



Verifier's Report

Legal Name of Issuer: Port of Morrow, Oregon

Issue Description: Transmission Facilities Revenue Bonds (Bonneville Cooperation Project No. 9) Series 2024 (Federally Taxable) (Green Bonds - Climate Bond Certified)

Project: Transmission System Improvements

Green Standards: Climate Bonds Standard (Version 4.0)
ICMA Green Bond Principles

Sector Criteria: Electrical Grids and Storage

Keywords: Transmission and distribution, electrification, hydropower, renewables, net zero, carbon-free, decarbonized grid, climate resilience, Pacific Northwest

Par: \$85,000,000*

Evaluation Date: May 8, 2024

*Preliminary, subject to change

CLIMATE BONDS DESIGNATION

The Port of Morrow, Oregon (the "Port") will issue Transmission Facilities Revenue Bonds (Bonneville Cooperation Project No. 9) Series 2024 (Federally Taxable) (Green Bonds - Climate Bond Certified) ("Series 2024 Bonds") to finance transmission system improvements to be leased and operated by Bonneville Power Administration ("Bonneville").

This Verifier's Report reflects Kestrel's view of Bonneville's projects and financing, allocation and oversight, and conformance of the Series 2024 Bonds with the Climate Bonds Standard (Version 4.0) and Certification Scheme, and *Electrical Grids and Storage* Sector Criteria. In our opinion, the Transmission Facilities Revenue Bonds (Bonneville Cooperation Project No. 9) Series 2024 (Federally Taxable) are impactful, net zero aligned, and conform with the internationally accepted Climate Bonds Standard (Version 4.0) and the *Electrical Grids and Storage* Sector Criteria (Version 1).

In recognition of the harmonization and alignment between the Climate Bonds Standard and the Green Bond Principles June 2021 (June 2022 Appendix I) established by the International Capital Market Association ("ICMA"), Kestrel has also evaluated and confirmed conformance of the Bonds with the Green Bond Principles.

ABOUT BONNEVILLE POWER ADMINISTRATION

Bonneville Power Administration (“Bonneville”) was created in 1937 and is one of four regional federal power marketing agencies within the United States Department of Energy. The transmission system constructed, owned and operated by Bonneville includes over 15,000 miles of high voltage transmission lines and approximately 260 substations in Washington, Oregon, Idaho, Montana, Wyoming, and northern California.

In addition to providing transmission services, Bonneville markets power from federally-owned and non-federally-owned generation facilities, including 31 hydroelectric projects in the Pacific Northwest which are operated by the US Army Corps of Engineers (“Corps”) or the US Bureau of Reclamation (“Reclamation”), and the Columbia Generating Station, a nuclear facility owned by Energy Northwest. Energy output in 2025 is expected to be over 9,600 MW under median water conditions and more than 7,900 MW under low water conditions. The electric power resources are primarily hydropower and power on the grid is nearly carbon-free. The hydroelectric projects operated by the Corps and Reclamation are managed for power generation, navigation, recreation, water supply, irrigation, and protection of fish and wildlife, among other purposes. Bonneville does not own or operate generation facilities but is responsible for selling power which makes up nearly 30% of power consumed in the region.

Power supply and transmission customers include publicly owned utilities, cooperatively owned utilities, tribal utilities, power generators, power marketers, and others. The service area is approximately 300,000 square miles and serves approximately 15 million people.

As a major marketer of low carbon energy and operator of the primary transmission network in the Pacific Northwest, Bonneville has multiple strategies to advance decarbonization goals. Supporting regional carbon reduction efforts is one of the primary objectives identified in the 2024-2028 Strategic Plan.

To meet decarbonization goals, Bonneville foresees that development of renewables will accelerate and these resources will require integration onto the transmission system. Approximately 1,055 MW of new wind and 849 MW of solar are expected to be added to Bonneville’s balancing authority area by the end of Fiscal Year 2026. To meet these demands, Bonneville is pursuing a suite of projects through 2032 to minimize transmission congestion and enable connection of more renewable generation projects. These strategic projects are called the Evolving Grid Projects and are expected to increase transmission capacity by up to 6 GW systemwide.

Energy conservation is also considered in resource planning. The Energy Efficiency Action Plan outlines how Bonneville can strengthen efforts to increase energy efficiency and energy conservation to reduce load requirements. Strategies address efficiency opportunities in distribution systems, demand-response, and residential, commercial, industrial, agriculture, and federal sectors.¹

In addition to maintaining and expanding access to low carbon energy, Bonneville has taken a proactive approach to climate resilience. The Climate Vulnerability Assessment and Resilience Plan developed in 2022 is a comprehensive assessment of potential climate risks to the system and strategies to mitigate

¹ “Energy Efficiency Action Plan 2022-2027,” Bonneville Power Administration, <https://www.bpa.gov/-/media/Aep/energy-efficiency/document-library/bpa-2022-2027-ee-action-plan.pdf>.

those risks. Additionally, the first Wildfire Mitigation Plan for the transmission system was released in 2020.²

CONFORMANCE WITH CLIMATE BONDS STANDARD AND SECTOR CRITERIA

Bonneville and the Port engaged Kestrel to provide an independent verification on alignment of the Series 2024 Bonds with the Climate Bonds Standard (Version 4.0) and Certification Scheme (“Climate Bonds Standard”), and the *Electrical Grids and Storage* Sector Criteria. The Climate Bonds Initiative (“Climate Bonds”) administers the Standard and Sector Criteria. Additionally, Kestrel examined alignment of the Series 2024 Bonds with the United Nations Sustainable Development Goals (“UN SDGs”).

Kestrel is a Climate Bonds Initiative Approved Verifier. The Kestrel Verification Team included environmental scientists and financial professionals. We performed a Reasonable Assurance engagement to independently verify that the bonds meet relevant criteria, in all material respects.

For this engagement, Kestrel reviewed Bonneville and the Port’s bond disclosure documentation, internal Green Bond Framework, disclosures and documentation on the allocation and uses of bond proceeds, as well as relevant plans and alignment to Bonneville’s overarching climate objectives. We examined public and non-public information and interviewed members of Bonneville. Our goal was to understand the planned use of proceeds, procedures for managing proceeds, and plans and practices for reporting in sufficient detail to verify the bonds.

Relevant Climate Bonds Sector Criteria and Other Standards

The Series 2024 Bonds align with the Climate Bonds Standard (Version 4.0) and *Electrical Grids and Storage* Criteria (Version 1).

Assurance Approach

Kestrel’s responsibility was to conduct a Reasonable Assurance engagement to determine whether the Series 2024 Bonds meet, in all material respects, the requirements of the Climate Bonds Standard. Our Reasonable Assurance was conducted in accordance with the Climate Bonds Standard (Version 4.0) and the *International Standard on Assurance Engagements (ISAE) 3000 (Revised), Assurance Engagements Other than Audits or Reviews of Historical Financial Information*. Information relating to this engagement and the Verifier’s and Issuer’s Responsibilities, and Independence and Quality Control are available in Appendix D.

Kestrel has relied on information provided by Bonneville. There are inherent limitations in performing our assurance; fraud, error or non-compliance may occur and not be detected. Kestrel is not responsible or liable for any opinions, findings or conclusions within the information provided by Bonneville that are incorrect. Our assurance is limited to the review of Bonneville’s policies and procedures that are, in Kestrel’s view, relevant to the key components of the Climate Bonds Standard (Version 4.0). The distribution and use of this verification report are at the sole discretion of Bonneville. Kestrel does not accept or assume any responsibility for distribution to any other person or organization.

² “Wildfire Mitigation,” Bonneville Power Administration, accessed April 24, 2024, <https://www.bpa.gov/energy-and-services/transmission/wildfire-mitigation>.

Use of Proceeds

The Series 2024 Bonds finance improvements to the Bonneville transmission system (the “Project”) to enable the transition to a carbon-free grid and accommodate increased demand for clean power. The projects improve reliability of the major regional transmission system in the Pacific Northwest and support decarbonization of the electrical grid.

Electrification of vehicles and buildings and addition of intermittent renewables to the resource mix create new demands on transmission and distribution infrastructure. Upgrades to this infrastructure are vital to the transition to a carbon-free grid by 2030. According to the National Renewable Energy Laboratory, transmission capacity needs nationwide are between two and three times the capacity installed in 2022 and require between 1,400 and 10,100 miles of new high-capacity lines per year. Investment needed for the entire US power system is estimated at \$330 billion to \$740 billion, a significant portion of which is transmission and distribution infrastructure.³ To achieve targeted US emission reductions, transmission capacity should expand approximately 50% faster than recent rates.⁴

Transmission system improvements financed by the Series 2024 Bonds are designed to maintain a reliable grid and accommodate new large-scale renewable generation developments. It is also designed for major shifts in demand expected as a result of large-scale electrification that is also necessary to meet emission reduction targets. Projects are all completed as of April 2022 and are described in Table 1.

Table 1. Projects to be financed with the Series 2024 Bonds

Project	Description
Keeler Substation Static Var Compensator Upgrade	Addition of static voltage controls at the Keeler substation located west of Portland, Oregon; stabilizes system voltage and eliminates wasted electricity
Maple Valley Substation Static Var Compensator Upgrade	Addition of static voltage controls at Maple Valley substation located southeast of Seattle, Washington; stabilizes system voltage and eliminates power loss
Ross Complex Facility	Construction of a maintenance facility for equipment and fleets which are wholly dedicated to the eligible system; electric vehicle chargers are expected to be added in the future
Slatt Substation Spare Transformer	Addition of a spare transformer to the Slatt Substation in Oregon to minimize system outages and improve system resilience
Fossil Substation Power Transformers	Replacement of power transformers at the Fossil Substation in north central Oregon to improve system reliability and reduce PCB contamination from existing transformers ⁵

³ Paul Denholm et al., “Examining Supply-Side Options to Achieve 100% Clean Electricity by 2035,” National Renewable Energy Laboratory, 2022, <https://www.nrel.gov/docs/fy22osti/81644.pdf>.

⁴ “Climate Progress and the 117th Congress: The Impacts of the Inflation Reduction Act and Infrastructure Investment and Jobs Act,” Rapid Energy Policy Evaluation and Analysis Toolkit (REPEAT), Princeton, July 2023, https://repeatproject.org/docs/REPEAT_Climate_Progress_and_the_117th_Congress.pdf.

⁵ Polychlorinated Biphenyl (PCB) was historically used in certain electrical equipment. PCBs tend to break down very slowly in the environment and can be toxic to humans and wildlife with exposure at relatively low concentrations. Transformers and other equipment manufactured in the US after 1979 does not contain PCBs.

Net Zero Alignment

As the main grid operator in the Pacific Northwest, the Bonneville projects are paramount to achieving net zero greenhouse gas emissions in the region. Clean energy targets have increased demand for interconnections and transmission services for renewable energy. The State of Washington has set a goal to reach 100% clean electricity by 2035 and the State of Oregon set a goal to reduce greenhouse gas emissions by 100% below a baseline by 2040. The US national target is to reach net zero greenhouse gas emissions by 2050.

The financed projects support addition of interconnections and expand capacity to meet changing demands as a result of these ambitious grid decarbonization targets and interconnection requests. Rapid development of transmission infrastructure is necessary to accommodate increased renewables and electrification of buildings and transportation. Electricity production is the second highest source of greenhouse gas emissions in the US.⁶ Providing renewable and carbon-free energy through a reliable and resilient transmission system is critical to reducing these emissions.

Sector Criteria for Electrical Grids and Storage (Version 1.0)

As per the *Electrical Grids and Storage* Sector Criteria, bonds must meet both Mitigation and Adaptation & Resilience Criteria to demonstrate conformance.

Mitigation Criteria: The average grid emissions factor in which the infrastructure is located is below 100 g CO₂e/kWh. Alternatively, more than 67% of new generation capacity in the system is expected to have emissions intensities below 100 g CO₂e/kWh over a rolling five-year period.

The Bonds only finance improvements to transmission infrastructure in the Bonneville system. The Bonneville system primarily transmits carbon-free energy and continues to integrate new renewable generation resources to the system. The grid emissions factor is 16 g CO₂e/kWh and thus, the transmission infrastructure projects meet the Mitigation criteria.

Bonneville has significant plans and procedures in place to meet criteria in the Adaptation & Resilience checklist included in Appendix C. The weighted average operational lifetime of the financed assets exceeds the term of the Series 2024 Bonds.

ICMA Green Bond Principles

The bond-financed activities are eligible projects as defined by the Green Bond Principles in the *Renewable Energy* project category.

Process for Project Evaluation and Selection

Bonneville Capital Programs and projects financed by the Series 2024 Bonds are developed based on multi-year strategic plans, the annual Transmission Plan, an asset management system and regional coordination among grid operators.

⁶ "Sources of Greenhouse Gas Emissions: Electricity," United States Environmental Protection Agency, accessed May 3, 2024, <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#electricity>.

The 2024-2028 Strategic Plan sets out goals for the next five years to prepare for transformation of electrical grids, increase reliability and resilience, and accommodate changing customer needs. The grid modernizations financed by the Series 2024 Bonds advance multiple objectives in the Strategic Plan, including *Support regional carbon reduction efforts; Advance transmission investments and innovative solutions to integrate loads and resources; and Promote energy efficiency investments to meet the long-term resource needs of Bonneville, our customers and the region.*

The annual Transmission Plan describes capital priorities for the transmission system to serve expected loads and load growth. The most recent 2023 Transmission Plan⁷ describes necessary projects to meet transmission service requests, interconnection requests, upgrades to serve new load growth, and improvements to reliability. This planning process informed prioritization of projects financed by the Series 2024 Bonds.

Physical assets are monitored through the Asset Management Key Strategic Initiative and related strategic asset management plans and asset plans. Each of these informs priorities for investment through the Capital Program. Priorities in the Climate Vulnerability Assessment and Resilience Plan and the Wildfire Mitigation Plan ensure projects are constructed to be resilient to physical climate risks.

Bonneville also participates in large, coordinated regional planning efforts to provide effective and reliable grid operations and to prioritize transmission infrastructure projects for financing. Examples of these regional efforts include NorthernGrid, a regional transmission planning organization with 13 member utilities, and the Western Transmission Expansion Coalition which coordinates inter-regional transmission planning.

Management of Proceeds

The Series 2024 Bonds refinance debt which financed construction and improvement of transmission infrastructure and pay costs of issuance. The Project was originally financed through a note purchase agreement which will be refinanced with proceeds of the Series 2024 Bonds. Proceeds will be used immediately at closing to repay the outstanding debt and will not be held in temporary investments prior to spending.

Reporting

Bonneville has several ongoing reporting processes that provide investors with insights into operations and activities.

- Annual reports include updates on key indicators related to operational and financial performance and are available at: [bpa.gov/about/finance/annual-reports](https://www.bpa.gov/about/finance/annual-reports).
- Reports on progress toward energy conservation targets are released separately from the comprehensive annual reporting efforts: [bpa.gov/energy-and-services/efficiency/energy-conservation-annual-review](https://www.bpa.gov/energy-and-services/efficiency/energy-conservation-annual-review).

⁷ "Transmission Plan: Open Access Transmission Tariff Attachment K Planning Process," Bonneville Power Administration, December 2023, <https://www.bpa.gov/-/media/Aep/transmission/attachment-k/2023-bpa-transmission-plan.pdf>.

- Bonneville also reports progress on capital plans in Quarterly Business Reviews: bpa.gov/about/finance/quarterly-business-review.
- Systemwide sustainability metrics are reported on the Bonneville website: bpa.gov/environmental-initiatives/sustainability/metrics.
- Bonneville reports annually on greenhouse gas emissions through The Climate Registry voluntary reporting program: theclimateregistry.org/members/bonneville-power-administration/.

In accordance with the Climate Bonds Standard, Kestrel will be engaged to provide one Post-Issuance Report within 24 months of issuance to confirm continued conformance of the Series 2024 Bonds with the relevant Standards and Criteria.

Bonneville will also submit continuing financial disclosures to the Municipal Securities Rulemaking Board (“MSRB”) as long as the Series 2024 Bonds are outstanding, as well as reports in the event of material developments. This reporting will be done annually on the Electronic Municipal Market Access (“EMMA”) system operated by the MSRB.

ALIGNMENT WITH UN SDGs



The Series 2024 Bonds support and advance the vision of the United Nations Sustainable Development Goals (“UN SDGs”), including:



Affordable and Clean Energy (Targets 7.1, 7.2)

Capital investments to improve reliability of a system delivering clean and renewable energy to customers



Industry, Innovation and Infrastructure (Targets 9.1, 9.4)

Installation of infrastructure to increase flexibility of the grid in alignment with large-scale electrification, deployment of renewables and wildfire resilience



Sustainable Cities and Communities (Target 11.6)

Comprehensive upgrades to grid infrastructure upgrades to maintain service reliability with electrification of buildings and vehicles



Climate Action (Target 13.2)

Continued implementation of projects to reach long-term grid decarbonization targets while maintaining grid reliability

Full text of the Targets for these Goals is available in Appendix A, with additional information available on the United Nations website: un.org/sustainabledevelopment

ASSURANCE STATEMENT AND CONCLUSIONS

Based on the Reasonable Assurance procedures we have conducted, in our opinion, the Transmission Facilities Revenue Bonds (Bonneville Cooperation Project No. 9) Series 2024 (Federally Taxable) are impactful, net zero aligned, and conform, in all material respects, with the current Climate Bonds Standard, and the bond-financed activities are completely aligned with the *Electrical Grids and Storage* Sector Criteria. The Projects provides critical infrastructure to meet ambitious grid decarbonization targets.

Sincerely,

April Strid

April Strid, Lead Verifier

Kestrel

Hood River, Oregon, United States

May 8, 2024

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About

Kestrel Sustainability Intelligence™ for municipal markets helps set the market standard for sustainable finance. We do this through verification and our comprehensive Analysis and Scores.

Kestrel is a leading provider of external reviews for green, social and sustainability bond transactions. We are qualified to evaluate corporate and municipal bonds in all asset classes worldwide for conformance with international green and social bond standards.

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Disclaimer

This Opinion aims to explain how and why the discussed financing meets the Climate Bonds Standard based on the information that was provided by Bonneville or made publicly available by Bonneville and relied upon by Kestrel only during the time of this engagement (April – May 2024), and only for purposes of providing this Opinion.

We have relied on information obtained from sources believed to be reliable, and assumed the information to be accurate and complete. However, Kestrel can make no warranty, express or implied, nor can we guarantee the accuracy, comprehensive nature, merchantability, or fitness for a particular purpose of the information we were provided or obtained.

By providing this Opinion, Kestrel is neither addressing nor certifying the credit risk, liquidity risk, market value risk or price volatility of the projects financed by the Climate Bonds. It was beyond Kestrel's scope of work to review for regulatory compliance, and no surveys or site visits were conducted by us. Furthermore, we are not responsible for surveillance, monitoring, or implementation of the project, or use of proceeds.

The Opinion delivered by Kestrel is for informational purposes only, is current as of the date of issuance, and does not address financial performance of the Climate Bonds or the effectiveness of allocation of its proceeds. This Opinion does not make any assessment of the creditworthiness of Bonneville, nor its ability to pay principal and interest when due. This Opinion does not address the suitability of a Bond as an investment, and contains no offer, solicitation, endorsement of the Bonds nor any recommendation to buy, sell or hold the Bonds. Kestrel accepts no liability for direct, indirect, special, punitive, consequential or any other damages (including lost profits), for any consequences when third parties use this Opinion either to make investment decisions or to undertake any other business transactions.

This Opinion may not be altered without the written consent of Kestrel. Kestrel reserves the right to revoke or withdraw this Opinion at any time. Kestrel certifies that there is no affiliation, involvement, financial or non-financial interest in Bonneville or the projects discussed. We are 100% independent. Language in the offering disclosure supersedes any language included in this Opinion.

Use of the United Nations Sustainable Development Goal (SDG) logo and icons does not imply United Nations endorsement of the products, services, or bond-financed activities. The logo and icons are not being used for promotion or financial gain. Rather, use of the logo and icons is primarily illustrative, to communicate SDG-related activities.

Appendix A.

UN SDG TARGET DEFINITIONS

Target 7.1

By 2030, ensure universal access to affordable, reliable and modern energy services

Target 7.2

By 2030, increase the share of renewable energy in the global energy mix

Target 9.1

Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

Target 9.4

By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities

Target 11.6

By 2030, reduce the adverse per capita environmental impact of cities, including paying special attention to air quality and municipal and other waste management

Target 13.2

Integrate climate change measures into national policies, strategies and planning

Appendix B.

ADAPTATION & RESILIENCE CHECKLIST

Adaptation and Resilience Checklist for Grid and Storage Infrastructure (Tables B.1–B.5)

Table B.1. Clear boundaries and critical interdependencies between the infrastructure and the system it operates within are identified.

No.	Adaptation and resilience checklist for grid and storage infrastructure	Submitted
1.1	<p>Boundaries of the infrastructure are defined using (1) a listing of all infrastructure and assets and activities associated with the use of the bond proceeds, (2) a map of their location, and (3) identification of the expected operational life of the activity, asset or project.</p>	<p>A detailed budget and list of all infrastructure, assets, and activities associated with the Series 2024 Bond proceeds has been provided. The service territory and locations of the financed assets are defined. The average operational life of the assets exceeds the term of the Series 2024 Bonds.</p>
1.2	<p>Critical interdependencies between the infrastructure and the system within which it operates are identified. Identification of these interdependencies should consider the potential for adverse impacts arising from, but not limited to:</p> <ul style="list-style-type: none"> (1) the effects of supply disruption or interruption on dependent electricity users or populations; (2) exacerbation of wildfires; (3) relationships of the asset/project to nearby flood zones; (4) reduction in pollinating insects and birds; (5) reduction in biodiversity or High Conservation Value¹⁰ habitat; (6) damage or reduction in value of neighboring property due to boundary structures at risk of falling during storm events; (7) fire and other practices that affect air quality; (8) appropriation of land or economic assets from nearby vulnerable groups¹¹ <p>¹⁰High Conservation Value (HCV) habitat criteria in accordance with https://www.hcvnetwork.org</p> <p>¹¹ According to IFC Performance Standards</p>	<p>Interdependencies and potential impacts from factors listed in criteria 1.2 are identified. Supply disruption, exacerbation of wildfires, flooding, and fire and other practices that affect air quality are addressed in the Vulnerability Assessment and Resilience Plan ("VARP"). Exacerbation of wildfires and other practices that affect air quality are addressed further in Wildfire Mitigation Plans. Bonneville has ongoing involvement in US Department of Energy studies assessing the impacts of climate change on federal power marketing administrations.</p>

Table B.2. An assessment has been undertaken to identify the key physical climate hazards to which the infrastructure will be exposed and vulnerable to over its operating life.

No.	Adaptation and resilience checklist for grid and storage infrastructure	Submitted
2.1	<p>Key physical climate risks and indicators of these risks are identified in line with the following guidelines.</p> <p>Risks are identified based on (a) a range of climate hazards, and (b) information about risks in the current local context, including reference to any previously identified relevant hazard zones, e.g., flood zones.</p> <p>In order to be confident that assets and activities are robust and flexible in the face of climate change uncertainties, it is essential that the climate risks being assessed and addressed cover those that are of greatest relevance to T&D grids and electrical energy storage. The physical characteristics of climate change that must be considered in the risk assessment include:</p> <ul style="list-style-type: none"> • Temperature rise <ul style="list-style-type: none"> ○ High temperatures can impact the electrical rating of assets, reducing transmission capacity and potentially reducing the ability of the network to meet demand. ○ Increasing temperatures can also result in extension of overhead lines, which reduces the clearance above trees. ○ Increased temperatures may also result in changes to the load on assets, due to increased cooling demands (higher summer peak demands) and less winter heating (reduced winter peak). • Increased heavy rainfall <ul style="list-style-type: none"> ○ Heavy rainfall can result in flash pluvial flooding, which could significantly impact electrical assets, particularly ground mounted assets. • Sea-level rises <ul style="list-style-type: none"> ○ Potential for flooding of coastal infrastructure and assets at risk from storm surge events. • Increased lightning <ul style="list-style-type: none"> ○ Lightning strikes have potential to cause transient outages due to power surges. • Increased winds / gales <ul style="list-style-type: none"> ○ Strong winds can cause damage to overhead transmission and distribution lines and supporting infrastructure (pylons and poles). ○ Up-rooting of trees and vegetation can also have an impact on power lines. • Increased snow, sleet, ice, freezing fog <ul style="list-style-type: none"> ○ Ice and snow accretion can make overhead power lines vulnerable to high-winds ○ Snow and ice can also impede access to sites for repairs in the event of a fault. • Increased coastal / river erosion <ul style="list-style-type: none"> ○ Risk to assets in coastal or riverbank locations • Wildfires <ul style="list-style-type: none"> ○ Wildfires present a risk to electricity infrastructure in affected areas and can significantly inhibit access to repair damaged infrastructure. ○ Electricity infrastructure can also be a cause of wildfires. For example, contact between transmission lines and dry vegetation has potential to start fires. • Landslides / ground movement <ul style="list-style-type: none"> ○ Potential to risk to both underground and above ground infrastructure from ground movement. ○ Potential for access to be impeded for repairs. 	<p>Key physical climate risks and indicators of these risks are identified in the VARP. Key risks considered in the VARP include:</p> <ul style="list-style-type: none"> • More frequent, longer and more intense heat waves • Move frequent, severe wildfires and a longer fire season • Increased coastal flooding due to sea-level rise • More frequent and intense inland flooding • More extreme heavy-rainfall events • More landslides <p>Erosion is also discussed in the VARP in the context of the risks above.</p> <p>The VARP project team collaborated with Bonneville meteorologists and climate change specialists to determine the climate hazards likely to impact the Pacific Northwest over the coming years. State-specific and regional literature developed by the National Oceanic and Atmospheric Administration, the River Management Joint Operating Committee (which has membership from Bonneville, the US Army Corps of Engineers, and the Bureau of Reclamation), and the US Global Change Research Program also informed the VARP. Bonneville has been monitoring climate-related risks to its operations for nearly two decades and developed its first Climate Change Adaptation Plan in 2012.</p> <p>Bonneville coordinates with other utilities in and around its service territory to provide essential materials to ensure grid reliability in the event of an emergency. Bonneville also negotiates agreements with land management agencies to coordinate actions occurring near power lines. A 2017</p>

No.	Adaptation and resilience checklist for grid and storage infrastructure	Submitted
	<p>Issuers might consider the climate risks posed through specific interdependencies which might include, for example:</p> <ul style="list-style-type: none"> • Availability of telecommunications for control systems and operational / field staff communications when dealing with extreme weather events, where the telecommunications rely on third party providers and infrastructure. • Flood risk and resilience will likely have interdependencies with local and national agencies, for example related to local flood defenses, coastal flood risk management, shoreline management plans etc. <p>Optional guidance for carrying out risk assessments:</p> <ul style="list-style-type: none"> • Users should apply climate scenarios based on representative concentration pathway (RCP) 4.5 and 8.5 or similar / equivalent to ensure consideration for worst case scenario. • A broad range of models can be used to generate climate scenarios. • Time horizons for assessing climate risk in agriculture can be based on annual seasonal forecasts and every ten years for the lifetime of the assets and projects. Where accurate assessments of climate variability for specific locations are not possible, use worst-case scenarios. • Risks can be characterized by the associated annual probability of failure or annual costs of loss or damage. • For risk assessment, the TCFD The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities is recommended. 	<p>Memorandum of Understanding with the US Forest Service requires advance coordination on maintenance activities and includes a fire prevention and suppression plan designed to prevent and minimize wildfire.</p> <p>The VARP outlines system-specific likelihood and consequence scales to identify the impact that climate hazard events have on critical systems (facilities, fleet, supply chain, transmission, and workforce). Subsequent VARP analysis cycles will expand in scope to include additional systems and will respond to any future developments in climate modeling for the region.</p>

Table B.3. The measures that have or will be taken to address those risks, mitigate them to a level such that the infrastructure is suitable to climate change conditions over its operational life.

No.	Adaptation and resilience checklist for grid and storage infrastructure	Submitted
3.1	<p>The following are examples of risk management activities that bond issuers might consider, or that might be adopted as part of regulations (e.g. codes and standards). This list is not exhaustive and bond issuers should fully assess the mitigation measures that are relevant to the climate risks and impacts identified in the risk assessment.</p> <p>Temperature</p> <ul style="list-style-type: none"> - Design standards that maintain equipment rating over its lifetime performance in the face of all potential ranges of temperature rise - Manage vegetation under power lines to ensure adequate clearance is maintained - Assess changing demand profile (milder winters, increased summer cooling) over equipment lifetime <p>Rainfall:</p> <ul style="list-style-type: none"> - Design for resilience to pluvial flooding - Assessment of site drainage requirements - Impact of restricted access to sites / lines due to flooding <p>Increased lightning</p> <ul style="list-style-type: none"> - Design of electrical equipment to withstand lightning impulses, including shielding and surge suppression devices - Redundancy <p>Increased winds / gales</p> <ul style="list-style-type: none"> - Design to withstand extreme winds - Cut vegetation regularly to safe distance to reduce risk from up-rooting - Invest in storm and hurricane forecasting tools - Consider placing cables underground - Redundancy <p>Increased snow, sleet, ice, freezing fog</p> <ul style="list-style-type: none"> - Design equipment for ice loading - Suitable vehicles for access to sites in heavy snow / icy conditions <p>Increased flooding</p> <ul style="list-style-type: none"> - Flood risk assessment and planning - Site ground installations outside of potentially affected zones - Ensure flood defense systems and coastal management plans are adequate - Consideration of site access during flooding events <p>Increased coastal / river erosion</p> <ul style="list-style-type: none"> - Shoreline management plans / coastal erosion assessment <p>Wildfires</p> <ul style="list-style-type: none"> - Management of vegetation around electricity infrastructure to ensure adequate clearance <p>Landslides / ground movement</p> <ul style="list-style-type: none"> - The potential for ground movement and landslides should be taken into account when assessing sites for installing grid infrastructure. 	<p>Completed or ongoing risk management activities include, but are not limited to:</p> <ul style="list-style-type: none"> • Build new facilities with HVAC systems that have extended temperature ranges and cooling/heating duration above climate forecasts • Implement enhanced inspection and operations and maintenance program for stormwater systems and roads • Re-evaluate replacement schedule and replace fleet assets with equipment that requires less downtime and maintenance • Purchase additional stocks of air, cabin and miscellaneous filters for areas determined to be at high risk of wildfires • Implement a capital asset management software program to optimize fleet size and placement • Assess material availability vulnerabilities to ensure field inventories reflect unique regional system needs • Coordinate with other utilities in and around the BPA service territory to provide essential materials to ensure grid reliability in the event of an emergency • Maintain a full staff of technical experts and have succession plans in place to foster an environment of proactive and creative solutions to material access issues • Ensure project schedules are able to account for shipping delays for materials with long lead times • Develop relationships with suppliers and contracting mechanisms to ensure material availability • Continue to implement a comprehensive vegetation management program to minimize vegetation-related fire hazards on BPA rights-of-way, easements and fee-owned land • Continue to conduct regular inspections of transmission assets and perform maintenance • Apply fire-resistant coating to wood poles in areas vulnerable to wildfires • Develop and execute business and continuity plans for emergency operations • Negotiate agreements with land management agencies to coordinate actions occurring near power lines

No.	Adaptation and resilience checklist for grid and storage infrastructure	Submitted
	<p>General risk mitigation measures:</p> <ul style="list-style-type: none"> - Business continuity plans - System restoration plans - Black start - Islanded operation / microgrids - System security standards 	<ul style="list-style-type: none"> • Install barriers to protect tower legs from flood debris impact • Relocate towers away from riverbanks • Install towers on flood control foundations or add additional weight to towers to prevent uplift • Relocate towers away from landslide area • Replace four-legged lattice towers with single tubular poles to reduce differential leg movement • Survey known and potential slide areas to track movement of transmission facilities <p>Bonneville has a Continuity of Operations program, an Outage Coordination Policy, a Wildfire Mitigation Plan, and a Blackstart Coordination Process.</p> <p>Risk management activities that are actively being planned include, but are not limited to:</p> <ul style="list-style-type: none"> • Implement a Material Visibility Initiative to assess what materials are deemed critical and in what quantities they should be held in stock to respond to event-driven demand • Develop a demand planning tool and dashboard to assess and communicate appropriate levels of materials in emergency management stock • Design and construct transmission assets to reduce ignition sources • Replace wood poles with steel poles in areas vulnerable to wildfires • Upgrade older buildings in areas vulnerable to wildfires with fire-resistive materials
3.2	<p>Risk reduction measures must be tolerant to a range of climate hazards and not lock-in conditions that could result in maladaptation.</p>	<p>The 2022 VARP focuses on climate hazards expected over a 20-year timeframe, from 2022 to 2042. The status of resilience measures is reviewed and updated as needed each year, and Bonneville will refresh the VARP every four years. As Bonneville plans for and develops its second VARP assessment, Bonneville intends to refine its methodology, particularly around the measurement of risk, and harmonize this assessment with other ongoing resilience planning efforts. Bonneville will also respond to any future developments in climate modeling for the region in subsequent VARP analysis cycles. Long-term planning periods, annual updates on resilience measures, and regular refresh of the VARP to be responsive to future developments avoid lock-in conditions.</p>

Table B.4. The infrastructure enhances the climate resilience of the defined system it operates within, as indicated by the boundaries of and critical interdependencies with that system as identified in item 1 in this checklist.

No.	Adaptation and resilience checklist for grid and storage infrastructure	Submitted
4.1	<p>Issuers are to assess the climate resilience benefits of system focused assets and activities and demonstrate they are ‘fit for purpose’, in the sense that they enhance climate resilience at a systemic level, with the flexibility to take into account the uncertainty around future climate change impacts.</p> <p>The assessment is conducted according to the principle of best available evidence during the investment period taking into account the infrastructure’s boundaries and critical interdependencies as defined in Criteria 1. ‘Fit for purpose’ is defined as measures that mitigate the following effects:</p> <ul style="list-style-type: none"> (1) the effects of supply disruption or interruption on dependent electricity users or populations; (2) exacerbation of wildfires; (3) relationships of the asset/project to nearby flood zones; (4) reduction in pollinating insects and birds; (5) reduction in biodiversity or High Conservation Value¹² habitat; (6) damage or reduction in value of neighboring property due to boundary structures at risk of falling during storm events; (7) fire and other practices that affect air quality; (8) appropriation of land or economic assets from nearby vulnerable groups¹³; <p>¹² High Conservation Value (HCV) habitat criteria in accordance with https://www.hcvnetwork.org.</p> <p>¹³ According to IFC Performance Standards</p>	<p>Financed improvements to the four substations enhance climate resilience at a systemic level by improving system reliability. Static var compensators at the Maple Valley and Keeler substations serve to stabilize voltage, improve system efficiency, and reduce power losses. The spare transformer at the Slatt substation provides an additional unit for system reliability when maintenance is performed on other units or when outages occur.</p> <p>Multiple system-level initiatives and infrastructure upgrades, including those listed in Criteria 3, enhance reliability and resilience of the system.</p>

Table B.5. The issuance is required to demonstrate that there will be ongoing monitoring and evaluation of the relevance of the risks and resilience measures and related adjustments to those measures will be taken as needed.

No.	Adaptation and resilience checklist for grid and storage infrastructure	Submitted
5.1	Indicators for risks identified under item 2 in this checklist are provided.	Bonneville is required to comply with standards set by the Federal Energy Regulatory Commission (FERC) and North American Electric Reliability Corporation (NERC). Not meeting reliability standards is one of the primary indicators of key climate hazards. As Bonneville plans for and develops its second VARP assessment, Bonneville intends to refine its methodology, particularly around the measurement of risk, and harmonize this assessment with other ongoing resilience planning efforts. The VARP outlines system-specific likelihood and consequence scales to identify the impact that climate hazard events have on critical systems (facilities, fleet, supply chain, transmission, and workforce). Subsequent VARP analysis cycles will expand in scope to include additional systems and will respond to any future developments in climate modeling for the region.
5.2	Indicators for risk mitigation measures identified under item 3 in this checklist are provided.	The 2022 VARP focuses on climate hazards expected over a 20-year timeframe, from 2022 to 2042. The status of resilience/risk mitigation measures is reviewed, and updated as needed, each year, and Bonneville will refresh the VARP every four years.
5.3	Indicators for “fit for purpose” resilience benefit measures identified under item 4 in this checklist are provided.	Indicators and the need for modification of “fit for purpose” resilience measures are identified through annual capital and resource planning and operational performance.
5.4	Issuers have a viable plan to annually monitor (a) climate risks linked to the infrastructure, (b) climate resilience performance, (c) appropriateness of climate resilience measure(s) and to adjust as necessary to address evolving climate risks.	The VARP, Strategic Asset Management Plans, and annual capital and resource planning amount to comprehensive plans to annually monitor climate risks linked to the infrastructure, climate resilience performance, and appropriateness of climate resilience measures. Regular updates ensure that Bonneville can adjust as necessary to address evolving climate risks.
5.5	Where electricity supply has been interrupted, the number of customer interruptions and customer minutes lost (i.e. aggregate duration of supply interruptions) should be measured and reported, together with the cause of the interruption. Any actions taken to reduce the risk of further impacts should also be recorded.	Bonneville provides online reporting of customer service interruptions, transmission line interruptions, and transformer interruptions. Reports include outage durations, causes, and the responsible parties.

Appendix C.

ASSURANCE PROCEDURES FOR USE OF PROCEEDS VERIFICATION (CLIMATE BONDS STANDARD V4.0)

REQUIREMENT	ASSURANCE PROCEDURES PERFORMED BY KESTREL
2.1. Utilization of Proceeds	
2.1.1. Project Documentation	Review documentation of the Nominated Projects assessed as likely to be Eligible Projects, and list of Nominated Projects that Issuer will keep up-to-date during the term of the bond.
2.1.2. Valuation	Review net proceeds of the bond to ensure they are not greater than the value of the project.
2.1.3. Multiple Nominations for Certified Debt Instruments	Review Nominated Projects or distinct portions of the Nominated Projects for previous nominations to other Certified Climate Debt Instruments, green bonds, or other designated instruments. Review and confirm whether Nominated Projects have been refinanced by other Certified Debt Instruments or bonds under assessment will refinance existing Certified Debt Instruments.
2.2. Process for Evaluation and Selection of Projects and Assets	
2.2.1. Process	Review documentation of the process the Issuer followed to identify projects and confirm eligibility requirements for inclusion of Nominated Projects in the bond. Review planning documents which establish goals, priorities and potential impact.
2.2.2. Environmental Statement, Eligibility & Technical Criteria (i.-vi.)	Review additional documentation Issuer provided on further aspects of identification process including strategic directions and standards. Review the Issuer's environmental and social integrity policy, exclusion criteria, and/or Green Bond Framework, and confirm its coverage of the Nominated Projects. Review statement of the climate-related objectives of the bond. Test Nominated Projects to determine whether they meet the minimum technical requirements of the Climate Bonds Standard and relevant Sector Criteria.
2.3. Management of Proceeds	
2.3.1. Documentation of Processes & Procedures	Confirm that policies, processes and procedures for tracking financial flows of bond proceeds to the Nominated Projects are in place.
a. Tracking of Proceeds	Review allocation of funds to ensure they can be tracked against Nominated Projects.
b. Managing of Unallocated Proceeds	Review documentation for the management of bond proceeds for funds prior to allocation to a Nominated Project and review eligible temporary investments for unallocated proceeds.
c. Earmarking Funds	Confirm policies, processes and procedures to identify flows of proceeds related to the Bond have been established.
2.3.2. Ring-Fenced Funds	Where proceeds will be ring-fenced, confirm processes and procedures to allocate funds to accounts, and track and monitor payments from the relevant accounts.
2.4. Pre-Issuance Reporting: Green Finance Framework and Disclosure Documentation	
2.4.1 Bond Disclosure Documentation	Review Issuer's Green Bond Framework and confirm plans to make the document publicly available and provide it to the Climate Bonds Standard Secretariat. Confirm inclusion of necessary information within the Green Bond Framework.
2.4.2. Confirmation of Alignment	In the Green Bond Framework, confirm documentation and review areas of investment align with the Climate Bonds Standard and review statements of alignment with other relevant standards.
i.	
ii. Uses of Proceeds	In the Green Bond Framework, confirm documentation and review expected uses of proceeds and amounts allocated to activities in relevant sectors and subsectors.

REQUIREMENT	ASSURANCE PROCEDURES PERFORMED BY KESTREL
2.4. Pre-Issuance Reporting: Green Finance Framework and Disclosure Documentation <i>(continued)</i>	
iii. Decision-making Process	In the Green Bond Framework, confirm documentation of decision-making processes and positioning in the context of the Issuer's overarching objectives.
iv. Management of Proceeds	In the Green Bond Framework, confirm documentation and review processes for managing proceeds.
v. Reporting and External Review	In the Green Bond Framework, confirm documentation and review processes for reporting and engagement of an Approved Verifier.
2.4.3. Sector Criteria	In the Green Bond Framework, confirm documentation of assumptions and methodologies to evaluate conformance with Sector Criteria.
i. Assumptions and Methodologies	
ii. Temporary Investment Instruments	In the Green Bond Framework, confirm documentation of allowable temporary investment instruments.
iii. Reporting Approach	In the Green Bond Framework, confirm disclosure of intended approach to providing Update Reports and/or undertaking periodic Assurance Engagements during term of bond to reaffirm conformance with the Climate Bonds Standard.
iv. List of Nominated Projects	In the Green Bond Framework, confirm disclosure of list of Nominated Projects likely to be eligible.
v. Refinancing	In the Green Bond Framework, confirm disclosure of proportion of proceeds for refinancing, if applicable.
2.4.4. Transparency	Confirm disclosure is comprehensive and as detailed as possible, given any Issuer or project-specific limitations such as confidentiality.
2.4.5. Disclosure Documentation	Confirm incorporation of key information in Disclosure Documentation.
i. Sector Criteria Disclosure	Confirm "investment areas," or alignment with the Climate Bonds Taxonomy and relevant Sector Criteria for Nominated Projects.
ii. Temporary Investments	Confirm disclosure of eligible temporary investments for unallocated proceeds.
iii. Verifier	Confirm disclosure of Verifier selected for Pre-Issuance and Post-Issuance Engagements.
iv. Ongoing Reporting	Confirm disclosure of intended ongoing reporting on the Nominated Projects and allocation of proceeds.
v. CBI Disclaimer	Confirm incorporation of the CBI Disclaimer as provided in the Certification Agreement.

Appendix D.

VERIFIER'S & ISSUER'S RESPONSIBILITIES

Verifier's Responsibilities

Kestrel's responsibilities for confirming alignment of the Series 2024 Bonds with the Climate Bonds Standard and *Electrical Grids and Storage* Criteria include:

- Assess the uses of proceeds for conformance with relevant Standard and Criteria;
- Assess and certify Bonneville's internal processes and controls, including selection process for projects and assets, internal tracking of proceeds, and the allocation system for funds;
- Assess policies and procedures established by Bonneville for reporting;
- Assess the readiness of Bonneville to meet the Climate Bonds Standard (Version 4.0) and *Electrical Grids and Storage* Sector Criteria; and
- Express a Reasonable Assurance conclusion.

Issuer's Responsibilities

Issuer was responsible for providing detailed information and documents relating to:

- The details of the Nominated Projects and Assets and the project selection process;
- Maintaining adequate records and internal controls designed to support the Climate Bond Pre-Issuance Certification process; and
- The collection, preparation, and presentation of the subject matter in accordance with the Climate Bonds Standard and Criteria.

Independence and Quality Control

Kestrel provides green, social and sustainability bonds services for corporate and municipal issuers. The Kestrel Verification Team is committed to providing robust, transparent, and accurate verifications. For over 20 years Kestrel has been a trusted advisor to state and local governments, nonprofits, and corporations. Kestrel certifies that there is no affiliation, involvement, financial or non-financial interest in the issuer or the projects discussed. We have no affiliation with any bond counsel, bond insurer, credit rating agency, financial advisor firm, municipal advisory firm, or other intermediary. Accredited as an Approved Verifier by the Climate Bonds Initiative, Kestrel is qualified to evaluate bonds against the Climate Bonds Initiative Standards and Criteria.