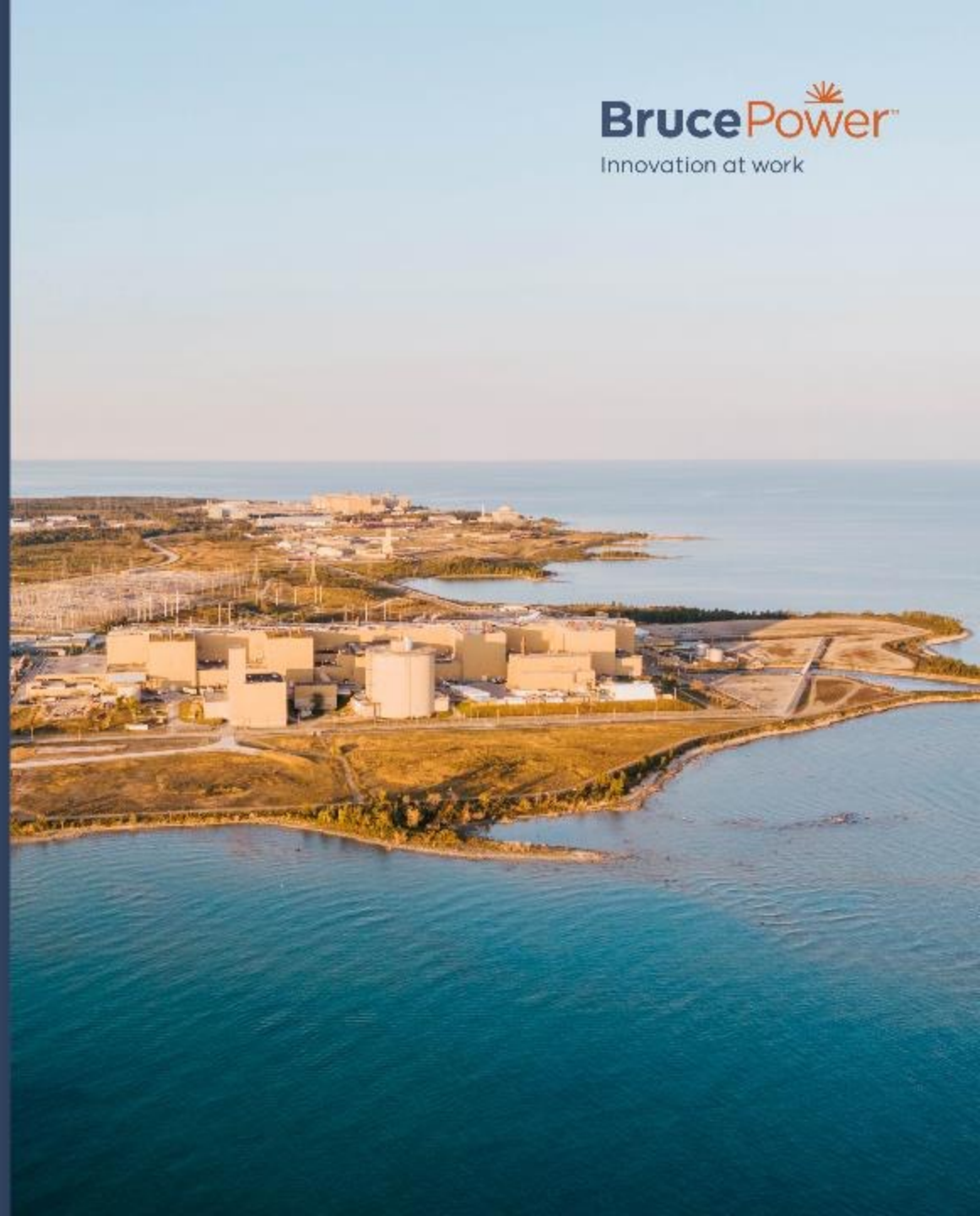


Building a Clean Energy Future

Infrastructure, Policy Development and
Sustainable Growth

May 16, 2023



First, a bit about Bruce Power

Canada's only private-sector nuclear generator, producing 30% of Ontario's clean, reliable electricity.

A vital source of sterilization and cancer-fighting medical isotopes used globally.

Investing in extending the life of our fleet. Canada's largest private sector infrastructure project

Project 2030 - supports Ontario's climate change goals and future clean energy needs by targeting a site net peak of 7,000 MW+ for the 2030s.

Increasing the output of existing units to contribute to a prosperous, clean energy future



Clean Energy - Decades of Clean, Reliable Electricity



Life-Extension Program – Canada’s largest private sector infrastructure project

- Lifetime Asset Management Program start 2016
- Major Component Replacement (MCR) in Units 3-8 finish 2033
- Extending the life of the Bruce site until 2064 and beyond



Unit 3 MCR
Breaker Open
March 1, 2023



Unit 6 MCR
Return to Service
by end of the year

\$3-4
billion
GDP Ontario

\$8-11
billion
GDP Canada

±1,000
supply chain companies across Ontario and
Canada are supported through Bruce Power.

76,000
direct and indirect jobs across Canada
supported by the nuclear industry.

>90%
of Bruce Power’s spend is in Canada, which makes the Life-Extension
Program truly a Canadian-led infrastructure project.

Saving Lives - Cancer-Fighting Medical Isotopes



Isotopes at Bruce Power

Lutetium-177

Produced in the Isotope Production System — a first-of-its-kind solution to produce short-lived medical isotopes in a commercial reactor.

Cobalt-60

Cobalt-59 adjuster rods are inserted into the reactor and cobalt-60 is harvested during planned outages.

40+ million

nuclear medicine procedures are performed worldwide each year using isotopes, with approximately 36 million for diagnostic nuclear medicine and four million for therapy.

Cancer-fighting medical isotopes



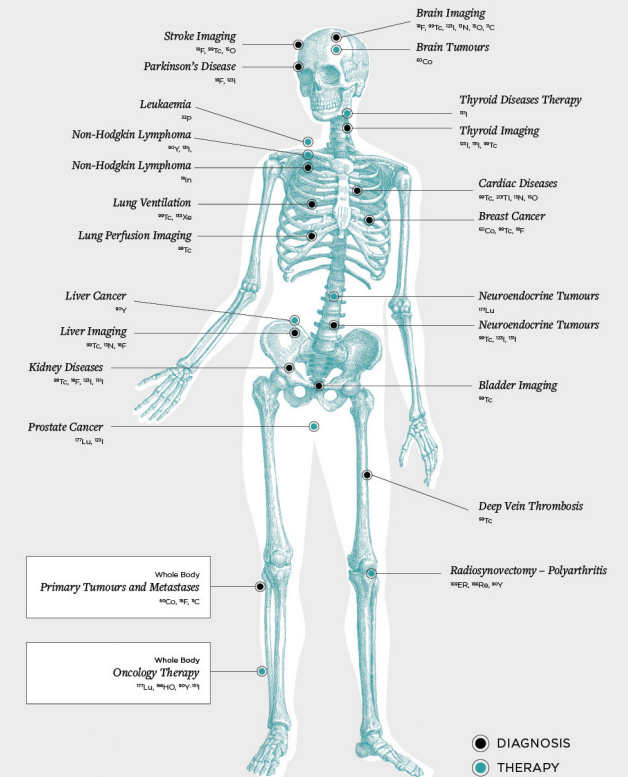
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The IPS will leverage Bruce Power's continuous operation to provide a consistent and scalable supply of cancer-fighting isotopes.

Medical-grade cobalt-60 is used to treat complex brain cancers and conditions through non-invasive procedures.



Isotope use for diagnosis and therapy



40%

of the world's single-use medical equipment is sterilized with cobalt-60.

Made-in-Ontario Isotope Production System (IPS) installed in Bruce Power's Unit 7 in 2022.

Commercial production

of lutetium-177 announced October 2022, a world's first for large-scale nuclear reactor.

Decarbonizing the Global Economy

The International Energy Agency's Net Zero by 2050 Roadmap outlines more than 400 milestones:


- Massive deployment of all available clean energy technologies between now and 2030
- Annual energy sector investment, which averaged US\$2.3 trillion globally in recent years, will need to jump to \$5 trillion by 2030
- Clean energy innovation, introducing new clean technologies
- Rapid shift away from fossil fuels
- Electricity generation will need to reach net-zero emissions globally by 2040 to ensure reliable supply



Source: IEA (2021), Net Zero by 2050, IEA, Paris



“As a major source of global emissions, the energy sector holds the key to responding to the world’s climate challenges.” – IEA Net Zero by 2050



In order for Canada to achieve a net-zero future, we need to continue expanding the amount of clean electricity produced by our existing facilities, focus on further innovation, and attracting private capital by aligning policy objectives with regulatory requirements.



Federal Energy and Environment Policy

- **Commitments:**
 - **Reducing emissions** by 40 to 45% by 2030
 - Securing a **net-zero electricity grid** by 2035
 - Achieving **carbon neutrality** by 2050
- **Drivers:**
 - Federal commitment to **NZ-2035**
 - Response to **U.S. Inflation Reduction Act**
 - **Energy security**
- **Policy:**
 - **Canada Growth Fund** – arm’s-length, public investment vehicle. Attract private capital for Canada’s clean economy
 - **Investment Tax Credits** – Clean Electricity Investment Tax Credit, Clean Technology Manufacturing Investment Tax Credit, Clean Hydrogen Investment Tax Credit
 - **Clean Electricity Regulation** – all provinces to have net-zero emissions by 2035
- **Permitting:**
 - streamline a daunting regulatory, approval and permitting process



Canadian Energy Security

- Several studies* found **electricity demand to increase**
 - **from 500 TWh** to between **1,250- 2,000 TWh by 2050**, with **most scenarios estimating demand of 1,500 TWh**
- RBC report: Canada **faces a \$2 trillion transition**
 - Governments, businesses and communities would spend at least **\$60 billion/year to cut Canada's emissions by 75% from current levels**
 - Significant jump from current spend of about **\$15 billion/year**
- Transition in energy and a shift to minerals
 - Shift from fuels (coal, oil and gas) to minerals (uranium, lithium, cobalt, nickel, etc.)

What does this mean?

Using only one power generation type, additional capabilities required to add 1,000 TWh*:

- **115 – 1,100 MW** sized large hydro reservoirs similar in capacity to BC Hydro's Site C project
- **114 – 1000 MW** sized large nuclear reactors (e.g., 19 sites the size of Bruce Power)
- **380 – 300 MW** small modular reactors
- **20,000 – 10 MW** sized wind turbines
- **4,000 GW+** of aggregate solar capacities

Sources: Institute de L'énergie Trottier, Horizon 2060, Canadian Energy Outlook, 2021; EPRI, Canadian National Electrification Assessment: Electrification Opportunities for Canada's Energy Future, 2021; SNC Lavalin, Engineering Net Zero, Canadian Technical Report, Mar 2021; David Suzuki Foundation, Clean Power Pathways, May 2022

*Source: **SNC-Lavalin Engineering Net Zero Report, 2021*

Reaching 2050 and Beyond

Successfully reaching net zero by 2050 and meeting our energy needs will into the future will require:

- A diverse, clean energy supply mix
- Energy as well as capacity supply
- Strong, stable baseload supply - nuclear, hydro, CCUS
- Intermittent resources – wind and solar, backed up by storage or ramping resources
- Complementary technologies such as hydrogen
- Reliable and resilient electric grid – integrated resource plan and rules



Ontario Energy System Themes and Priorities

- IESO **Pathways to Decarbonization (P2D)** report: hydro expansion, incremental nuclear, hybrids and stand-alone storage, limited expansion of existing gas assets
- Ontario **Clean Energy Credit** and **Future Clean Energy Fund** – supports clean energy development
- Interest in exploring **hydrogen** and **CCS**, **DERs** and **smart grid** innovations.
- Challenge – **Time** and **competing priorities**. **Reliability** is central, with **affordability**, **sustainability** and **consumer choice**

17,800 MW

Added nuclear capacity needed in Ontario by 2050 to decarbonize, overall capacity more than doubling to 88,000 MW

Source: Independent Electricity System Operator Pathways to Decarbonization 2022 Report

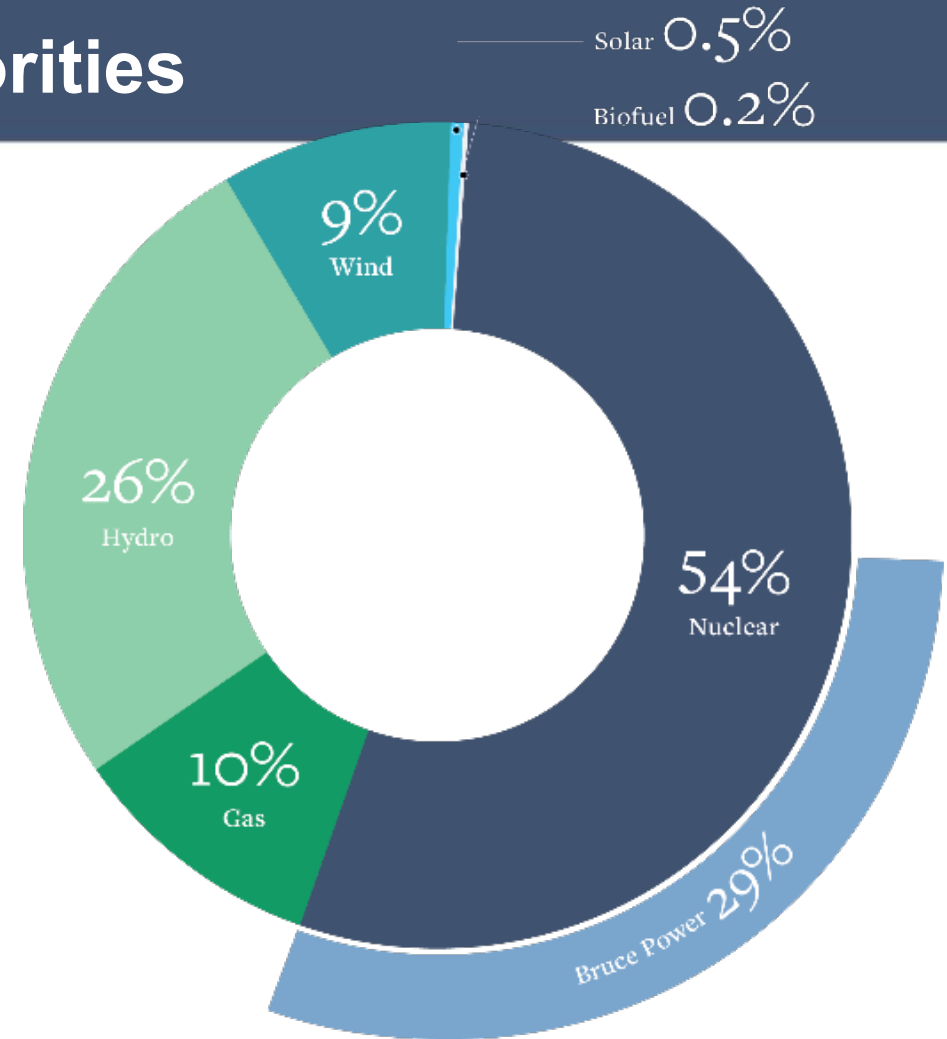


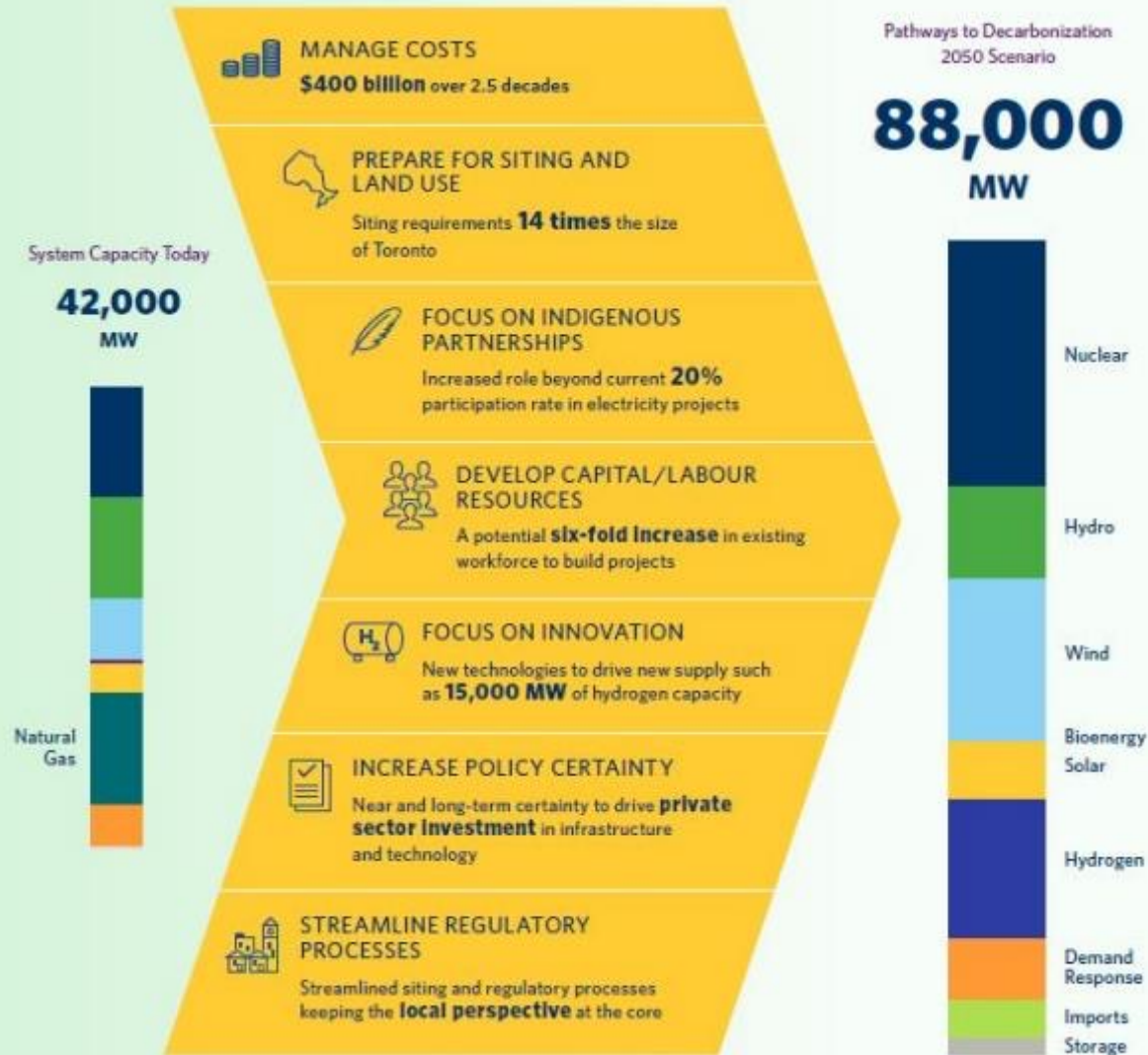
Figure 1: Electricity output by fuel type 2022

PATHWAYS TO
DECARBONIZATION

Decarbonizing Ontario

Decarbonizing Ontario's Electricity System

Bridging the work of today with the needs of a decarbonized world will be challenging and complex. Ontario's electricity system is well positioned to make the transition, but will need to address a series of challenges in order to achieve decarbonization.



No regret actions

- Accelerate efforts to **acquire new non-emitting supply**
- Begin **planning, siting and environmental assessment** work needed for new nuclear, long duration storage and hydroelectric facilities, as well as transmission infrastructure, to allow for faster implementation.
- Invest in emerging technologies like low-carbon fuels.
- **Galvanize collaboration** amongst stakeholders and Indigenous communities.
- Ensure that **regulatory, approval and permitting processes** are ready to manage future investment at scale.
- Establish an **open, transparent and traceable process** to measure progress

Regulatory Modernization

- **Reaching net zero requires an aligned regulatory environment** – flexibility, transparency and predictability
- **Address siting of new electricity generation** – existing footprints backed by supportive communities provide opportunities
- **Cost recovery** mechanisms for private-sector investors to progress project planning/siting
- Optimize **impact assessment process**
- **De-risk and address barriers to private sector investment** in new and growth technologies (hydrogen, next generation nuclear, battery storage)
- **Codify tax incentives** – CRA to promptly publish announced incentives




Permitting timelines need streamlined to ensure a just energy transition.

Financing a Sustainable Future

- **Green bonds** – Canada is leading the way in nuclear green bonds
- **Tax credits and green frameworks** – Clean Electricity Investment Tax Credit, Clean Technology Manufacturing Tax Credit
- **Clean energy credits** – further decarbonize grid
- **Long-term power purchase agreements** – entire lifecycle and capital cost of investment considered to attract private capital
- **Canadian Infrastructure Bank** – supporting private sector investment, P3s
- **Support for Indigenous participation** – Budget 2023 announced loans to Indigenous communities to support in purchasing equity stakes in infrastructure projects in which the Bank is also investing



Working Together for a Cleaner Future



Sustainable growth and achieving a net-zero future are only possible by taking a **pragmatic, collaborative approach to decarbonization** with a **diverse portfolio of generation sources and clean electricity supply mix.**

We look to policymakers to be open to both regulatory and policy mechanisms that clear the path for us to realize the full potential of our clean energy infrastructure for a **bright, sustainable future.**



BrucePower™
Innovation at work