are extending their lives for several decades by refurbishing major equipment and systems. In addition to component maintenance, replacement and/or modifications, refurbishment enhances safety through updated technology and knowledge.

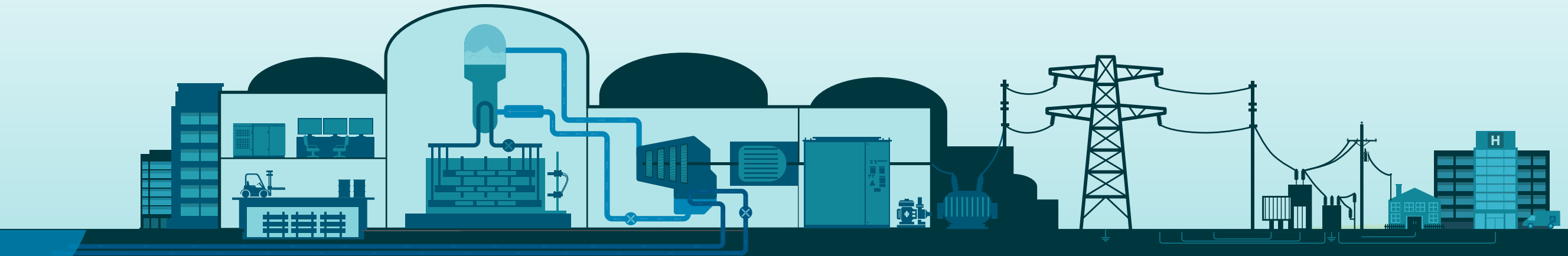
Bruce Power began its life-extension program to secure the site's operation to 1964 by replacing older systems during regularly scheduled maintenance outages. In January 2020, beginning with Unit 6, it began an intensive Major Component Replacement project, with a focus on the replacement of key reactor components in Units 3-8, including steam generators, pressure tubes, calandria tubes and feeder tubes.

OPG's Darlington Station began its program in 2016, scheduling refurbishment for its four units over the next ten years. With the replacement of core reactor components, the plant can operate safely for over 30 years more. The Unit 1 refurbishment started in February 2022 and OPG is now refurbishing two units simultaneously. All work will be completed in 2026.



## CANDU Reactors

“In-a-nutshell” information can simplify the complexity of our CANDU reactors. The acronym means “Canada Deuterium Uranium” **(designed in Canada; cooling with deuterium oxide, or heavy water; using natural uranium for fuel)**. The heavy water allows the CANDU reactor to use natural, rather than enriched, uranium, shrinking processing costs. And CANDUs can be refuelled while operating at full power, unlike other reactors that lose time by shutting down.



CANDU reactors account for about 15% of Canada’s electricity and are operating in six countries. In 1987, the CANDU reactor was recognized as one of Canada’s top ten engineering achievements of the previous 100 years. With major refurbishment projects underway to extend the life cycle of the reactors, CANDU technology will continue to help decarbonize national and global economies for decades to come.

### How do they work?

Uranium powder is packed into solid pellets that are put into fuel rods and assembled into fuel bundles, which are inserted into the reactor. During the operation of the reactor, the uranium atoms split, releasing neutrons in a chain reaction controlled by the heavy water. The resulting heat from this fission activity generates steam, which drives a turbine to produce clean electricity.

In 1987, the CANDU reactor was recognized as one of Canada’s

★ **TOP 10** ★  
**ENGINEERING**

achievements of  
the previous  
100 years.



# Small Modular Reactors

While focusing on safe, reliable operations and life-extension programs, the industry also recognizes the importance of emerging technologies, including large-scale nuclear, advanced nuclear and micro-reactors, and small modular reactors (SMRs).

Small modular reactors generate between 10 and 300 MWe and are much smaller than Canada’s flagship CANDU reactors, which average around 700 MWe.

These prefabricated, transportable small units can play a role in helping to meet the urgent need for low-carbon electricity sources, providing electricity to smaller grids, such as those in remote communities, as well as providing heat and power for natural resource industries. Their development is another pathway to secure a cleaner energy future and support Canada’s Net Zero 2050 commitment.

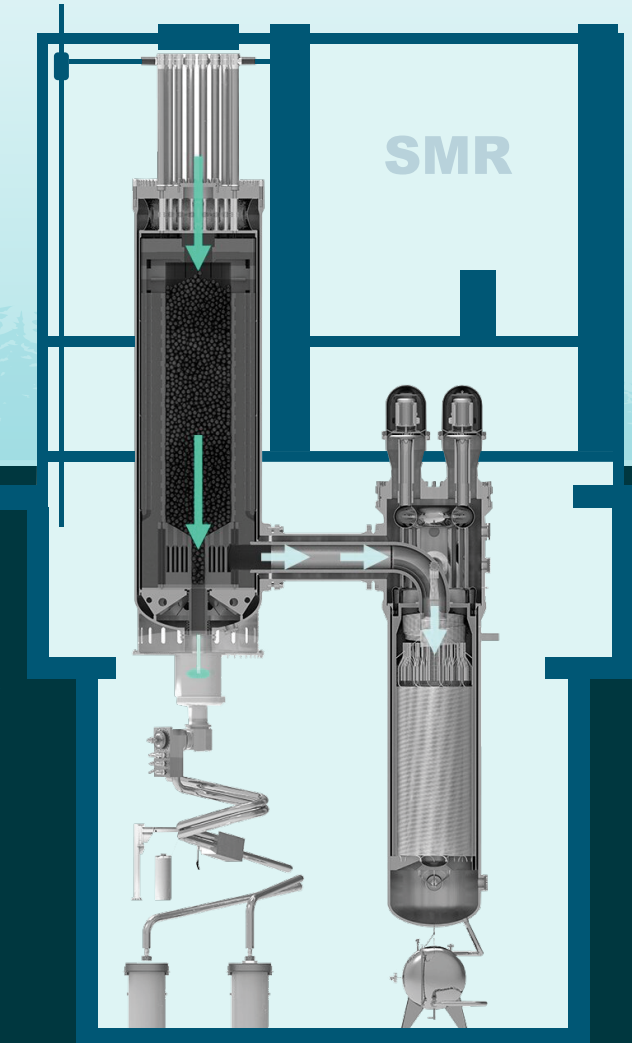
**Small**  
A fraction of the size of conventional reactors

**Modular**  
Prefabricated, transportable components

**Reactors**  
Generating energy through nuclear fission

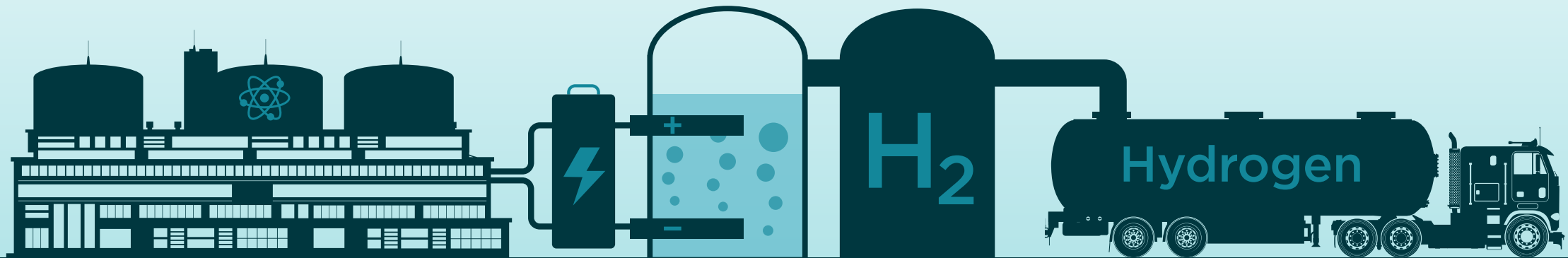
**Their potential applications include:**

- ✓ On-grid power generation, with hybrid nuclear/renewables systems to phase out coal
- ✓ On- and off-grid heat and power for heavy industry, transportation and mines
- ✓ Off-grid power for emissions-free heat and electricity in remote communities



## The Hydrogen Economy

Hydrogen has the potential to radically lower greenhouse gases by changing how we fuel public and private vehicles. It is an energy carrier, but not a source; and it must access energy, most commonly with fossil fuels that emit carbon dioxide. Research is underway to create zero-carbon hydrogen using direct heat from nuclear reactors. When hydrogen is cleanly mass-produced, it can decarbonize major industries such as aviation, transport, steel and agriculture. Canada is at the forefront in establishing nuclear-to-hydrogen strategies.



Research is underway to create zero-carbon hydrogen using direct heat from nuclear reactors.

## An Exciting Vision

We've come a long way, and nuclear has taken us there. Nuclear is accelerating the journey to a powerful transformation: medical breakthroughs, reliable and clean energy, new industrial applications, economic growth. And the future will take us much further, as global scientists continue to unlock revolutionary nuclear technologies.

**It's time to spread the word.**





# Engagement Strategies: Spread the Word

**We have the facts, but the challenge is finding the ears to hear them.** Changing minds is not easy, but consistent and cohesive communication is the pathway to clearing the air. ONA is providing the tools, and we are counting on our industry partners to help spread the word. Let’s work together to strengthen our industry and heighten support for our initiatives. Review our resources and share them liberally.

## Engage Stakeholders

By including some key facts in your presentations, newsletters or talking points. Start the conversation.

## Host a Meeting

With regional associations like local Boards of Trade or service clubs: ONA is willing to support you with guest speakers and presentation materials.

## Share Your Perspectives

With government representatives through annual briefings or meetings with your constituent members and their staff.

## Use Social Media Tools

Follow industry colleagues and advocates on their channels and comment, like and share.

## Counter Negative Information

With the facts when you see or hear it: through social media, public meetings, media opinions.

## Nurture Media Contacts

Submit news stories, op-eds, releases and letters. If you see misinformation, respond or refer the issue to ONA.

## Stay Informed and Updated

By subscribing to groups and industry stakeholders. Consider adding appropriate links to your website or social media channels.



# Frequently Asked Questions

These FAQs may help you correct misinformation or answer any questions you may receive.

## **Q: Why can't we just use wind and solar?**

**A:** There are a number of reasons. Stability is one, because the sun doesn't always shine, and the wind doesn't always blow. Arctic regions in particular have fewer hours of sunlight. Secondly, renewables require a much greater land mass. And producing their infrastructure is dependent on alternate sources of energy, including fossil fuels.

## **Q: Is nuclear safe?**

**A:** The nuclear industry is one of the most highly regulated industries in the world with an excellent safety record spanning six decades. Plant operators must achieve high standards of qualification through rigorous training programs and ongoing learning, with frequent audits by regulatory bodies. Lessons have been learned from past experience, and the safety standards are continually reviewed, along with mock events to evaluate and prepare responses to hypothetical emergencies such as a hurricane or on-site plane crash.

## **Q: What happens to nuclear plants as they age?**

**A:** They are either decommissioned, with safe removal and disposal of the equipment; or they can be refurbished to extend their lives by several decades. Life-extension programs include major component replacement before the units are returned to service.

## **Q: What makes up nuclear waste?**

**A:** Nuclear waste is grouped into three categories, classified by the level of radioactivity. Low-level materials include tools, clothing and cleaning supplies; intermediate-level materials are used reactor components and resins and filters that purify reactor waste systems; and high-level materials are used fuel bundles.



**Q: Is Canada's nuclear waste safely managed?**

**A:** The nuclear industry is the only energy industry that can account for all of its waste, which is safely stored and managed above ground or in near-surface containment. Canada is recognized around the world as a leader in nuclear materials and waste management.

**Q: How will Canada deal with used fuel?**

**A:** Canada's Nuclear Waste Management Organization (NWMO) plans to contain and isolate used nuclear fuel in a deep geological repository. This solution has been adopted as best practice in other countries, including Finland, France, Sweden, Switzerland and the United Kingdom. The materials are stored in multiple layers of protective barriers, then placed in deep rock with no valuable minerals for future mining and where no seismic activity has occurred. **More information can be found here: [Multiple-Barrier System | The Nuclear Waste Management Organization \(NWMO\)](#)**

**Q: Is it dangerous to live or work near a nuclear plant?**

**A:** No. The water and surrounding land are constantly monitored. For instance, Canadian farmers have worked safely near nuclear facilities for decades, and testing continually monitors the safety of their crops, water and livestock.

**Q: Are other countries turning to nuclear to fight climate change?**

**A:** The Paris Accord has recognized the critical role that nuclear energy will play in climate-change mitigation. Many European countries are using or developing nuclear reactors, increasing their use of nuclear power.

**Q: What does net zero 2050 mean?**

**A:** Net zero is a state when the greenhouse gases entering the atmosphere are balanced by their removal from it. Scientific consensus indicates that human-caused emissions of carbon dioxide need to fall by about 45% by 2030, with the goal of reaching net zero in 2050.

**Q: What are medical isotopes and how do nuclear plants produce them?**

**A:** An isotope is an atom with the same number of protons and electrons, but a different number of neutrons. Isotopes can occur naturally or be artificially irradiated in our CANDU reactors. Stable isotopes are inserted into the reactor's core, where they absorb high-energy neutrons during power generation to destabilize them. These unstable isotopes emit energy as they return to a stable form. They're used in nuclear medicine to help prevent and fight disease and sterilize medical equipment.

**Q: Can medical isotopes cure cancer?**

**A:** Medical isotopes are showing positive results for many patients in the diagnosis and treatment of cancer. The research is ongoing; and targeted alpha therapy holds a great deal of promise for successful therapies.

**Q: Is it safe to use radiation on the food we eat?**

**A:** The US Department of Agriculture Food Safety & Inspection Service confirms that food irradiation has been evaluated by international public health agencies over the past 50 years, with full assurance of its safety. The process does not make the foods radioactive: rather, the radiant energy passes through the food. While conventional pasteurization relies on heat to control food spoilage, irradiation uses radiant energy, such as cobalt-60 gamma rays. Irradiation does not compromise nutritional value or change the taste or texture of food.



**Q: What kind of training is needed for a career in the nuclear industry?**

**A:** There are excellent opportunities through post-secondary education, apprenticeships and internship programs to prepare for various careers. Diversity is encouraged, with opportunities for various roles within the industry.

**Q: What are the advantages of small modular reactors (SMRs)?**

**A:** Applications of SMRs include on-grid power generation to facilitate coal phase-out, on- and off-grid power for heavy industry and transportation, and off-grid heating and electricity for remote communities that currently rely on costly diesel fuel with harmful emissions.

**Q: How does nuclear support clean hydrogen production?**

**A:** Hydrogen production requires an energy source for activation. Clean nuclear power can replace the fossil fuels that have traditionally fulfilled that role, resulting in pure hydrogen powered by emissions-free energy.

**Q: Is nuclear power expensive?**

**A:** Nuclear power in Ontario helps keep down the price of electricity and will continue to do so for years to come. It is a baseload generation that runs 24/7 and is less costly than solar and wind.

**Q: How is Canada poised for leadership in nuclear innovation?**

**A:** We have a reputable international brand, sound regulatory practices, world-class laboratories, a robust supply chain, strong uranium mining industry, extensive operating experience and advanced research and development capabilities in nuclear technologies.

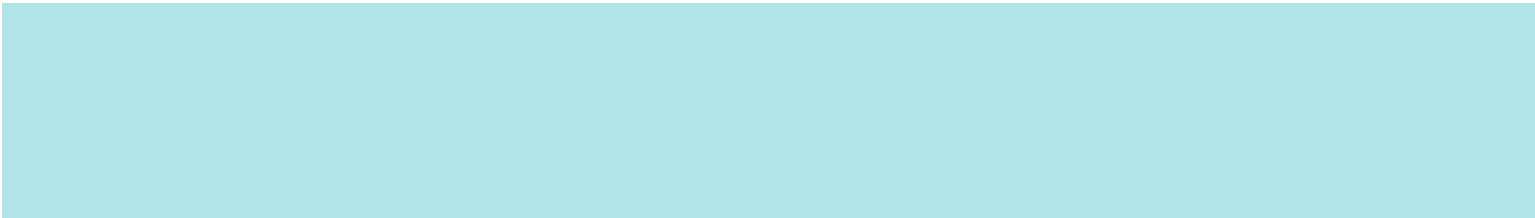
# Resources

ONA is providing tools to help you spread the word through your presentations and social media channels.

## Downloads

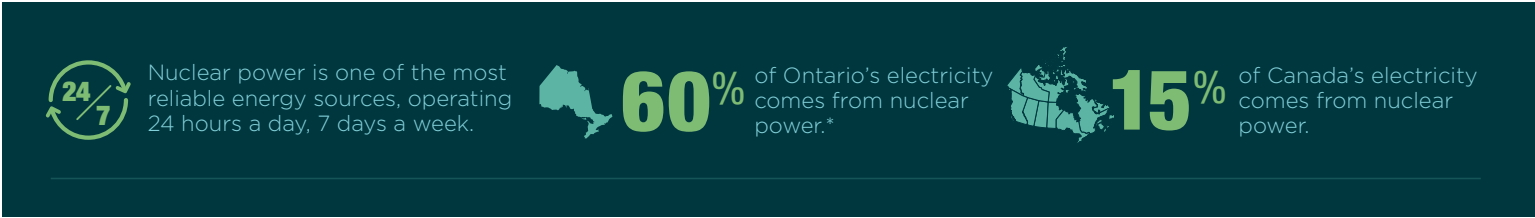
Click images to download images.

2-page  
Summary Sheet



### Reliable Electricity

Nuclear energy works around the clock throughout all seasons. With our country’s enormous reserve of natural uranium, nuclear is the primary source of electricity for 60% of Ontarians.



### Medical Isotopes

Nuclear medicine is changing patient outcomes around the world. Canada is a leader in medical isotope production, used to sterilize medical devices and diagnose and fight disease.



### Clean Air

Nuclear provided most of the energy needed for Ontario’s phase-out of coal. Nuclear innovation is supporting other provinces in replacing fossil fuels with clean energy sources.

