Bruce Power
Innovation at work

2021

Bruce Power Green Bond Report

This Green Bond Report covers the reporting period of Q2 2021–Q1 2022 and includes information on the allocation and impact of green bond proceeds.

During this time period, Bruce Power L.P. completed the following private placement green bond offering in accordance with Bruce Power's Green Financing Framework:

- *November 2021 $500 million 2.68% 7-year maturing December 2028 (ISIN no. CA116705AK00)*

The net proceeds of the green bond offering were fully allocated to the Unit 6 Major Component Replacement project, which is part of Bruce Power's broader Life-Extension Program described in the Bruce Power Green Financing framework. As of December 31, 2021, the net proceeds from the above green bond offering were fully allocated to Eligible Investments. Bruce Power's nuclear generation will provide clean, safe, reliable and affordable power for decades to come, displacing millions of tonnes of emissions from other carbon sources of power.

Company overview

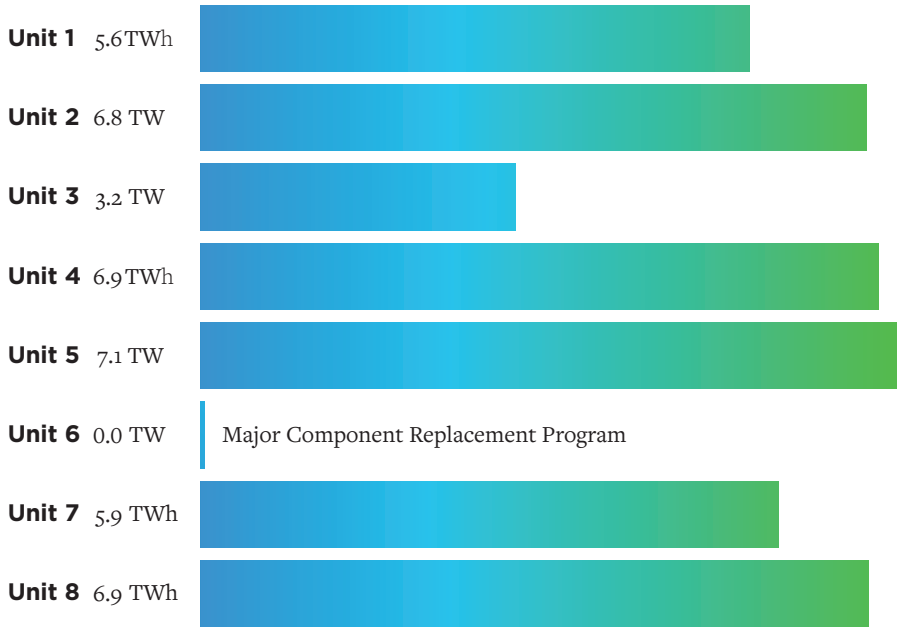
Bruce Power is Canada's only private-sector nuclear generator, annually producing 30% of Ontario's power. Established in 2001, Bruce Power is a Canadian-owned partnership indirectly owned by TC Energy, Ontario Municipal Employees Retirement System (OMERS), the Power Workers' Union, The Society of United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

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 has signed a long-term agreement with the Province to refurbish six of its eight units, with the private owners investing billions of dollars to extend the life of the facility. The Life-Extension Program consists of the Major Component Replacement (MCR) Program and the Asset Management Plan. The MCR Program 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.

Bruce Power also plays a prominent role in Canada's position as a global leader in the production of medical isotopes, which sterilize medical equipment and diagnose and treat cancer across the country and around the world.

Bruce Power's strong output through 2021 saw the company producing 30 per cent of the power for the province, with reliable, consistent operations.

Work on the Unit 6 Major Component Replacement continued as planned through the duration of 2021. Unit 3 underwent an extended planned outage in 2021 for maintenance and inspection in the lead up to its MCR commencing in 2023. These investments will ensure Bruce Power can continue to provide reliable, emissions-free electricity for decades to come.



Our approach to sustainability

Our Sustainability Program focuses on four key areas:

1 Environment

2 People and Safety

3 Products and Services

4 Community

Bruce Power's approach to sustainability is integrated across the organization and has a significant positive impact on our local community and on a wider scale. We support provincial and federal carbon-reduction goals, while contributing to economic growth, innovation and environmental protection.

Our 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 business practices and to foster a culture of equality. We recognize these practices can be achieved while ensuring the continued delivery of energy to the province 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.

We are committed to continuous improvement, clear, quantitative and qualitative relevant disclosure of our ESG performance, with actions that drive real, tangible benefits in the near and long-term.

To access Bruce Power's Sustainability Reports, please visit our website. A copy of our 2022 Sustainability Report can be found here.

Net Zero 2027

In 2021, Bruce Power launched a number of initiatives, including the commitment to be a Net Zero site by 2027, Carbon Offset Coalition, and a carbon-reduction community partnership program administered through the Nuclear Innovation Institute. Bruce Power has made these commitments to help positively mitigate climate change by setting tangible goals in support of our communities, the province and the country.

In April 2021, Bruce Power formally announced its commitment to be Net Zero by 2027, becoming the first nuclear operator in North America to set such an ambitious target. 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 9 Megawatt 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 off-sets, renewables, hydrogen, and electrified transportation.

Bruce Power's commitment to achieving Net Zero greenhouse gas emissions will account for all direct and indirect emissions that occur from sources that are owned or controlled by our company. To support this commitment, Bruce Power is taking steps to ensure it minimizes and offsets emissions resulting from operations by developing and releasing our 2027 Net Zero Strategy in partnership with our consultants. This strategy includes implementing energy and emission-reduction projects in its operations, finding alternatives to high-emission energy sources and, where further reductions are not feasible, pursuing emission offsets. An internal Fleet Optimization Study has also been completed as part of these initiatives, to identify opportunities including electrification and increasing efficiencies in vehicle utilization and operation.

Green Financing Framework Overview

The Green Financing Framework[1] (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[2] dated June 2021 issued by the International Capital Markets Association (ICMA) as well as the Green Loan Principles[3] dated February 2021 issued by the Loan Market Association (LMA) and Loan Syndications and Trading Association (LSTA). Capitalized terms not defined in this report shall have the meaning ascribed to such terms in the Framework.

1. Use of proceeds	• Investments related to Bruce Power's Life-Extension Capital Program (which includes the MCR and the Asset Management programs as described in the Company Overview) • Investments related to increasing the output of existing Bruce Power units
2. Process for Project Evaluation and Selection	• Dedicated Sustainability Committee provides oversight • Proceeds evaluated and allocated based on criteria laid out in Green Financing Framework • Ongoing review of Eligible Investments to ensure compliance with Eligibility Criteria
3. Management of Proceeds	• Net proceeds of each Green Financing will be allocated or used to finance or re-finance, in part or in full, new and/or existing green investments • Eligible Investments may include existing investments made by Bruce Power within 36 months preceding the date of the Green Financing issuance • Pending allocation, proceeds may be temporarily invested in cash or short-term investment instruments that do not include GHG-intensive projects
4. Reporting	• Published on an annual basis to address allocation of funds and associated impacts • Finance reporting will include summary of outstanding Green Financings, allocations to Green Investments on a project-by-project basis, and project updates • Impact reporting to include 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
5. External Review	• Second party opinion[4] on Bruce Power's Green Financing Framework • Report from independent account firm attesting to management's assertion of the allocation of bond proceeds to Eligible Investments

For further detail please see:

1 Green Financing Framework: https://www.brucepower.com/wp-content/uploads/2021/11/Bruce-Power-Green-Financing-Framework-Final.pdf

2 International Capital Markets Association, "The Green Bond Principles (GBP) 2021", published on June 2021. https://www.icmagroup.org/green-social-and-sustainability-bonds/green-bond-principles-gbp/

3 Loan Syndications & Trading Association and Loan Market Association, "Green Loan Principles", published in February 2021. Green Loan Principles - LSTA

4 Second-Party Opinion: https://www.brucepower.com/wp-content/uploads/2021/11/Second-Opinion-Bruce-Power-16July2021final.pdf

GREEN BOND ISSUANCE

In November 2021, Bruce Power issued its inaugural green bond. Below are the details of Bruce Power's green bond issuance and allocation to the portfolio of outstanding Eligible Investments.

All amounts are in Canadian dollars unless otherwise stated.

Issuance Details

Issuer	Size ($ million)	Coupon	Issuance Date	Maturity Date	Net Proceeds ($ million)
Bruce Power LP	$500	2.68%	November 18, 2021	December 21, 2028	496.8
Total					

GREEN BOND ALLOCATION

Balance as of December 31, 2020	-
Add: Net proceeds from 2021-1 Green Bonds	496.8
Net proceeds available for allocation	496.8
Proceeds used for the allocation to Investments:	
Unit 6 Major Component Replacement Project	496.8
Remaining unallocated proceeds	-

GREEN BOND PROCEEDS IMPACT

Net proceeds obtained from Bruce Power's Green Bond November 2021 issuance were allocated to the Unit 6 Major Component Replacement Project, which is an Eligible Investment under Bruce Power's Framework and duly approved by the Sustainability Committee.

Green bond funding allocations and estimated avoided carbon dioxide equivalent (CO_2e) emissions are as follows. The methodology for calculating estimated annual avoided emissions is provided below.

Project	Allocation ($m)	Forecasted annual production (TWh)*	Estimated Annual Avoided Emissions (tCO_2e)	Expected in-service date
Unit 6 Major Component Replacement	$496.8	6.4	2.6 million	2023

CASE STUDY

Unit 6 MCR

BRUCE POWER MAJOR COMPONENT REPLACEMENT

Output from the Unit 6 MCR Project is forecast to result in the avoidance of 90.5 million tCO_2e in emissions from the Ontario electricity grid over its estimated life of 35 years, in comparison to carbon-emitting energy sources such as natural gas generators.

The Major Component Replacement (MCR) Project is part of Bruce Power's Life-Extension Program and one of Canada's largest infrastructure projects. MCR focuses on the removal and replacement of key reactor components in Units 3-8, and will extend the operational life of each unit by 30 to 35 years through 2064.

The Unit 6 MCR project began in 2020. It will remove and replace large nuclear components like steam generators, all reactor internals and the vault pipework. During this four-year campaign, upgrades will be made to electrical, cooling water system, steam turbines and safety systems among others.

In 2020, lead in activities commenced with the unit's shut down, the reactor defuel and the installation of bulkheads and shielding to separate the fueling duct from the vault. The removal series began late in the year and continued on into 2021 with the removal of all major vault components including feeders, pressure tubes, end fittings, and calandria tubes. The inspection series followed the removals and was completed in 2021, with the vault installation work commencing as Bruce Power rebuilds the reactor. The calandria tube installation and upper feeder work is in progress with the fuel channel and lower feeder installation to follow later in 2022, with the unit's return-to-service scheduled for 2023.

The investment in the Unit 6 Major Component Replacement Project is forecast to produce 6.4 TWh on average per annum. This production is forecast to result in the avoidance of approximately 2.6 million tCO_2e in emissions from the Ontario electricity grid annually, compared to carbon-emitting energy sources.

Over the lifetime of Unit 6, the forecast output of 223 TWh is expected to result in the avoidance of over 90.5 million tCO_2e in emissions from the Ontario electricity grid.

UNIT 6 MCR TIMELINE OF WORK

LEAD IN
2020

In January 2020, Unit 6 began its power rundown. Station teams disconnected the unit from the grid, started the cooldown process, and defueled the reactor. Once the fuel was out, the Major Component Replacement (MCR) team had access to the vault to begin installing bulkheads that would isolate the Unit 6 reactor from all other operating units at Bruce B.

CRITICAL WORK:
- Defuel 5,760 fuel bundles from reactor
- Bulkhead and shielding installation

REMOVAL SERIES
fall 2020 – summer 2021

The removal series of work dismantles the Unit 6 reactor starting with the removal of upper and lower feeders.

CRITICAL WORK:
- Upper and lower feeder tubes removed
- End fittings and pressure tubes removed
- Calandria tubes removed

INSPECTION SERIES
summer 2021 – winter 2021

Inspection work is completed to ensure the reactor is ready for the installation of new components. Work is completed to prepare the vault for new component installation.

CRITICAL WORK:
- Calandria vessel inspection
- Tubesheet bore inspection and lattice tube cleaning

INSTALLATION SERIES
winter 2021 – spring 2023

New vault components are installed in the reactor including 960 feeder tubes, 480 fuel channels, and 480 calandria tubes.

CRITICAL WORK:
- Upper feeder tube installation
- Calandria tube installation
- Fuel channel assembly installation
- Lower feeder installation

LEAD OUT
spring 2023 – end of 2023

System, structures and components are checked to meet performance and license requirements to return the unit to full power. These will be completed prior to full return of the unit to commercial operation.

CRITICAL WORK:
- New fuel load
- Remove bulkheads and shielding
- Low power testing and turbine run-up
- Sync to grid
- Full reactor power and testing complete

RETURN TO SERVICE
end of 2023

It is estimated that every kilowatt-hour of electricity generated from low carbon sources like nuclear avoids 406 g CO_2e compared to electricity generated in Ontario from natural gas.

Greenhouse Gas Avoidance Calculation Methodology

In line with best practice greenhouse gas accounting guidance, 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 greenhouse gas avoidance resulting from Bruce Power's Unit 6 Major Component Replacement (MCR) Project, considers the forecast average annual output of the unit at the completion of the project (6.4 TWh/yr). Since the current IESO forecast assumes any increase in electricity demand is met by natural gas electricity generation, this annual output associated with zero direct emissions, is compared with the amount of GHG emissions that would result from the same power output being provided from natural gas electricity generation, instead of nuclear.

Using 2019 data taken from the Government of Canada's National Inventory Report (NIR) 1990-2019 (2021) the greenhouse gas intensity of electricity generated from natural gas in Ontario has been calculated as 406 g CO_2e/kWh. Every kWh of electricity generated from low carbon sources, such as nuclear, avoids 406 g CO_2e compared to electricity generated in Ontario from natural gas. It is of note that the NIR data represents direct emission 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.

The estimated average annual output of Unit 6 at the completion of MCR Project (TWh) is then multiplied by the greenhouse gas intensity of natural gas electricity generation (g CO_2e/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 6 via the MCR Project (2,598,400 tCO_2e per year).

ELECTRICITY GENERATION AND GHG EMISSIONS FOR ONTARIO, 2019

	GHG Emissions (kt CO_2e)*	Electricity Generation (GWh)	Generation Intensity (g CO_2e per kWh electricity generated)
Natural Gas	3,820	9,400	406
Nuclear	0	90,500	0

Source: National Inventory Report, 2021
*data represents emissions from on-site combustion of fuel directly related to electricity generation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TEREX

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