### **2023 BRUCE POWER**

Green Bond Report





This Green Bond Report covers the reporting period of the second quarter of 2023 through the first quarter of 2024. The report includes information on new issuances during the reporting period and information on the allocation and impact of all green bond proceeds through the first quarter 2024.

In March 2024, Bruce Power L.P. issued the following private placement green bonds in accordance with Bruce Power's Green Financing Framework:

 \$600 million of 4.70% Senior Unsecured Notes due June 21, 2031 (ISIN no CA116705AN49)

The net proceeds of the green bond offering were allocated in full to the Unit 6 Major Component Replacement Project, the Unit 3 Major Component Replacement Project and Project 2030, which are Eligible Investments described in Bruce Power's Green Financing Framework. These projects focus on extending the life and increasing efficiency of the nuclear generation facility, to enable Bruce Power to provide clean, reliable power for decades to come, while displacing millions of tonnes of emissions from carbon-emitting electricity generators.

# Table of Contents

Company Overview	4
Our Approach to Sustainability	7
Net Zero 2027	8
Green Financing Framework Overview	10
Bruce Power's Major Component Replacement	14
Project 2030	16
Greenhouse Gas Avoidance Calculation Methodology	17

## Company Overview

Bruce Power is Canada's only private-sector nuclear generator, annually producing approximately 30 per cent of Ontario's power. Established in 2001, Bruce Power is a Canadian-owned partnership indirectly owned by TC Energy, Ontario Municipal Employees Retirement System (OMERS), the Power Workers' Union, The Society of United Professionals and the Bruce Power Employee Investment Trust.

The Bruce Power site is located within the Saugeen Ojibway Nation Territory, the shared treaty and traditional Territory of the Chippewas of Saugeen First Nation and Chippewas of Nawash Unceded First Nation (Neyaashiinigmiing). Bruce Power is dedicated to honouring Indigenous history and culture and is committed to moving forward in the spirit of reconciliation and respect with the Indigenous communities we work with. We are committed to strong and respectful relationships with the Saugeen Ojibway Nation (SON), the Métis Nation of Ontario (Region 7) and Historic Saugeen Métis.

Ontario's energy and environmental plans are counting on Bruce Power to provide a reliable and carbon-free source of affordable energy through 2064. To do so, Bruce Power's Life-Extension Program is currently underway, consisting of the Major Component Replacement (MCR) Project and the Asset Management Plan. The MCR Project focuses on the replacement of key reactor components in Units 3-8. The life extension of each unit will add 30 to 35 years of operational life, through the year 2064. The Asset Management Plan involves inspections and the gradual replacement of equipment which is performed during regularly scheduled maintenance outages. The Life Extension Program will secure an estimated 22,000 jobs directly and indirectly from operations, and an additional 5,000 jobs annually throughout the investment program. In support of Ontario's climate change targets and future energy needs, Bruce Power's Project 2030 is underway. Project 2030 is the company's goal of achieving a site net peak capacity of 7,000 megawatts (MW) of clean electricity for the early 2030s. The Project focuses on increasing the site's current eight-unit peak capacity through continued asset optimization, innovation and leveraging new technology.

Bruce Power also plays a prominent role in Canada's position as a global leader in the production of medical isotopes. Bruce Power has been a key part of the global isotope supply chain for more than 35 years, beginning with the production of cobalt-60, which is used to sterilize medical equipment and treat cancer around the world. Bruce Power's Isotope Production System, installed on Unit 7 in 2022, made Bruce Power the first commercial nuclear generator to produce lutetium-177, a cancerfighting medical isotope used in precision oncology for targeted therapy of a growing number of cancers, including neuroendocrine tumours and prostate cancer.

#### **ONTARIO ELECTRICITY OUTPUT BY FUEL TYPE 2023**

### 28% Bruce Power

53.2% Nuclear



12.8% <sub>Gas</sub>

8.2% Wind

0.7% Solar (0.5%) and Biofuel (0.2%)

#### **BRUCE POWER OUTPUT 2023**

Unit 1 7.02 TWh	
Unit 2 6.99 TWh	
Unit 3 1.15 TWh	
Unit 4 5.90 TWh	
Unit 5 6.93 TWh	
Unit 6 2.20 TWh	
Unit 7 7.18 TWh	
Unit 8 4.96 TWh	

Units 3 and 6 were offline for parts of 2023 for their Major Component Replacement outages.

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# Our Approach to Sustainability

An important part of achieving the company's vision of powering the future is never wavering as a responsible steward of the environment, being a good corporate citizen, and maintaining excellent governance by integrating strong Environmental, Social, and Governance (ESG) principles into Bruce Power's business strategies and operations.

We aim to continuously improve performance in each of these areas to exceed industry and stakeholder standards and expectations.

Our Sustainability Program takes guidance from industry best practices and global standards. The Sustainability Program focuses on four key areas – Environment, People and Safety, Products and Services, and Community. We have a responsibility to both the environment and society to implement sustainable and responsible business practices and to foster a culture of equality. We recognize these practices can be achieved while ensuring the continued delivery of energy to Ontario at an affordable rate.

The Sustainability Program is led by the Environment, Sustainability and Net Zero Division, which reports quarterly to the Environment and Sustainability Oversight Committee. The Bruce Power Board of Directors (the Board) approves the strategy and governance related to all ESG matters, and performance is reported quarterly to the Board. This governance and oversight structure ensures the integration of sustainability-related monitoring and goals into the long-term business strategy, and that due consideration is given to social and environmental trends that could impact the company's short-, medium- and long-term operations.

Bruce Power is committed to continuous improvement, clear quantitative and qualitative disclosure of our sustainability-related performance, and actions that drive real, tangible benefits in the short- and long-term.

To access Bruce Power's Sustainability Reports, please visit our website. A copy of our 2024 Sustainability Report can be found <u>here</u>.



# Net Zero 2027

Bruce Power is continuing to contribute to a net zero Canada by 2050 through our commitment to achieve net zero Scope 1 and 2 greenhouse gas (GHG) emissions from our site operations by 2027, making Bruce Power the first nuclear operator in North America to make such an ambitious commitment.

While the company reliably produces large volumes of emissions-free electricity that is critical to Ontario reducing carbon-emitting sources, Bruce Power is taking the next step to ensure it minimizes and offsets emissions from routine undertakings such as equipment, vehicles, and heating and ventilation of buildings, to achieve net zero Scope 1 and 2 GHG emissions by 2027.

Our Net Zero 2027 target accounts for all direct and indirect GHG emissions that occur from sources that are owned, controlled or purchased by the company (Scope 1 and Scope 2 emissions). To drive continued progress towards this net zero target, increasing emissionreduction targets were set against a 2019 baseline for the years leading up to 2027, from 2021 through 2027.

Our Net Zero Strategy outlines how emissions reduction targets will be achieved and our structured approach to supporting both Provincial and Federal Climate Change goals. This strategy includes reducing or avoiding GHG emitting sources through the optimization of building use on site, implementing energy and emissionreduction projects and initiatives in our operations, finding alternatives to high-emission energy sources, and, where further reductions are not feasible, leveraging Clean Energy Credits (CECs) through the Ontario Clean Energy Credit Program, and pursuing carbon offsets. Bruce Power has met all its emissions reduction targets in 2023 and continues to work on the implementation of on-site operational initiatives and partnering with local carbon sequestration and offset projects to support further reductions to its net Scope 1 and Scope 2 emissions.

Emission-reduction projects currently underway to increase efficiencies in our on-site operations, buildings, and fleet include:

- Site building-use optimization through decommissioning of buildings that are no longer required to reduce energy demands.
- Switching building heating systems to more efficient sources, including substitution from diesel generated steam (which endures significant line losses) to more efficient natural gas combustion on site.
- Reducing fuel consumption by optimizing the duration and frequency of standby generator safety system tests.
- Investigating opportunities related to fleet electric vehicle (EV) upgrades and fleet use optimization, including fleet size reduction, vehicle sharing, and anti-idling strategies.
- Exploring opportunities for renewable diesel use in our vehicle fleet.



- Increasing EV charging on site for fleet and employee use, with a current capacity to charge 34 vehicles.
- Upgrading interior and exterior lighting to LED with 770 fixtures upgraded in 2023.
- Integrating Building Automation Systems (BAS) allowing temperatures to be monitored and adjusted remotely based on occupancy.
- Additional building metering to measure energy use and identify reduction opportunities.
- Building temperature setpoint optimization to reduce energy use while maintaining occupant comfort.
- Regular inspection and maintenance of refrigeration equipment to reduce halocarbon leaks.
- Major HVAC replacement projects using refrigerants with lower global warming potentials and zero ozone depletion potential.

#### CARBON OFFSET ACCELERATOR FUND

Where further emissions reductions are not achievable to meet set targets, we continue to leverage locally generated carbon offset credits from well-recognized voluntary programs and from local and provincial offset projects that are supported by the Carbon Offset Accelerator Fund.

Bruce Power's Carbon Offset Accelerator Fund was allocated to support the New Acre Project with Alternative Land Use Services (ALUS). This project, identified through the Carbon Offset Coalition in partnership with the Nuclear Innovation Institute (NII), will establish 600 acres of nature-based projects on marginal agricultural land across Bruce and Grey Counties that sequester carbon and enhance and steward local ecosystems.





Bruce Power further solidified its commitment to leading Canada on the path to a zero-emissions future by launching Bruce Power Net Zero (BPNZ), which repurposes and leverages the business of Huron Wind, a nine-megawatt (MW) wind farm located near Tiverton, Ontario to identify and invest in clean energy initiatives that complement the role of nuclear and assist Bruce Power and Ontario in achieving its Net Zero targets. BPNZ will focus on projects that are complementary to leverage Bruce Power nuclear, including storage, carbon offsets, renewables, hydrogen, and electrified transportation.





## Green Financing Framework Overview

The Green Financing Framework (the "Framework") applies to Green Financings issued by Bruce Power and sets out the guidelines for Bruce Power's Green Financing issuances in accordance with the Green Bond Principles issued by the International Capital Markets Association (ICMA) as well as the Green Loan Principles issued by the Loan Market Association (LMA) and Loan Syndications and Trading Association (LSTA) and the Asia Pacific Loan Market Association (APLMA).

In November 2023, Bruce Power updated its Green Financing Framework. Green financing instruments issued after November 2023 will be guided by the updated Framework, which includes investments in new nuclear installations as eligible green expenditure. The updated Framework received a Second Party Opinion from S&P Global Ratings, a leading provider of second party opinions on green financings, under the Shades of Green analytical approach, formerly part of CICERO. S&P Global Ratings assessed the Framework as 'Medium Green' on a scale of Light, Medium and Dark. S&P Global Ratings indicated that the Framework is Aligned with the Green Bond Principles and the Green Loan Principles.

Key highlights of the Framework follow.

1. Use of Proceeds	<ul> <li>Development, operation and refurbishment of new and existing nuclear projects which may include:</li> </ul>				
	<ul> <li>Bruce Power's Life-Extension Program, which includes the MCR Program and the Asset Management Plan as described in the Company Overview</li> </ul>				
	<ul> <li>Investments related to increasing the output of existing Bruce Power units while maintaining or improving the level of operational safety of such units, such as Project 2030</li> </ul>				
	<ul> <li>Investments in new installations to produce electricity that displace other emitting electricity sector generators</li> </ul>				
2. Process for Project	Dedicated Environment and Sustainability Oversight Committee				
Evaluation and Selection	<ul> <li>Proceeds allocated and managed based on the process described in the Green Financing Framework</li> </ul>				
	<ul> <li>Ongoing review of Eligible Investments to ensure compliance with Eligibility Criteria</li> </ul>				
3. Management of Proceeds	<ul> <li>Value of allocated funds to the financing or refinancing of existing or future Green Investments is equal to the net proceeds from the issuance of each Green Financing</li> </ul>				
	<ul> <li>Full allocation of Green Financing to be made within 36 months from the date of issuance</li> </ul>				
	• Pending allocation, proceeds may be temporarily invested in cash or short- term investment instruments that do not include GHG-intensive projects				
4. Reporting	Allocation of funds and associated impacts published on an annual basis				
	<ul> <li>Finance reporting will include summary of outstanding Green Financings, allocations to Green Investments on a project-by-project basis where possible, and project updates</li> </ul>				
	<ul> <li>Impact reporting to include where feasible qualitative and/or quantitative environmental performance at a project level including estimated annual GHG emissions reduced or avoided, methodology disclosure for calculations, and annual nuclear energy generation</li> </ul>				
5. External Review	<ul> <li>Opinion by a Second-Party Opinion provider, that confirms the Framework is credible and impactful, available on Bruce Power's website</li> </ul>				
	<ul> <li>Report from an independent accounting firm attesting to management's assertion of the allocation of bond proceeds to eligible projects, available on Bruce Power's website</li> </ul>				

#### For further detail please see:

- 1 Green Bond Framework: <u>https://www.brucepower.com/publications/2023-green-financing-framework/</u>
- 2 International Capital Markets Association, "The Green Bond Principles (GBP) 2021", published June 2021. <u>https://www.icmagroup.org/</u> sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp/
- 3 Loan Syndications & Trading Association and Loan Market Association, "Green Loan Principles", published in February 2023. Green Loan Principles LSTA. <u>https://www.lsta.org/content/green-loan-principles/</u>



#### **GREEN BOND ISSUANCES AND ALLOCATION**

Below are the details of Bruce Power's green bond issuances and allocation to the portfolio of outstanding Eligible Green Investments. All amounts are in millions Canadian dollars unless otherwise stated.

lssuer	Series No.	Size	Coupon	Issuance Date	Maturity Date	Net Proceeds
Bruce Power LP	2021-1	\$500	2.68%	November 18, 2021	December 21, 2028	\$496.8
Bruce Power LP	2023-1	\$300	4.70%	March 21, 2023	December 21, 2027	\$298.3
Bruce Power LP	2023-2	\$300	4.99%	March 21, 2023	December 21, 2032	\$298.0
Bruce Power LP	2024-1	\$600	4.70%	March 12, 2024	June 21, 2031	\$595.2
Total		\$1,700				\$1,688.3

#### Allocation to Eligible Investments:

Unit 6 Major Component Replacement Project	\$1,204.6
Project 2030 - Power Recovery Stage 1 and 2	\$122.6
Unit 3 Major Component Replacement Project	\$361.1
	\$1,688.3
Remaining Unallocated Proceeds	\$0.0



#### **GREEN BOND IMPACT SUMMARY**

Net proceeds from Bruce Power's Green Bond issuances were allocated to the Unit 3 MCR Project, the Unit 6 MCR Project, and the Project 2030 - Power Recovery Stage 1 and 2.

These projects are duly approved by the Environment and Sustainability Oversight Committee as Eligible Investments under Bruce Power's Green Financing Framework.

Green Bond funding allocations and estimated avoided carbon dioxide equivalent (CO<sub>2</sub>e) emissions are as follows.

Project	Allocation	Estimated Energy Production	Estimated Annual Avoided Emissions*	Benefit Realization
Unit 3 Major Component Replacement	\$361.1 million	5.9 TWh estimated average annual output post MCR	2,471,571 tCO <sub>2</sub> e	Expected return to service date is end of 2026
Unit 6 Major Component Replacement	\$1,204.6 million	6.4 TWh estimated average annual output post MCR	2,677,388 tCO <sub>2</sub> e	Returned to service September 2023
Project 2030 – Power Recovery Stage 1 and 2	\$122.6 million	0.6 TWh estimated annual incremental output from 2021 to 2064	255,591 tCO <sub>2</sub> e	Target expected peak of incremental gains is in early 2030's

\*The calculation method for Estimated Annual Avoided Emissions is provided at the end of this report.

### Bruce Power's Major Component Replacement

The life-extension of each unit will add 30 to 35 years of operational life, while other investments will add a combined 30 reactor years of operational life to the units.

Bruce Power's Life-Extension Program, Ontario's largest private sector clean energy infrastructure project, consists of Major Component Replacement (MCR) Projects in Units 3-8 and lifetime Asset Management Plan that will extend the life of the site until 2064 and beyond. The life extension of the reactor units will secure decades of reliable, carbon-free energy for the people of Ontario.

The MCR Projects focus on the removal and replacement of large nuclear components such as the fuel channels in the core of the reactor, feeder tubes, and the steam generators. During this multi-year campaign, upgrades are also made to electrical, cooling water, turbines, and safety systems, among others.

The Unit 6 MCR Project began in 2020. Unit 6 was returned to service in September 2023, ahead of schedule and budget despite the challenges of the COVID-19 pandemic, thanks to the efforts of dedicated Bruce Power employees, industry partners and skilled tradespeople. Returning the renewed asset to commercial operation marked the beginning of a new operational life of the unit to provide clean, reliable, carbon-free power to the people of Ontario for more than four decades. Unit 3 MCR began on March 1, 2023, following successful planning and preparation work. The project is currently in the removal and replacement series of work for components including 480 fuel channels, 960 feeder tubes, eight steam generators, and many other upgrades.

The lifetime Asset Management Plan and MCR remain on plan. Unit 3 is expected to return to service in late 2026, Unit 4 MCR start is planned for early 2025 with Units 5, 7 and 8 to follow, until the program's completion in 2033.

Bruce Power and Ontario Power Generation continue to collaborate and benchmark their MCR projects, setting a worldwide standard for nuclear refurbishment.

## Unit 3 project overview



#### MAJOR COMPONENT REPLACEMENT SCHEDULE





# Project 2030

In October of 2021, Bruce Power announced Project 2030, which is the company's goal of achieving a site net peak capacity of 7,000 MW by the early 2030s in support of Ontario's climate change targets and future clean energy needs.

Project 2030 focuses on continued asset optimization, innovations, and leveraging new technology, which could include integration with storage and other forms of energy, to increase the eight-unit peak capacity at Bruce Power. This additional generation will be achieved through a three-stage series of projects, and the increase to Bruce Power's generation will be approximately equivalent to adding about a ninth large-scale reactor to our site without the need to build new infrastructure.

Project 2030 implemented the following scope in 2023 to Q1 2024:

• Unit 8 reactor inlet header temperatures were reduced by installing a heat exchanger bypass line. Doing so permitted recovery of operating margin and related megawatts (MW).

- The Unit 1 main electrical generator excitation transformer was replaced. Doing so removed a limitation on generator output and will permit operation of the unit at higher output.
- The Unit 1 condenser cooling water pumps were replaced, providing more cooling water to the condensers and increasing upper MW operating threshold during the summer.
- Unit 1 heat transport system flows were measured, providing key information to help predict unit operation at higher reactor power. This prediction can confirm how long the Bruce A units can operate at increased reactor power.
- Data reconciliation is being implemented in Unit 8 and Unit 1 (and, subsequently, other units) to improve the accuracy of reactor power calibration and in turn, improve unit MW output.

### Greenhouse Gas Avoidance Calculation Methodology

For the greenhouse gas (GHG) avoidance calculations in this report, the carbon impact of electricity supply projects is estimated by determining the difference in GHG emissions between the project and the sources of electricity that the project activity displaces (i.e., avoided emissions).

The quantification of GHG avoidance resulting from Bruce Power's Unit 3 and Unit 6 MCR Projects considers the forecasted average annual output of the units at the completion of the projects. As Unit 6 was returned to service at the end of 2023, forecast annual average output of the unit from 2024 forward is used.

The quantification of GHG avoidance resulting from Project 2030 – Stage 1 and 2 considers the average annual incremental output resulting from related power recovery projects, resulting in an average incremental gain of 0.6 terawatt hours (TWh) per year from 2021 through to 2064. Note that incremental gains were also achieved starting in 2018; however, for the purpose of calculations the boundary was set at 2021 through to 2064.





The output datasets related to the Unit 3 MCR project, Unit 6 MCR project, and Project 2030 stage 1 and 2, are split out and calculated separately using the same in order to quantify GHG emissions avoidance benefits.

The Independent Electricity System Operator's (IESO) 2022 Annual Planning Outlook assumes any increase in electricity demand is met by increased natural gas electricity generation. In our avoided emissions calculation, we compare the annual output associated with nuclear, i.e., output resulting in zero direct emissions with the amount of GHG emissions that would result from the same power output being provided from natural gas electricity generation. For the purposes of the calculations in this report, we assume the system remains static with the current supply/demand stated in the IESO forecast, that increase in electricity demand is met by natural gas electricity generation, and that no change in current electricity generation supply mix occurs.

Using 2021 data taken from the Government of Canada's National Inventory Report (NIR) 1990-2021 (2023), the greenhouse gas intensity of electricity generated from natural gas in Ontario has been calculated as 420.88 g CO<sub>2</sub>e/kWh. Every kWh of electricity generated from carbon-free sources, such as nuclear, avoids 420.88 g CO<sub>2</sub>e compared to electricity generated in Ontario from natural gas. It is of note that the NIR data represents direct emissions from the generation plant only and does not include wider lifecycle emissions, such as extraction, processing, and fuel transport, which results in inherently higher generation intensity values. Data is sourced from the Government of Canada's NIR 1990-2021 (2023) to use the most recent data available in our calculations for avoided emission projections, recognizing that natural gas electricity generation emissions intensity fluctuates year over year. The estimated average annual outputs of Unit 3 and Unit 6 at the completion of MCR Projects (TWh) is then multiplied by the GHG intensity of natural gas electricity generation (g CO<sub>2</sub>e/kWh) to determine the annual amount of greenhouse gas emissions avoided as the result of the investment in the Life Extension of Bruce Power Unit 3 and Unit 6 via the MCR Projects - 2,471,571 tCO2e and 2,677,388 tCO2e per year, respectively.

A similar calculation is done to determine the annual amount of GHG emissions avoided as the result of the investment in power recovery projects related to Project 2030 (255,591 tCO<sub>2</sub>e per year). The average annual incremental output resulting from Project 2030 power recovery projects from 2021-2064 (TWh) is multiplied by the GHG intensity of natural gas electricity generation.

	GHG Emissions (kt CO <sub>2</sub> e)*	Electricity Generation (GWh)	Generation Intensity (g CO <sub>2</sub> e per kWh electricity generated)
Natural Gas	3,830	9,100	420.88
Nuclear	0	83,000	0

#### ELECTRICITY GENERATION AND GHG EMISSIONS FOR ONTARIO, 2021

**Source:** Government of Canada, "National Inventory Report 1990-2021: Greenhouse Gas Sources and Sinks in Canada", published April 2023. https://publications.gc.ca/collections/collection\_2023/eccc/En81-4-2021-3-eng.pdf

\*data represents emissions from on-site combustion of fuel directly related to electricity generation



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