

Second-Party Opinion

Tennessee Valley Authority

Sustainable Financing Framework



Evaluation Summary

Sustainalytics is of the opinion that the Tennessee Valley Authority Sustainable Financing Framework is credible and impactful and aligns with the Sustainability Bond Guidelines 2021, Green Bond Principles 2021, Social Bond Principles 2021, Green Loan Principles 2021, and Social Loan Principles 2021. This assessment is based on the following:



USE OF PROCEEDS The six eligible categories for the use of proceeds are aligned with those recognized by the Green Bond Principles, Social Bond Principles, Green Loan Principles, and Social Loan Principles. Sustainalytics considers that investments in the eligible categories will lead to positive environmental or social impacts and advance the UN Sustainable Development Goals ("SDGs"), specifically SDGs 7, 9, and 13.



PROJECT EVALUATION / SELECTION Tennessee Valley Authority's Treasury department, along with its internal accounting and other functions, will be responsible for the evaluation and selection of Eligible Sustainable Expenditures. Tennessee Valley Authority's Financial Operations & Performance department, or equivalent functions, will provide oversight. Tennessee Valley Authority has environmental and social risk management processes in place that are applicable to all allocation decisions made under the Framework. Sustainalytics considers this process to be adequate and aligned with market practice.



MANAGEMENT OF PROCEEDS Tennessee Valley Authority's Treasury department, along with its business planning, accounting, and other internal resources, will be responsible for the allocation and tracking of bond proceeds per the criteria defined in the Framework. The unallocated proceeds may be held in cash, cash equivalents or invested in liquid marketable instruments, in accordance with Tennessee Valley Authority's liquidity management policy. This is in line with market practice.



REPORTING Tennessee Valley Authority intends to provide allocation reporting on its website on an annual basis until full allocation, and thereafter in the event of material developments. The allocation reporting is expected to include category-level details on the allocation of proceeds, brief description of eligible projects, and the balance of unallocated proceeds. In addition, Tennessee Valley Authority intends to report on relevant qualitative and quantitative impacts, where feasible, and has provided indicative metrics within the Framework. Sustainalytics views Tennessee Valley Authority's allocation and impact reporting as aligned with market practice.

Evaluation Date	September 9, 2021
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Issuer Location	Knoxville, U.S.
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For inquiries, contact the Sustainable Finance Solutions project team:

Zach Margolis (Toronto)

Project Manager
zach.margolis@sustainalytics.com
(+1) 647 695 4341

Hrithik Sharma (Toronto)

Project Support

Amala Devi (Toronto)

Project Support

Paramjot Kaur (New York)

Client Relations
susfinance.americas@sustainalytics.com
(+1) 646 518 9623

Introduction

Tennessee Valley Authority (“TVA”, or the “Issuer”) is a corporate agency of the U.S. headquartered in Knoxville, Tennessee, which has a population of over 6.8 million.¹ TVA was established in 1933 by federal legislation to improve navigation on the Tennessee River, reduce the damage from destructive flood waters within the Tennessee River system and downstream on the lower Ohio and Mississippi Rivers, further the economic development of TVA’s service area in the south-eastern U.S. and sell the electricity generated at the facilities it operates.

TVA has developed the Tennessee Valley Authority Sustainable Financing Framework (the “Framework”) under which it intends to issue sustainability bonds and/or loans and use the proceeds to finance and/or refinance, in whole or in part, existing and/or future expenditures (the “Eligible Sustainable Expenditures” or the “Eligible Expenditures”) towards eligible projects that are expected to create positive environmental and social impact for the people of the Tennessee Valley. The Framework defines eligibility criteria in six areas:

1. Renewable Energy
2. Energy Efficiency
3. Climate Change Adaptation
4. Green Innovation
5. Access to essential services (electricity) (“Access to Electricity”)
6. Access to essential services (broadband internet) (“Access to Broadband Internet”)

TVA engaged Sustainalytics to review the Tennessee Valley Authority Sustainable Financing Framework, dated September 2021, and provide a Second-Party Opinion on the Framework’s environmental and social credentials and its alignment with the Green Bond Principles 2021 (GBP), Social Bond Principles 2021 (SBP), Sustainability Bond Guidelines 2021 (SBG)², Green Loan Principles 2021 (GLP), and Social Loan Principles 2021 (SLP)³. This Framework has been published in a separate document.⁴

Scope of work and limitations of Sustainalytics’ Second-Party Opinion

Sustainalytics’ Second-Party Opinion reflects Sustainalytics’ independent⁵ opinion on the alignment of the reviewed Framework with the current market standards and the extent to which the eligible project categories are credible and impactful.

As part of the Second-Party Opinion, Sustainalytics assessed the following:

- The Framework’s alignment with the Sustainability Bond Guidelines 2021, Green Bond Principles 2021, and Social Bond Principles 2021, as administered by ICMA, and the Green Loan Principles 2021 and Social Loan Principles 2021, as administered by LMA, APLMA, and LSTA;
- The credibility and anticipated positive impacts of the use of proceeds; and
- The alignment of the issuer’s sustainability strategy and performance and sustainability risk management in relation to the use of proceeds.

For the use of proceeds assessment, Sustainalytics relied on its internal taxonomy, version 1.8, which is informed by market practice and Sustainalytics’ expertise as an ESG research provider.

As part of this engagement, Sustainalytics held conversations with various members of TVA’s management team to understand the sustainability impact of their business processes and planned use of proceeds, as well as management of proceeds and reporting aspects of the Framework. TVA representatives have confirmed (1) they understand it is the sole responsibility of TVA to ensure that the information provided is complete, accurate or up to date; (2) that they have provided Sustainalytics with all relevant information and

¹ U.S. Census Bureau, “Quick Facts- Tennessee”, at: <https://www.census.gov/quickfacts/TN>

² The Green Bond Principles, Social Bond Principles, and Sustainability Bond Guidelines are administered by the International Capital Market Association and are available at <https://www.icmagroup.org/green-social-and-sustainability-bonds/sustainability-bond-guidelines-sbg/>

³ The Green Loan Principles and Social Loan Principles are administered by the Loan Market Association, Asia Pacific Loan Market Association and Loan Syndications & Trading Association and are available at: <https://www.lsta.org/content/green-loan-principles/#> and <https://www.lsta.org/content/social-loan-principles-slp/>

⁴ The Tennessee Valley Authority Sustainable Financing Framework is available on Tennessee Valley Authority’s website at: <https://tva.q4ir.com/esg/>

⁵ When operating multiple lines of business that serve a variety of client types, objective research is a cornerstone of Sustainalytics and ensuring analyst independence is paramount to producing objective, actionable research. Sustainalytics has therefore put in place a robust conflict management framework that specifically addresses the need for analyst independence, consistency of process, structural separation of commercial and research (and engagement) teams, data protection and systems separation. Last but not the least, analyst compensation is not directly tied to specific commercial outcomes. One of Sustainalytics’ hallmarks is integrity, another is transparency.

(3) that any provided material information has been duly disclosed in a timely manner. Sustainalytics also reviewed relevant public documents and non-public information.

This document contains Sustainalytics' opinion of the Framework and should be read in conjunction with that Framework.

Any update of the present Second-Party Opinion will be conducted according to the agreed engagement conditions between Sustainalytics and TVA.

Sustainalytics' Second-Party Opinion, while reflecting on the alignment of the Framework with market standards, is no guarantee of alignment nor warrants any alignment with future versions of relevant market standards. Furthermore, Sustainalytics' Second-Party Opinion addresses the anticipated impacts of eligible projects expected to be financed with bond and loan proceeds but does not measure the actual impact. The measurement and reporting of the impact achieved through projects financed under the Framework is the responsibility of the Framework owner.

In addition, the Second-Party Opinion opines on the potential allocation of proceeds but does not guarantee the realised allocation of the bond and loan proceeds towards eligible activities.

No information provided by Sustainalytics under the present Second-Party Opinion shall be considered as being a statement, representation, warrant or argument, either in favour or against, the truthfulness, reliability or completeness of any facts or statements and related surrounding circumstances that TVA has made available to Sustainalytics for the purpose of this Second-Party Opinion.

Sustainalytics' Opinion

Section 1: Sustainalytics' Opinion on the Tennessee Valley Authority Sustainable Financing Framework

Sustainalytics is of the opinion that the Tennessee Valley Authority Sustainable Financing Framework is credible, impactful and aligns with the four core components of the GBP, SBP, GLP, and SLP. Sustainalytics highlights the following elements of TVA's Sustainability Bond Framework:

- Use of Proceeds:
 - The eligible categories – Renewable Energy, Energy Efficiency, Climate Change Adaptation, Green Innovation, Access to Electricity, and Access to Broadband Internet – are aligned with those recognized by the GBP, SBP, GLP, and SLP.
 - TVA has indicated a two-year look-back period for its refinancing activities, which Sustainalytics considers to be in line with market practice.
 - Under the Renewable Energy category, the Issuer may finance expenditures related to renewable energy projects, in particular, wind and solar power. Sustainalytics views the criteria to be aligned with market practice.
 - Under the Energy Efficiency category, the Framework allows for investments in battery storage and related grid assets. Sustainalytics considers investments in energy storage systems and associated assets to be aligned with market practice.
 - Under the Climate Adaptation category, the Issuer intends to invest in resilient and reliable electricity transmission infrastructure within its service territory⁶ which is specifically intended to withstand the impacts of climate change.
 - Sustainalytics notes that TVA has a comprehensive Climate Adaptation Plan,⁷ through which it mandates vulnerability assessments to identify climate-related impacts and risks for all adaptation projects, followed by a principle-based adaptation plan that speaks to the identified risks and prioritizes efforts in the most vulnerable areas. Sustainalytics views investments in infrastructure adaptation projects based on climate risk identification and mitigation plan to be aligned with market practice.

⁶ TVA document, "County/State TVA Service Territory", at: <https://irp-cdn.multiscreensite.com/d980f98f/files/uploaded/TVA%20Service%20Area%20CountyState%202018.pdf>

⁷ TVA document, "Climate Change Adaptation and Resiliency Plan 2020 Update", at: https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/about-tva/guidelines-reports/climate-statements-plans/2020-climate-adaptation-plan.pdf?sfvrsn=c3506352_2

- Under the Green Innovation category, TVA intends to finance expenditures related to research and development activities, with a primary focus on carbon-free and/or energy-efficient solutions that are aligned with the categories defined in the Framework. TVA has confirmed that it will limit investments under this category to a small percentage of allocated proceeds. Sustainalytics recognizes the positive intent of this category, noting that market practice for R&D initiatives is to specifically target improved environmental outcomes and encouraging TVA to report on specific projects undertaken in this category.
- Under the Access to Electricity category, the Issuer may invest in transmission infrastructure upgrades in rural and/or low-income areas (the “Underserved Areas”) with an aim to enhance system reliability and spur economic development.
 - The Issuer intends to invest in (i) expansion or replacement of transmission lines and associated equipment in the Underserved Areas that help reduce outages, (ii) adding additional delivery points with local power companies in the Underserved Areas, with an aim to create backup feeds for load and add capacity to handle extreme loading events, and (iii) climate resiliency upgrades in the same areas. Sustainalytics recognizes TVA’s intent of providing reliable access to electricity in well-defined underserved regions while also noting that the investments are directly aligned with the Issuer’s primary business function; Sustainalytics considers the criteria to be aligned with market practice.
- For the Access to Broadband Internet category, TVA intends to finance capital expenditures related to providing high-speed, broadband internet infrastructure to rural and/or low-income communities, in particular, the costs related to the deployment of fiber network. Sustainalytics recognizes the need to address the “digital divide” and the potential that increased access to improved digital infrastructures has to promote socioeconomic advancement in rural and low-income communities and considers the criteria for focusing investments on well-defined populations to be aligned with market practice.
- Project Evaluation and Selection:
 - TVA’s Treasury department, along with its internal accounting and other functions, will be responsible for the evaluation and selection of Eligible Expenditures, per the criteria defined in the Framework.
 - The Issuer’s Financial Operations & Performance department, or equivalent functions, will provide oversight on the project evaluation and selection activities through its capital planning process and business planning function.
 - TVA has adopted a comprehensive Climate Adaptation and Resiliency Plan along with other policies and processes to evaluate applicable environmental and social risks, including those that are associated with all allocation decisions made under the Framework. For additional details, see Section 2.
 - Based on the clear delineation of responsibility, Sustainalytics considers this process to be in line with market practice.
- Management of Proceeds:
 - TVA’s Treasury department, along with its business planning, accounting, and other internal resources, will be responsible for the allocation and tracking of bond proceeds per the criteria defined in the Framework.
 - Unallocated proceeds may be held in cash, cash equivalents or invested in liquid marketable instruments, in accordance with TVA’s liquidity management policy. TVA has not disclosed the period over which it intends to achieve full allocation; Sustainalytics considers it market practice that where feasible proceeds be allocated within three years of issuance.
 - Based on the disclosures related to management approaches and the temporary use of unallocated proceeds, Sustainalytics considers this process to be in line with market practice.
- Reporting:
 - TVA intends to report on the allocation and where feasible, the impact of proceeds on its website approximately one year from the date of the bond issuance and annually until full allocation, and thereafter in the event of material developments.
 - Allocation reporting is expected to include category-level details on the allocation of proceeds, brief description of eligible projects, and the balance of unallocated proceeds and will be asserted by TVA’s management.

- Impact reporting is expected to provide category-level impact of the Eligible Expenditures against respective key performance indicators including (i) annual greenhouse gas (“GHG”) emissions avoided, (ii) increase in grid resilience, generation and storage (MWh), and (iii) number of beneficiaries associated with transmission infrastructure upgrade projects.
- Based on TVA’s commitment to allocation reporting and, where feasible, impact reporting, Sustainalytics considers this process to be in line with market practice.

Alignment with Sustainability Bond Guidelines 2021

Sustainalytics has determined that the Tennessee Valley Authority Sustainable Financing Framework aligns with the four core components of the GBP, SBP, GLP, and SLP. For detailed information please refer to Appendix 1: Sustainability Bond/ Sustainability Bond Programme External Review Form.

Section 2: Sustainability Strategy of TVA

Contribution of Framework to the Tennessee Valley Authority’s sustainability strategy

Sustainalytics is of the opinion that TVA demonstrates a commitment to sustainability through its focus on the three key environmental and social areas outlined in its mission: (i) Delivering safe, low cost, reliable power, (ii) Providing responsible stewardship of natural resources and (iii) Creating sustainable economic growth.⁸ TVA’s activities are guided by the TVA Act 1993, which calls upon it to improve the navigability and flood control of the Tennessee River, reforestation and proper use of marginal lands, national defense, and agricultural and industrial development in the Tennessee Valley.⁹ TVA’s Strategic Intent and Guiding Principles provides the direction for all its energy supply and decarbonization initiatives in accordance with its mission and mandate.¹⁰

Sustainalytics highlights the following aspects of the Issuer’s strategy and historical performance for being particularly aligned with the Framework:

- TVA achieved a 63% reduction in its carbon emissions in FY2020, compared with a 2005 baseline. It has set targets to reach an 80% reduction by 2035 and net-zero carbon emissions by 2050.¹¹
- In FY2020, 59% of the energy produced by TVA was carbon free, from nuclear, hydroelectric, solar and wind sources.¹² The total existing and contracted renewable energy capacity reached 7,044 megawatts in the same year, with close to 1,600 megawatts in solar capacity alone.¹³ In addition, TVA plans to add 10,000 megawatts of solar by 2035.¹⁴
- TVA has a comprehensive portfolio of renewable energy programs (called TVA Green) and energy efficiency programs (called TVA EnergyRight) for its residential and business customers. As of FY2020, the programs under TVA Green accounted for over 300 gigawatt-hours in green power sales¹⁵ and those under TVA EnergyRight accounted for around 50 gigawatt-hours in energy efficiency savings.¹⁶
- TVA has also set a target to have 200,000 electric vehicles (EV) in the Tennessee Valley by 2028 from 16,000 in 2020, resulting in almost 1 million metric tons of CO₂ savings per year.¹⁷ In November 2020, the TVA Board approved the development of a new EV Policy with a new commercial rate structure to support electric vehicle charging infrastructure. It is also actively involved in creating a

⁸ TVA report, “FY2020 Sustainability Report”, (p7), at: <https://www.tva.com/environment/environmental-stewardship/sustainability/sustainability-report>

⁹ TVA website, “Tennessee Valley Authority Act”, at: https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/default-document-library/site-content/about-tva/tva_act.pdf?sfvrsn=99c2b8c4_0

¹⁰ TVA website, “TVA Strategic Intent and Guiding Principles”, at: https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/about-tva/board-of-directors/may-6-2021/strategic-plan-document/c67079e2-d479-4f3d-a13b-1fa6fd714cde.pdf?sfvrsn=bc7bb2e8_7

¹¹ TVA report, “FY2020 Sustainability Report”, (p15), at: <https://www.tva.com/environment/environmental-stewardship/sustainability/sustainability-report>

¹² TVA website, “Our Power System”, at: <https://www.tva.com/energy/our-power-system>

¹³ TVA report, “Renewables Highlights Fiscal Year 2020”, at: https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/energy/valley-renewable-energy/renewables_highlight_report-4-8-2134530957-c68e-4495-b045-b799893d3f97.pdf?sfvrsn=df252df_3

¹⁴ TVA report, “FY2020 Sustainability Report”, (p17), at: <https://www.tva.com/environment/environmental-stewardship/sustainability/sustainability-report>

¹⁵ TVA report, “Renewables Highlights Fiscal Year 2020”, at: https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/energy/valley-renewable-energy/renewables_highlight_report-4-8-2134530957-c68e-4495-b045-b799893d3f97.pdf?sfvrsn=df252df_3

¹⁶ TVA report, “EnergyRight 2020 Highlights Report”, at: https://prod.tva-ers.media.energyright.com/wp-content/uploads/2021/03/EnergyRight_HighlightsReport2020.pdf

¹⁷ TVA report, “FY2020 Sustainability Report”, (p13), at: <https://www.tva.com/environment/environmental-stewardship/sustainability/sustainability-report>

network of charging stations in partnership with state agencies, local power companies and developers, creating awareness tools and programs for consumers and building coalitions.¹⁸

- TVA actively plans for and manages the risks posed by climate change in its operations. TVA's 2020 Climate Change Adaptation and Resilience Plan, developed in accordance with the U.S. Federal Government's Fourth National Climate Assessment provides a comprehensive overview of the climate change risks and operational vulnerabilities faced by TVA in the short- and long-term, and the programs and policies in place to mitigate them.¹⁹
- TVA has a specific focus on promoting small and diverse businesses in its supply chain and tracks its own performance in promoting such businesses. In FY2020, it spent USD 8.44 million with small businesses and USD 388 million with diverse businesses.²⁰

Sustainalytics is of the opinion that the Tennessee Valley Authority Sustainable Financing Framework is aligned with the Issuer's overall sustainability strategy and initiatives and will further the Issuer's action on its key environmental priorities.

Well-positioned to address common environmental and social risks associated with the projects

While Sustainalytics recognizes that the use of proceeds from the Framework will be directed towards eligible projects that are expected to have positive environmental and social impact, Sustainalytics is aware that such eligible projects could also lead to negative environmental and social outcomes. Some key environmental and social risks associated with the eligible projects, could include land use and biodiversity issues associated with large-scale infrastructure development, emissions, effluents, and waste generated in construction and stakeholder participation.

- Land-use and biodiversity: TVA manages 293,000 acres of public land and 11,000 miles of shoreline for integrated operation of the TVA reservoir, power systems, for activities that enhance the economic opportunities in the region and for public recreation purposes.²¹ TVA's strategy to manage this land is set by its Land Policy and operationalized through its Reservoir Land Management Plans. It also actively addresses issues such as shoreline stabilization, protection of archeological and historically important sites and preservation of wildlife in its land and projects.²²
- Environmental management: Under its 2020 Environmental Policy, TVA commits to produce reliable, affordable, and increasingly clean energy, proactive stewardship of the Tennessee River system and public lands and support sustainable economic growth in the region.²³ TVA maintains an Environmental Management System to reduce its environmental footprint and foster continuous improvement. Under its Environmental Policy, TVA establishes goals, measures progress and reports performance against six environmental goals - climate change mitigation, air quality improvement, water resource monitoring, waste minimization, environmental reviews and sustainable land use and natural resource management.²⁴ TVA also complies with applicable laws and regulations. For example, as part of its environmental reviews, it complies with the National Environmental Policy Act which requires federal agencies to consider the effects of their projects on human and natural environment before finalization.²⁵
- Stakeholder participation: TVA has various channels to collect and address stakeholder feedback, including public meetings and open houses, hearings, ratepayer complaint resolution process, ombudsman, and direct interactions and internet communications.²⁶ TVA also has two Advisory Councils - Regional Energy Resource Council and Regional Resource Stewardship Council for public and private sectors to provide inputs on energy and environmental stewardship issues. The Council members are nominated by the governors of the seven states in TVA's service area, distributors of TVA power, TVA's directly served customers and other stakeholders.²⁷

¹⁸ TVA website, "Electric Vehicles", at: <https://www.tva.com/energy/technology-innovation/electric-vehicles>

¹⁹ TVA report, "Climate Change Adaptation and resilience Plan 2020 Update", at: https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/about-tva/guidelines-reports/climate-statements-plans/2020-climate-adaptation-plan.pdf?sfvrsn=c3506352_2

²⁰ TVA report, "FY2020 Sustainability Report", (p37), at: <https://www.tva.com/environment/environmental-stewardship/sustainability/sustainability-report>

²¹ TVA report, "FY2020 Sustainability Report", (p25), at: <https://www.tva.com/environment/environmental-stewardship/sustainability/sustainability-report>

²² TVA website, "Land Management", at: <https://www.tva.com/environment/environmental-stewardship/land-management>

²³ TVA website, "Environmental Policy", at: <https://www.tva.com/environment/environmental-stewardship/land-management>

²⁴ *Ibid.*

²⁵ TVA website, "NEPA at TVA", at: <https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-at-tva>

²⁶ TVA website, "Ombudsman", at: <https://www.tva.com/about-tva/ombudsman>

²⁷ TVA website, "About TVA", at: <https://www.tva.com/about-tva>

In addition to the above, TVA has an Enterprise Risk Council (“ERC”) which is responsible for the highest level of risk oversight. TVA’s Chief Sustainability Officer and the Chief Risk Officer are both members of its Risk Management Steering Committee that reports to the ERC. The Chief Risk Officer also heads the Enterprise Risk Management business unit, that establishes risk management policies and guidelines and conducts risk assessments.²⁸ In line with its statutory requirements as a government-owned corporation, TVA also has governance structures in place to ensure accountability. Aside from oversight from its Board of Directors, TVA is accountable to the Congress, Government Accountability Office, Office of Management and Budget, the U.S. Treasury and the Office of the Inspector General. In addition, it also reports against the standards laid out by the Global Reporting Initiative, CDP (formerly the Carbon Disclosure Project), Edison Electric Institute, Electric Power Research Institute, the Whitehouse Council for Environment Quality and the Task Force on Climate-Related Disclosures.

Based on these policies, standards and assessments, Sustainalytics is of the opinion that TVA has implemented adequate measures and is well-positioned to manage and mitigate environmental and social risks commonly associated with the eligible categories.

Section 3: Impact of Use of Proceeds

All six use of proceeds categories are aligned with those recognized by GBP, SBP, GLP or SLP. Sustainalytics has focused on two below where the impact is specifically relevant in the local context.

Importance of renewable energy in the U.S.

The electricity sector is the second largest source of GHG emissions in the U.S., accounting for 25% of total GHG emissions in 2019.²⁹ As of 2020, 60% of the electricity generation in the U.S. comes from fossil fuels such as natural gas, coal and petroleum.³⁰ From 1990 to 2019, GHG emissions from electricity generation decreased by 12% as a result of the increase in renewable energy and energy efficiency.³¹ While renewable energy accounted for just 20% of the total electricity generated in 2020,³² between 2014 and 2019, wind and solar contributed to 58% of all new generating capacity added to the U.S. grids.³³ In April 2021, the Federal Government set a goal to reach 100% carbon-free electricity by 2035,³⁴ and this is expected to further add to the momentum for renewable energy in the U.S. TVA’s efforts towards increasing the share of renewable energy in its network (as detailed in Section 2) are likely to contribute towards this federal target.

Sustainalytics is of the opinion that the use of proceeds for increasing renewable energy is expected to support the clean energy transition in the U.S and have positive environmental impacts.

Importance of reliable and climate-resilient power systems in the U.S.

Weather-related events account for over 80% of power outages in the U.S.³⁵ In the decade between 2003 and 2012, the U.S. saw a doubling in the number of weather-related power outages, affecting an average of 15 million households and businesses annually.³⁶ Extreme weather events can include high winds, thunderstorms, hurricanes, heat waves, intense cold periods, intense snow events and ice storms, and extreme rainfall.³⁷ Climate change is expected to exacerbate such events, disrupting power generation, transmission, distribution as well as demand.³⁸ For example, in March 2021, over four million people in Texas were affected by grid failures and the resulting blackouts, spurred by extreme cold weather conditions that

²⁸ TVA report, “FY2020 Sustainability Report”, (p7), at: <https://www.tva.com/environment/environmental-stewardship/sustainability/sustainability-report>

²⁹ U.S. Environmental Protection Agency website, “Sources of Greenhouse Gas Emissions”, at: <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#electricity>

³⁰ U.S. Energy Information Administration website, “Electricity Explained”, at: <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us.php>

³¹ U.S. Environmental Protection Agency website, “Sources of Greenhouse Gas Emissions”, at: <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#electricity>

³² U.S. Energy Information Administration website, “Electricity Explained”, at: <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us.php>

³³ Bolinger, M. (2020), “Utility-Scale Wind and Solar in the U.S.: Comparative Trends in Deployment, Cost, Performance, Pricing, and Market Value”, Lawrence Berkeley National Laboratory, at: https://emp.lbl.gov/sites/default/files/webinars/bolinger_webinar_december_8_2020_16x9.pdf

³⁴ The White House website, “FACT SHEET: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies”, at: <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/>

³⁵ Keward, A. & Raja, U. (2014), “Blackout: Extreme Weather, Climate Change And Power Outages”, Climate Central, at: <https://www.ourenergypolicy.org/wp-content/uploads/2014/04/climate-central.pdf>

³⁶ *Ibid.*

³⁷ U.S Department of Energy report, transforming the nation’s electricity system: the second installment of the QER”, (2017), at:

<https://www.energy.gov/sites/prod/files/2017/02/f34/Quadrennial%20Energy%20Review--Second%20Installment%2028Full%20Report%29.pdf>

³⁸ U.S. Government Accountability Office, “Electricity Grid Resilience: Climate Change Is Expected to Have Far-reaching Effects and DOE and FERC Should Take Actions”, at: <https://www.gao.gov/assets/gao-21-346.pdf>

simultaneously affected the demand and supply of electricity in the state.³⁹ In addition, the U.S. also faces an aging electricity infrastructure that is more vulnerable to disruptions. The average thermal power plant in the U.S. is over 30 years old and more than 70% of transmission lines and transformers are over 25 years old.⁴⁰

Power grid reliability varies considerably across regions, and grid failures can disproportionately affect underserved and marginalized populations.⁴¹ The loss of power during extreme weather events can lead to ripple effects such as costs of lost output and wages, spoiled inventory and restarting operations.⁴² The U.S. Department of Energy reports that between 2003 and 2012, weather-related outages cost USD 18 to 33 billion per year.⁴³ A 2021 report by the U.S. Government Accountability Office calls for the development for strategies to identify and assess climate risks to the power grids and enhance grid resilience.⁴⁴ TVA integrates climate adaptation and resilience in its own operational and regional level planning efforts and conducts detailed assessment of risks and resilience measures, as laid out in its 2020 Climate Adaptation Plan.⁴⁵

Based on the above context, Sustainalytics is of the opinion that TVA's efforts to build resilience and reliability of its electricity infrastructure based on detailed assessments are expected to have positive environmental and social impacts.

³⁹ Plumer, B. (2021), "A Glimpse of America's Future: Climate Change Means Trouble for Power Grids", The New York Times, at: <https://www.nytimes.com/2021/02/16/climate/texas-power-grid-failures.html>

⁴⁰ Dyson, M. & Li, B. (2020), "Reimagining Grid Resilience: A Framework For Addressing Catastrophic Threats to the US Electricity Grid in an Era of Transformational Change", Rocky Mountain Institute, at: https://rmi.org/wp-content/uploads/2020/07/reimagining_grid_resilience.pdf

⁴¹ Center for American Progress website, "Advancing Equity Through Grid Modernization", at: <https://www.americanprogress.org/issues/green/news/2021/04/28/498839/advancing-equity-grid-modernization/>

⁴² Davis, M. & Clemmer, S. (2014), "Power Failure: How Climate Change Puts Our Electricity at Risk—and What We Can Do", Union of Concerned Scientists, at: <https://www.ucsusa.org/sites/default/files/2019-10/Power-Failure-How-Climate-Change-Puts-Our-Electricity-at-Risk-and-What-We-Can-Do.pdf>

⁴³ Dyson, M. & Li, B. (2020), "Reimagining Grid Resilience: A Framework For Addressing Catastrophic Threats to the US Electricity Grid in an Era of Transformational Change", Rocky Mountain Institute, at: https://rmi.org/wp-content/uploads/2020/07/reimagining_grid_resilience.pdf

⁴⁴ U.S. Government Accountability Office, "Electricity Grid Resilience: Climate Change Is Expected to Have Far-reaching Effects and DOE and FERC Should Take Actions", at: <https://www.gao.gov/assets/gao-21-346.pdf>

⁴⁵ TVA report, "Climate Change Adaptation and resilience Plan 2020 Update", at: https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/about-tva/guidelines-reports/climate-statements-plans/2020-climate-adaptation-plan.pdf?sfvrsn=c3506352_2

Alignment with/contribution to SDGs

The SDGs were set in September 2015 by the United Nations General Assembly and form an agenda for achieving sustainable development by the year 2030. The bonds issued under the Tennessee Valley Authority Sustainable Financing Framework advances the following SDGs and targets:

Use of Proceeds Category	SDG	SDG target
Renewable Energy	7. Affordable and clean energy	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix
Energy Efficiency		7.3 By 2030, double the global rate of improvement in energy efficiency
Climate Change Adaptation	13. Climate Action	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
Green Innovation	9. Industry, innovation and infrastructure	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
Access to essential services (electricity)	7. Affordable and Clean Energy	7.1 By 2030, ensure universal access to affordable, reliable and modern energy services
Access to essential services (broadband Internet)	9. Industry, innovation and infrastructure	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

Conclusion

TVA has developed the Tennessee Valley Authority Sustainable Financing Framework under which it may issue sustainability bonds and/or loans and use the proceeds to finance and/or refinance Eligible Expenditures towards eligible projects that are expected to create positive environmental and social impact for the people of the Tennessee Valley. Sustainalytics considers that the projects funded by the sustainability bond proceeds are expected to provide positive environmental and social impact.

The Framework outlines a process by which proceeds will be tracked, allocated, and managed, and commitments have been made for reporting on the allocation and impact of the use of proceeds. Furthermore, Sustainalytics believes that the Framework is aligned with the overall sustainability strategy of the company and that the use of proceed categories will contribute to the advancement of the UN SDGs 7, 9, and 13. Additionally, Sustainalytics is of the opinion that TVA has adequate measures to identify, manage and mitigate environmental and social risks commonly associated with the eligible projects funded by the use of proceeds.

Based on the above, Sustainalytics is confident that Tennessee Valley Authority is well-positioned to issue sustainability bonds and that the Framework is robust, transparent, and in alignment with the four core components of the Green Bond Principles (2021), Social Bond Principles (2021), Green Loan Principles (2021), and Social Loan Principles (2021).

Appendix

Appendix 1: Sustainability Bond / Sustainability Bond Programme - External Review Form

Section 1. Basic Information

Issuer name:	Tennessee Valley Authority
Sustainability Bond ISIN or Issuer Sustainability Bond Framework Name, if applicable:	Tennessee Valley Authority Sustainable Financing Framework
Review provider's name:	Sustainalytics
Completion date of this form:	September 9, 2021
Publication date of review publication:	

Section 2. Review overview

SCOPE OF REVIEW

The following may be used or adapted, where appropriate, to summarise the scope of the review.

The review assessed the following elements and confirmed their alignment with the GBP and SBP:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Use of Proceeds | <input checked="" type="checkbox"/> Process for Project Evaluation and Selection |
| <input checked="" type="checkbox"/> Management of Proceeds | <input checked="" type="checkbox"/> Reporting |

ROLE(S) OF REVIEW PROVIDER

- | | |
|---|--|
| <input checked="" type="checkbox"/> Consultancy (incl. 2 nd opinion) | <input type="checkbox"/> Certification |
| <input type="checkbox"/> Verification | <input type="checkbox"/> Rating |
| <input type="checkbox"/> Other (<i>please specify</i>): | |

Note: In case of multiple reviews / different providers, please provide separate forms for each review.

EXECUTIVE SUMMARY OF REVIEW and/or LINK TO FULL REVIEW (*if applicable*)

Please refer to Evaluation Summary above.

Section 3. Detailed review

Reviewers are encouraged to provide the information below to the extent possible and use the comment section to explain the scope of their review.

1. USE OF PROCEEDS

Overall comment on section *(if applicable)*:

The six eligible categories for the use of proceeds are aligned with those recognized by the Green Bond Principles, Social Bond Principles, Green Loan Principles, and Social Loan Principles. Sustainalytics considers that investments in the eligible categories will lead to positive environmental or social impacts and advance the UN Sustainable Development Goals ("SDGs"), specifically SDGs 7, 9, and 13.

Use of proceeds categories as per GBP:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Renewable energy | <input checked="" type="checkbox"/> Energy efficiency |
| <input type="checkbox"/> Pollution prevention and control | <input type="checkbox"/> Environmentally sustainable management of living natural resources and land use |
| <input type="checkbox"/> Terrestrial and aquatic biodiversity conservation | <input type="checkbox"/> Clean transportation |
| <input type="checkbox"/> Sustainable water and wastewater management | <input checked="" type="checkbox"/> Climate change adaptation |
| <input type="checkbox"/> Eco-efficient and/or circular economy adapted products, production technologies and processes | <input type="checkbox"/> Green buildings |
| <input type="checkbox"/> Unknown at issuance but currently expected to conform with GBP categories, or other eligible areas not yet stated in GBPs | <input checked="" type="checkbox"/> Other (please specify): Green Innovation |

If applicable please specify the environmental taxonomy, if other than GBPs:

Use of proceeds categories as per SBP:

- | | |
|---|---|
| <input type="checkbox"/> Affordable basic infrastructure | <input checked="" type="checkbox"/> Access to essential services |
| <input type="checkbox"/> Affordable housing | <input type="checkbox"/> Employment generation (through SME financing and microfinance) |
| <input type="checkbox"/> Food security | <input type="checkbox"/> Socioeconomic advancement and empowerment |
| <input type="checkbox"/> Unknown at issuance but currently expected to conform with SBP categories, or other eligible areas not yet stated in SBP | <input type="checkbox"/> Other (please specify): |

If applicable please specify the social taxonomy, if other than SBP:

2. PROCESS FOR PROJECT EVALUATION AND SELECTION

Overall comment on section (if applicable):

Tennessee Valley Authority's Treasury department, along with its internal accounting and other functions, will be responsible for the evaluation and selection of Eligible Sustainable Expenditures, per the criteria defined in

the Framework. Tennessee Valley Authority's Financial Operations & Performance department, or equivalent functions, will provide oversight. Tennessee Valley Authority has environmental and social risk management processes in place that are applicable to all allocation decisions made under the Framework. Sustainalytics considers this process to be adequate and aligned with market practice.

Evaluation and selection

- | | |
|---|---|
| <input checked="" type="checkbox"/> Credentials on the issuer's social and green objectives | <input checked="" type="checkbox"/> Documented process to determine that projects fit within defined categories |
| <input checked="" type="checkbox"/> Defined and transparent criteria for projects eligible for Sustainability Bond proceeds | <input checked="" type="checkbox"/> Documented process to identify and manage potential ESG risks associated with the project |
| <input type="checkbox"/> Summary criteria for project evaluation and selection publicly available | <input type="checkbox"/> Other (please specify): |

Information on Responsibilities and Accountability

- | | |
|--|--|
| <input checked="" type="checkbox"/> Evaluation / Selection criteria subject to external advice or verification | <input type="checkbox"/> In-house assessment |
| <input type="checkbox"/> Other (please specify): | |

3. MANAGEMENT OF PROCEEDS

Overall comment on section *(if applicable)*:

Tennessee Valley Authority's Treasury department, along with its business planning, accounting, and other internal resources, will be responsible for the allocation and tracking of bond proceeds per the criteria defined in the Framework. The unallocated proceeds may be held in cash, cash equivalents or invested in liquid marketable instruments, in accordance with Tennessee Valley Authority's liquidity management policy. This is in line with market practice.

Tracking of proceeds:

- | |
|---|
| <input checked="" type="checkbox"/> Sustainability Bond proceeds segregated or tracked by the issuer in an appropriate manner |
| <input checked="" type="checkbox"/> Disclosure of intended types of temporary investment instruments for unallocated proceeds |
| <input type="checkbox"/> Other (please specify): |

Additional disclosure:

- | | |
|---|---|
| <input type="checkbox"/> Allocations to future investments only | <input checked="" type="checkbox"/> Allocations to both existing and future investments |
|---|---|

- | | |
|---|---|
| <input type="checkbox"/> Allocation to individual disbursements | <input type="checkbox"/> Allocation to a portfolio of disbursements |
| <input checked="" type="checkbox"/> Disclosure of portfolio balance of unallocated proceeds | <input type="checkbox"/> Other (please specify): |

4. REPORTING

Overall comment on section (if applicable):

Tennessee Valley Authority intends to provide allocation reporting on its website on an annual basis until full allocation, and thereafter in the event of material developments. The allocation reporting is expected to include category-level details on the allocation of proceeds, brief description of eligible projects, and the balance of unallocated proceeds. In addition, Tennessee Valley Authority intends to report on relevant qualitative and quantitative impacts, where feasible, and has provided indicative metrics within the Framework. Sustainalytics views Tennessee Valley Authority's allocation and impact reporting as aligned with market practice.

Use of proceeds reporting:

- | | |
|--|--|
| <input type="checkbox"/> Project-by-project | <input checked="" type="checkbox"/> On a project portfolio basis |
| <input type="checkbox"/> Linkage to individual bond(s) | <input type="checkbox"/> Other (please specify): |

Information reported:

- | | |
|---|---|
| <input checked="" type="checkbox"/> Allocated amounts | <input type="checkbox"/> Sustainability Bond financed share of total investment |
| <input type="checkbox"/> Other (please specify): | |

Frequency:

- | | |
|--|--------------------------------------|
| <input checked="" type="checkbox"/> Annual | <input type="checkbox"/> Semi-annual |
| <input type="checkbox"/> Other (please specify): | |

Impact reporting:

- | | |
|--|--|
| <input type="checkbox"/> Project-by-project | <input checked="" type="checkbox"/> On a project portfolio basis |
| <input type="checkbox"/> Linkage to individual bond(s) | <input type="checkbox"/> Other (please specify): |

Information reported (expected or ex-post):

- | | |
|---|--|
| <input checked="" type="checkbox"/> GHG Emissions / Savings | <input checked="" type="checkbox"/> Energy Savings |
| <input type="checkbox"/> Decrease in water use | <input checked="" type="checkbox"/> Number of beneficiaries |
| <input type="checkbox"/> Target populations | <input checked="" type="checkbox"/> Other ESG indicators (please specify): Expenditures spent on fiber deployment that enable highspeed, broadband internet access |

Frequency:

- ☒ Annual
 ☐ Semi-annual
☐ Other (please specify):

Means of Disclosure

- ☐ Information published in financial report
 ☐ Information published in sustainability report
☐ Information published in ad hoc documents
 ☒ Other (please specify): Issuer's website
☐ Reporting reviewed (if yes, please specify which parts of the reporting are subject to external review):

Where appropriate, please specify name and date of publication in the useful links section.

USEFUL LINKS (e.g. to review provider methodology or credentials, to issuer's documentation, etc.)**SPECIFY OTHER EXTERNAL REVIEWS AVAILABLE, IF APPROPRIATE****Type(s) of Review provided:**

- ☐ Consultancy (incl. 2nd opinion)
 ☐ Certification
☐ Verification / Audit
 ☐ Rating
☐ Other (please specify):

Review provider(s):**Date of publication:****ABOUT ROLE(S) OF REVIEW PROVIDERS AS DEFINED BY THE GBP AND THE SBP**

- i. Second-Party Opinion: An institution with sustainability expertise that is independent from the issuer may provide a Second-Party Opinion. The institution should be independent from the issuer's adviser for its Sustainability Bond framework, or appropriate procedures such as information barriers will have been implemented within the institution to ensure the independence of the Second-Party Opinion. It normally entails an assessment of the alignment with the Principles. In particular, it can include an assessment of the issuer's overarching objectives, strategy, policy, and/or processes relating to sustainability and an evaluation of the environmental and social features of the type of Projects intended for the Use of Proceeds.
- ii. Verification: An issuer can obtain independent verification against a designated set of criteria, typically pertaining to business processes and/or sustainability criteria. Verification may focus on alignment with internal or external standards or claims made by the issuer. Also, evaluation of the environmentally or socially sustainable features of underlying assets may be termed verification and may reference external criteria. Assurance or attestation regarding an issuer's internal tracking method for use of proceeds, allocation of funds from Sustainability Bond proceeds, statement of environmental or social impact or alignment of reporting with the Principles may also be termed verification.
- iii. Certification: An issuer can have its Sustainability Bond or associated Sustainability Bond framework or Use of Proceeds certified against a recognised external sustainability standard or label. A standard or label defines

specific criteria, and alignment with such criteria is normally tested by qualified, accredited third parties, which may verify consistency with the certification criteria.

- iv. Green, Social and Sustainability Bond Scoring/Rating: An issuer can have its Sustainability Bond, associated Sustainability Bond framework or a key feature such as Use of Proceeds evaluated or assessed by qualified third parties, such as specialised research providers or rating agencies, according to an established scoring/rating methodology. The output may include a focus on environmental and/or social performance data, process relative to the Principles, or another benchmark, such as a 2-degree climate change scenario. Such scoring/rating is distinct from credit ratings, which may nonetheless reflect material sustainability risks.

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