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Powered by Shades of Green

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Second Party Opinion

Bruce Power L.P.'s 2023 Green Financing Framework

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Alignment With Principles

Aligned = ✔ Conceptually aligned = O Not aligned = ✕

- ✔ Green Bond Principles, ICMA, 2021 (with June 2022 Appendix 1)
- ✔ Green Loan Principles, LMA/LSTA/APLMA, 2023

See Alignment Assessment for more detail.

Medium green

Activities that represent significant steps towards a low-carbon climate resilient future but will require further improvements to be long-term low-carbon climate resilient solutions.

Our Shades of Green Analytical Approach >

Strengths

Bruce Power is a nuclear plant operator that enables substantial low carbon electricity capacity to support Ontario's climate goals. Increased and expanded capacity at plant offsets the need for natural gas generation to meet rising energy demand in the region.

Bruce Power is committed to net zero Scope 1 & 2 emissions by 2027 and has introduced initiatives to track and reduce Scope 3 emissions.

Extensive and comprehensive physical risk analysis is carried out in compliance with regulation. Nuclear power is heavily regulated in Canada, leading to strong risk management of safety and environmental impacts.

Weaknesses

No weaknesses to report.

Areas to watch

Residual risk associated with a maximum credible accident with devastating consequences remains. However, Bruce Power has not recorded any material accidental radiation events or other harmful impacts on the environment.

A host site for the long-term storage of Canada's nuclear waste has not been determined. The Nuclear Waste Management Organization is undertaking a site selection process for used fuel deep geological storage. The search has narrowed down to two areas and the final preferred site will be selected by the end of 2024.

Sourcing of uranium is outside the direct control of Bruce Power; however, the issuer is exposed to risks from mishandling of these operations. Strong policies and risk management are in place to minimize environmental and social risks from uranium sourcing.

Eligible Green Projects Assessment Summary

Eligible projects under issuer's green finance framework are assessed based on their environmental benefits and risks, using Shades of Green methodology.

Clean Energy	Medium green
Increased incremental output of existing nuclear units, lifetime extension of existing nuclear units, and new nuclear capacity on site.	

See Analysis Of Eligible Projects for more detail.

Issuer Sustainability Context

This section provides an analysis of the issuer's sustainability management and the embeddedness of the financing framework within its overall strategy.

Company Description

Bruce Power L.P., established in 2001, is Canada's only private sector nuclear generator. It is 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. Located on a 2,300 acre site with 4,200 employees, Bruce Power produces 30% of Ontario's power annually. It operates eight nuclear reactors on Lake Huron where it leases the Bruce Nuclear Generation site from Ontario Power Generation (OPG). The facility has a net peak capacity of 6,550 megawatts, making it the largest operating nuclear plant in the world.

Material Sustainability Factors

Climate Transition Risk

Power generation is the largest direct source of greenhouse gas (GHG) emissions globally, making this sector highly susceptible to the growing public, political, legal, and regulatory pressure to accelerate climate goals. Public awareness of the urgency for climate action has reached a turning point. In turn, policymakers and regulators are more often pushing for faster transition to lower-carbon energy, especially as these technologies become more mature and cost competitive. Over the past decade we have seen multibillion-dollar impairments for most polluting assets, reflecting their weaker economics as taxes increase and they are displaced by new, cleaner technologies. In addition, more stringent decarbonization rules may sometimes restrict their license to operate. Nuclear energy is a low carbon option that generates approximately 10% of the world's electricity according to the IEA. In countries where it is deployed, nuclear power can work together with renewables to reduce emissions in the power sector. Additionally, it offers a reliable and dispatchable power source, thus contributing to electricity security. While certain nations refrain from utilizing nuclear power due to safety concerns and other environmental factors, and others may not have access to nuclear technology, many countries recognize its potential role in their energy transitions.

Physical Climate Risk

Given fixed assets, generators are relatively more exposed to physical climate risks compared to other sectors. For stakeholders, extreme weather events, including wildfires, hurricanes, and storms, are becoming more frequent and severe and can result in

power outages for large populations of users. As water is often a significant resource for hydro, nuclear, and fossil-fuel based power plants, exposure to flooding, drought, or warmer temperatures can also weaken operations. In turn, these dynamics, coupled with regulatory pressure to preserve security of supply, are driving players to enhance the resilience of assets. The physical climate risks generally involve significant financial losses for operators due to repairs, but more importantly from exposure to extreme power price spikes or claims due to business disruption. We expect these dynamics to continue but vary regionally depending on regulatory responses.

Waste & Recycling

Nuclear power generates hazardous radioactive waste that has a long half-life and lacks viable disposal options, which can prompt community resistance for disposal sites. Additionally, end-of-life management--the dismantling and recycling or processing of waste--exposes companies to financial, reputational, or litigation risks if not properly planned and provisioned, especially for nuclear plants.

Pollution

While nuclear operations tend to be well managed with few incidents globally, high-profile events--such as those at Fukushima in 2011--have spotlighted nuclear safety issues and triggered public concern about waste management, although local acceptance varies across jurisdictions.

Safety

Nuclear power can lead to low-probability/high-impact risks associated with the potential for weapon proliferation along with maximum credible accidental radiation from the operation of plants, with devastating regional consequences.

Issuer And Context Analysis

The financing applies exclusively to nuclear power related investments that address climate transition risk, which we view as the most important sustainability factor for the entity. In addition, physical climate risks, waste management, pollution, and safety are relevant for nuclear power.

Bruce Power targets net zero Scope 1 and 2 emissions by 2027 and is taking steps to ensure it minimizes and offsets emissions. Between 2019 to 2022, Scope 1 and 2 net CO2 emissions (inclusive of offsets) show a decline from 22,327 mtCO2e to 19,535 mtCO2e, achieving its 2022 12.5% interim GHG reduction target (from 2019 baseline). Its net zero strategy includes optimizing building use on site, implementing energy and emission-reduction projects and initiatives in operations, finding alternatives to high-emissions energy sources, and where further reductions are not feasible, utilizing emission offsets. Bruce Power has also advanced its Scope 3 emissions accounting approach and has established a plan to further reduce emissions. This includes engaging with top suppliers to obtain data and commit to emissions reductions, investments in local decarbonization projects, and identifying further opportunities to reduce emissions from waste and employee commuting. Since 2019, Scope 3 emissions declined 6% from 0.88 mtCO2e in 2019 to 0.83 mtCO2e in 2022.

Bruce Power carries out comprehensive physical risk analysis in compliance with regulation, including risks associated with future warming of the cooling water, more extreme weather, and other factors. These studies are, however, not publicly available, as recommended by the Task Force on Climate-Related Financial Disclosures (TCFD), though we expect the company to provide more transparency into this risk assessment in the future.

Bruce Power manages and fully funds the storage and disposal of its waste in conjunction with OPG, a provincial crown corporation, and has programs to minimize the production of nuclear waste. OPG is responsible for the used fuel that is produced at the Bruce Power site. Since the 1970s, OPG has managed, transported, stored, and processed all waste from the Bruce site,

following international best practices. All radioactive waste as well as used nuclear fuel is currently stored on an interim basis on the Bruce site until long-term disposal facilities are established. Upholding OPG's commitment to respecting the land rights of Indigenous communities, a proposal for a deep geologic repository (DGR) at the Bruce Power site was ended in 2020. OPG is currently exploring alternative locations. The Canadian Nuclear Safety Commission regulates Bruce Power's nuclear site, including the use of nuclear energy and materials to safeguard health and the environment, to ensure safety and security, and to respect Canada's international commitments on the peaceful use of nuclear energy. The Nuclear Waste Management Organization is currently undertaking a site selection process for the used fuel DGR and has indicated it intends to select a preferred site in late 2024.

Bruce Power goes to great lengths to ensure the radiological safety of its workforce, the public, and the environment. These measures are part of their operating license. As required by the Canadian Nuclear Safety Commission, exposure and dose limits for all nuclear energy workers is closely tracked. There are also dose limits calculated for members of the public living near a nuclear power plant. The dose is determined through third-party studies, as well as the data from constant monitoring of emissions releases to the air and water and monitoring of plants, animals, air, and water. The regulatory maximum dose a member of the public can receive from living near a power plant is 1 millisievert (mSv) per year. The actual dose of a person living next to the property line of the Bruce site in 2022 was calculated at 0.0024 mSv. Thus, radiological effluents, consistently remain at small percentages of the Dose Release Limits (DRLs). No material accidental radiation events or other harmful impacts on the environment have been recorded since Bruce Power started operation in 2001. Still, there is residual risk associated with a maximum credible accident with devastating consequences. Weapon proliferation is mitigated by Canadian regulations and the use of the CANDU technology, which uses heavy water as a moderator and therefore uses natural versus enriched uranium.

Alignment Assessment

This section provides an analysis of the framework's alignment to Green Bond and Loan principles.

Alignment With Principles

Aligned = ✔ Conceptually aligned = O Not aligned = ✖

- ✔ Green Bond Principles, ICMA, 2021
- ✔ Green Loan Principles, LMA/LSTA/APLMA, 2023

✔ Use of proceeds

All proceeds issued under the framework are allocated to nuclear power-related investments and are shaded green. Net proceeds will be allocated exclusively to finance or refinance eligible investments related to the development, operation, and refurbishment of new and existing nuclear projects at the Bruce Power Nuclear site that fall under a clean energy and pollution prevention and control eligible category. Eligible investments may include existing investments made by Bruce Power within 36 months preceding issuance. (Please refer to the Analysis of Eligible Projects section for more information on our analysis of the environmental benefits of the expected use of proceeds.)

✔ Process for project evaluation and selection

Bruce Power's Environment and Sustainability Oversight Committee is responsible for reviewing and evaluating the eligibility of projects. The process involves an assessment of potential investments against Bruce Power's sustainability objectives, environmental and social risks and impacts, internal policies and guidelines, and compliance with relevant environmental regulations. The Sustainability Committee also consults with external experts, where necessary, to further validate eligible projects. The framework clearly references relevant Sustainable Development Goals with which eligible investments align, including Affordable and Clean Energy and Climate Action.

✔ Management of proceeds

Bruce Power's Finance department is responsible for the allocation and management of proceeds and commits to tracking and periodically adjusting proceeds to match allocations to eligible projects during the time the instrument is outstanding. They intend to fully allocate an amount equal to the net proceeds of a Green Financing within 36 months from the date of issuance. Pending allocation, proceeds may be temporarily invested in cash or short-term investment instruments or used to repay existing indebtedness, in accordance with Bruce Power's normal liquidity practices. The framework includes explicit exclusion provisions for GHG-intensive projects, which we view as a strong practice.

✔ Reporting

Bruce Power commits to annual reporting on the outstanding balance of green financings, the allocation of proceeds on a project-by-project basis, the share of proceeds used for new financing and refinancing, and updates on projects related to the eligible investments. Its impact reporting includes both qualitative and/or quantitative project-level environmental indicators such as avoided GHG emissions, along with the calculation methodology as well as actual annual nuclear energy generation. Specific details on methodology, baselines, and assumptions used for impact calculations are also included where feasible.

Analysis Of Eligible Projects

This section provides details of our analysis of eligible projects, based on their environmental benefits and risks, using the Shades of Green methodology.

Medium green

Activities that represent significant steps towards a low-carbon climate resilient future but will require further improvements to be long-term low-carbon climate resilient solutions.

Our Shades of Green Analytical Approach >

Bruce Power expects to allocate all net proceeds issued under the Framework to finance or refinance new and/or existing investments and expenditures for Bruce Power's nuclear assets. This includes investments associated with the Life-Extension Program, increasing the output of the existing units, and new installations at the site. Over the next decade, Bruce Power expects most of the proceeds to be allocated to its Life-Extension Program.

Bruce Power has signed a long-term agreement with the Province of Ontario to refurbish six of its eight units. 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 lifetime extension of each unit will add approximately 30-35 years of operational life. The Asset Management Plan involves inspections and gradual replacement of equipment which is performed during regularly scheduled maintenance outages.

Investments in increasing the output of existing units includes Project 2030, which aims to achieve a site net peak capacity of 7,000 MW by the early 2030s by increasing the site's current eight-unit peak capacity through continued asset optimization, innovation, and leveraging new technology. 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 in capacity to adding a ninth large-scale reactor to the site without the need to build new infrastructure.

Bruce Power is also exploring new installations on site which is the main change since their 2021 Green Financing Framework. This initiative is in a pre-development phase and any new capacity, when determined, must follow strict impact analysis in line with Canadian regulation. Final reactor design will be subject to licensing by Canadian Nuclear Safety Commission for construction and operation.

Eligible investments may include existing investments made by Bruce Power within three years preceding the Green Financing issuance date.

The Framework also commits to not knowingly allocating proceeds from the Green Financing for financing of projects that involve fossil fuels as the primary source of fuel for the purpose of power generation.

Overall Shades of Green assessment

Based on the project category shades of green detailed below, and consideration of environmental ambitions reflected in Bruce Power's Green Financing Framework, we assess the framework Medium green.

Green project categories

Clean Energy

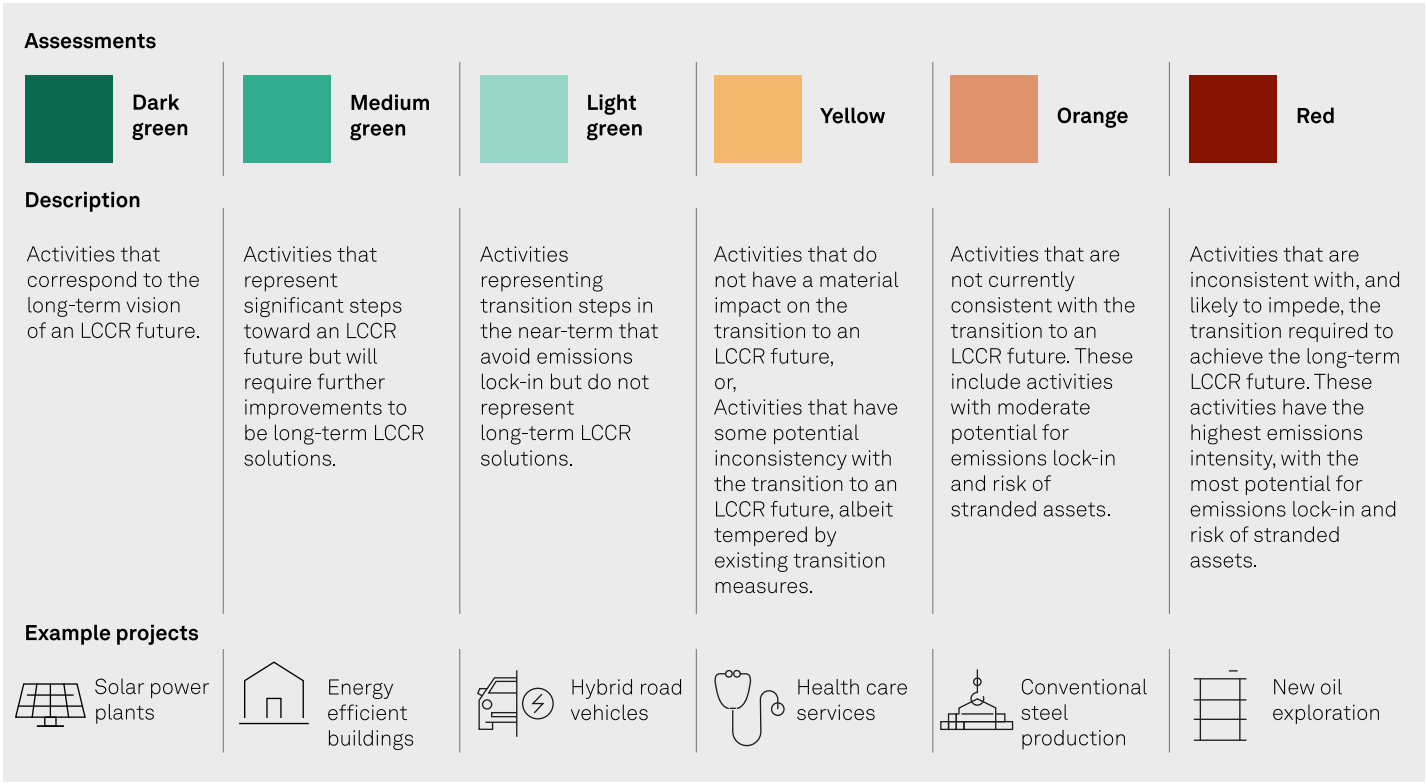
Assessment	Description
Medium green	Development, operation, and refurbishment of new and existing nuclear projects, which may include: • Investments in new installations to produce electricity that displace other emitting electricity sector generators;

- Investments associated with the Life-Extension Program, which includes the MCR Program and the Asset Management Plan. Examples of such investments include component replacement, refurbishment, and maintenance with the purpose of increasing operational life span while maintaining or improving the level of operational safety; and
- Investments related to increasing the incremental output of the existing units used to displace the remitting electricity sector generators while maintaining or improving the level of operational safety of such units. An example of such investments includes Project 2030.

Analytical considerations

- Nuclear power is a low-carbon source of electricity with a land use footprint that is smaller than other low-carbon sources, such as renewables. Refurbishment of nuclear reactors to expand the useful life of the plant enables low carbon electricity, in part by avoiding some emissions from construction. Increasing incremental output of the plant and installation of new units on site increase clean energy capacity on Ontario's grid, displacing natural gas generation to meet growing energy demand and helping to support Canada's climate goals.
- Although empirical evidence shows nuclear power generation in Canada to be a safe form of electricity and the risk of nuclear incident to be remote, a significant nuclear incident at any nuclear power plant could have devastating consequences. No major accidental radiation events or other harmful impacts on the environment have been recorded since Bruce Power started operation in 2001 and safety provisions as required under Canadian regulation are robust.
- Bruce Power utilizes safeguards and procedures that mitigate risks associated with environmental damages from uranium mining. Nuclear fuel is procured from Cameco Corp., a Canadian based and regulated company. Uranium is sourced internationally by Cameco. Bruce Power limits countries of origin to Canada, USA, Australia, and Kazakhstan. While Bruce Power has historically used uranium from more environmental- and social-risk-prone countries, since 2021 they've placed reasonable procedures and safeguards in place to mitigate these risks.
- Long-term storage of spent fuel is a key concern for nuclear power that remains unresolved in Canada. The responsibility for storage of spent fuel resides with OPG, a provincial crown corporation; however, the issuer is exposed to risks from mishandling these operations. A Deep Geological Repository is the scientifically accepted method for long-term storage of such waste approved in Canada, but a host site has yet to be selected. However, the Nuclear Waste Management Organization is currently undertaking a site selection process and indicates that it plans to select a preferred site in late 2024.
- Bruce Power indicates that all existing design and approaches to environmental assessment remain best in class and that they are leading in many areas such as climate updates, thermal modelling, approaches for evaluation of fish impacts, broader ecosystem understanding, development of a joint coastal waters monitoring program with a local first nation, and working on invasive species control to maintain shoreline diversity.
- The issuer informs us that fossil fuel standby generators cannot be financed with green bond proceeds.

S&P Global Ratings' Shades of Green



Note: For us to consider use of proceeds aligned with ICMA Principles for a green project, we require project categories directly funded by the financing to be assigned one of the three green Shades.

LCCR--Low-carbon climate resilient. An LCCR future is a future aligned with the Paris Agreement; where the global average temperature increase is held below 2 degrees Celsius (2 C), with efforts to limit it to 1.5 C, above pre-industrial levels, while building resilience to the adverse impact of climate change and achieving sustainable outcomes across both climate and non-climate environmental objectives. Long term and near term--For the purpose of this analysis, we consider the long term to be beyond the middle of the 21st century and the near term to be within the next decade. Emissions lock-in--Where an activity delays or prevents the transition to low-carbon alternatives by perpetuating assets or processes (often fossil fuel use and its corresponding greenhouse gas emissions) that are not aligned with, or cannot adapt to, an LCCR future. Stranded assets--Assets that have suffered from unanticipated or premature write-downs, devaluations, or conversion to liabilities (as defined by the University of Oxford).

Mapping To The U.N.'s Sustainable Development Goals

Where the Financing documentation references the Sustainable Development Goals (SDGs), we consider which SDGs it contributes to. We compare the activities funded by the Financing to the International Capital Markets Association (ICMA) SDG mapping and outline the intended linkages within our SPO analysis. Our assessment of SDG mapping does not impact our alignment opinion.

This framework intends to contribute to the following SDGs:

Use of proceeds	SDGs
Clean Energy: Nuclear Pollution prevention and control	 **7. Affordable and clean energy**  **13. Climate action**

*The eligible project categories link to these SDGs in the ICMA mapping.

Related Research

- Analytical Approach: Second Party Opinions: Use of Proceeds, July 27, 2023
- FAQ: Applying Our Integrated Analytical Approach for Use-of-Proceeds Second Party Opinions, July 27, 2023
- Analytical Approach: Shades of Green Assessments, July 27, 2023
- S&P Global Ratings ESG Materiality Maps, July 20, 2022

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