Second-Party Opinion

Renesas Electronics Corporation Green Bond Framework

Evaluation Summary

Sustainalytics is of the opinion that the Renesas Electronics Corporation Green Bond Framework is credible and impactful and aligns to the four core components of the Green Bond Principles 2021. This assessment is based on the following:

USE OF PROCEEDS The eligible categories for the use of proceeds – Clean Transportation, Energy Efficiency, Renewable Energy, and Sustainable Water and Wastewater Management – are aligned with those recognized by the Green Bond Principles. Sustainalytics considers that investments in the eligible categories will lead to positive environmental impacts and advance the UN Sustainable Development Goals, specifically SDGs 6, 7 and 11.

PROJECT EVALUATION / SELECTION Automotive Solution Business Unit, IoT and Infrastructure Business Unit, Sustainability Promotion Office, and Chief Technology Officer will evaluate and select Eligible Green Projects based on compliance with the Framework's eligibility criteria, alignment with Renesas' sustainability objectives, and applicable national and international environmental standards and regulations. The final decision will be made by the Chief Financial Officer. Renesas Electronics Corporation has internal procedures in place to identify and manage environmental and social risks which are applicable to all allocation decisions made under the Framework. Sustainalytics considers these risk management systems to be adequate and the project selection process to be in line with market practice.

MANAGEMENT OF PROCEEDS The Treasury team will manage the allocated and unallocated amounts of the proceeds using a separate register of Eligible Green Projects on an annual basis. The Company will ensure a level of allocation to the Eligible Green Projects portfolio that matches or exceeds the amount equal to the net proceeds from outstanding green bonds. Pending full allocation, proceeds will be held in cash, cash equivalents, short-term investments, or used to repay existing borrowings. This is in line with market practice.

REPORTING Renesas Electronics Corporation intends to report on allocation and where feasible, impact of proceeds on its website on an annual basis until full allocation. Allocation reporting will include the amount of proceeds allocated to Eligible Green Projects at a bond level and a category level, and the balance of unallocated proceeds. Sustainalytics views Renesas Electronics Corporation's allocation and impact reporting as aligned with market practice.

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Issuer Location	Tokyo, Japan

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Introduction

Renesas Electronics Corporation ("Renesas", or the "Company") is a Japan-based company that manufactures and distributes semiconductor components and other products for use in the areas of automotive, communications, healthcare, high-performance computing, home and building, industrial, and personal electronics. Its product portfolio includes microcontroller units (MCUs) and microprocessor units (MPUs), embedded systems platform, insulated-gate bipolar transistors (IGBT), intelligent power devices (IPD), thyristors, transistors, diodes, analog integrated circuits, and optoelectronics products.

Renesas has developed the Renesas Electronics Corporation Green Bond Framework (the "Framework") under which it intends to issue green bonds and use the proceeds to finance and/or refinance, in whole or in part, existing and/or future projects that generate environmental benefits. The Framework defines eligibility criteria in four areas:

1. Clean Transportation
    a. Smart Electric Vehicles Solutions
    b. Smart Autonomous Drive Solutions
2. Energy Efficiency
    a. Smart Data Center Solutions
    b. Smart Cellular Solutions
    c. Smart Society Solutions
    d. Green Devices and Technology
3. Renewable Energy
4. Sustainable Water and Wastewater Management

Renesas engaged Sustainalytics to review the Renesas Electronics Corporation Green Bond Framework, dated November 2021, and provide a Second-Party Opinion on the Framework's environmental credentials and its alignment with the Green Bond Principles 2021 (GBP).[1] This Framework has been published in a separate document.[2]

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

Sustainalytics' Second-Party Opinion reflects Sustainalytics' independent[3] 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 Green Bond Principles 2021, as administered by ICMA;
- 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 1.11.1, 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 Renesas 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. Renesas representatives have confirmed (1) they understand it is the sole responsibility of Renesas to ensure that the information provided is complete, accurate or up to date; (2) that they have provided Sustainalytics with all relevant information and (3) that any

[1] The Green Bond Principles are administered by the International Capital Market Association and are available at https://www.icmagroup.org/green-social-and-sustainability-bonds/green-bond-principles-gbp/.
[2] The Renesas Electronics Corporation Green Bond Framework is available on Renesas Electronics Corporation's website at: https://www.renesas.com/us/en/about/company/sustainability
[3] 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.

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 Renesas.

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 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 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 Renesas has made available to Sustainalytics for the purpose of this Second-Party Opinion.

Sustainalytics' Opinion

Section 1: Sustainalytics' Opinion on the Renesas Electronics Corporation Green Bond Framework

Sustainalytics is of the opinion that the Renesas Electronics Corporation Green Bond Framework is credible and impactful, and aligns to the four core components of the GBP. Sustainalytics highlights the following elements of the Framework:

- Use of Proceeds:
  - The eligible categories – Clean Transportation, Energy Efficiency, Renewable Energy, and Sustainable Water and Wastewater Management – are aligned with those recognized as impactful by the GBP.
  - The majority of green bond proceeds is intended to be invested in research and development (R&D) activities. Sustainalytics considers R&D activities to have the potential to drive positive environmental outcomes, while noting that it is more difficult to quantify the direct impacts of R&D related activities until commercialization. Against the backdrop of this nature of R&D, Sustainalytics considers the allocation of the proceeds into R&D to be aligned with market practice only if the investments have reasonable assurance of implementation, as well as achievement of measurable impact in the near-term. Sustainalytics views positively the R&D activities of Renesas' Framework, based primarily on the following:
    - The Framework defines specific technological areas, and the product types within each area, that are to be the focus of R&D expenditures, which are outlined in the paragraphs below. Refer to Section 3 for further discussion of the impacts of the specific R&D programs which may be financed.
    - Renesas has disclosed the anticipated and/or targeted outcomes for its R&D initiatives in each of the areas described in the Framework, through either percentage savings or a qualitative description of expected outcomes/products.
    - Renesas has a demonstrated track record of successfully implementing new and advanced technology, and the specific products targeted by the Framework for R&D activity are noted to be in deployment and/or near commercial stage.
  - Under the Clean Transportation category, Renesas may allocate green bond proceeds to technologies and components used for manufacturing and running electrified vehicles and improving the energy efficiency performance of automobiles. Sustainalytics views these activities to be in line with market practice, while noting the following considerations:

- Smart Electric Vehicles Solutions: Renesas' activities in this area relate to battery management and inverters for electrified vehicles including fully electric and hybrid automobiles. Sustainalytics considers components intended to be used only in electric vehicles (EVs) to have positive environmental impacts, and to be fully aligned with market practice for clean transportation. However, Renesas has informed Sustainalytics that components may be applied to Hybrid vehicles (HVs) with direct emissions of more than 75 g CO_2/p-km per passenger transport, which do not align with international trajectories for low-carbon transportation. [4] Nevertheless, as Renesas' investments are focused on improving the performance of electrical systems within these vehicles, thus enabling a lesser reliance on fossil fuel combustion, these investments are viewed positively.
- Smart Autonomous Drive Solutions: Sustainalytics notes that Autonomous driving (AD), and Advanced driver assistance system (ADAS) can be applied to all types of vehicles, including those with internal combustion engines. However, these technologies have the potential to provide significant energy savings,[5] [6] as well as improved road safety, and do not constitute a "lock-in" of fossil fuel based technologies, and should therefore be considered to have net-positive impacts.

– Under the Energy Efficiency category, the Framework defines a number of "application domains" in which Renesas will focus the R&D activities financed by its green bonds, all of which aim to promote the development of products which enable energy savings or are themselves more energy efficient:
  - Smart Data Center Solutions: Through provision of new types of Random Access Memory (RAM) with Renesas' high-bandwidth interface, the next generation of data centers are expected to be able to improve bandwidth power efficiency by approximately 20%. Sustainalytics views positively the expected impact of these investments.
  - Smart Cellular Solutions: While recognizing that the expansion of 5G networks will potentially increase the overall electricity demand, Sustainalytics views positively the contribution of those technologies to improving energy efficiency. Renesas' research activities in this area relate to improved performance of wireless network base stations, in particular, beamformer solutions as well as Timing, Clock Distribution products. According to Renesas' internal data, a new type of its beamformer expects to lower power consumption by 33%. Due to the continued expansion of wireless communications such as 5G networks, which have greater power demands, investments in this area have the potential to provide meaningful energy savings.
  - Smart Society Solutions: Renesas' semiconductors and sensor solutions enhance energy efficiency of various end applications and systems such as renewable energy, building automation, factory automation, IoT, home appliance, etc. In each of these application areas, Renesas anticipates double-digit percentage improvement in energy efficiency resulting from its products. Based on the potential magnitude of energy savings that could be achieved, Sustainalytics considers the development of these enabling technologies to be aligned with market practice.
  - Green Devices and Technology: Renesas promotes Eco-Product Initiatives, in which the Company provides environmentally-conscious semiconductors throughout the product lifecycle, from procurement and usage, to disposal. Renesas labels its products as "Renesas Green Devices" when a target product improves environmental performance such as energy savings and product safety by more than 10% compared to previous generations of products, based on the Company's internal assessments. In addition, products with over 40% improvement in the environmental performance are certified as "Renesas Super Green Devices". In addition, one of the examples of Renesas' green technology is the SOTB (Silicon on Thin Buried Oxide) process. The technology allows for both low active and standby currents, expecting to reduce the amount of energy

[4] Sustainalytics considers an emissions threshold in CO_2 emitted per person-kilometer of mobility, as proposed by the IEA Mobility Model, to be indicative of compliance with a 2-degree warming scenario.
[5] It is estimated that ADAS systems can generate 30-45% energy savings, with system-wide savings of up to 60% technically feasible with full network implementation.) (Chen et al., 2017) Refer: https://www.osti.gov/biblio/1409303
[6] Center for Sustainable Systems, University of Michigan. 2021. "Autonomous Vehicles Factsheet." Pub. No. CSS16-18., at: https://css.umich.edu/factsheets/autonomous-vehicles-factsheet

required by 80% while running, and 50% while on standby compared to prior micro controller units (MCUs).

- Renesas' green bonds may also finance investments related to improving the environmental performance of the Company's activities. Specifically, these may include:
  - Reduction of Scope 2 Green House Gas emissions:
    - Renesas may finance expenditures related to the purchase of Green Electricity, or renewable energy. The Company has confirmed to Sustainalytics that the energy sources will be identifiable and do not include any nuclear power, and that positive environmental impacts will be created by making five-year or longer-term procurement.
    - Renesas may allocate proceeds to on-site and off-site solar energy projects. Sustainalytics views this class of investments to be impactful and aligned with market practice.
    - In terms of energy efficiency measures, including new construction and refurbishment of manufacturing facilities, Sustainalytics views positively the intention of these investments, while noting that market practice includes specifying thresholds for improvement and/or specific types of upgrades, and encouraging project-by-project reporting to provide assurance to investors on the impact of projects financed.
  - Reduction of total water withdrawal through improved water recycling projects: Investments in the water recycling systems, which expect to enhance the recycling efficiency by approximately 20% (against the 2020 level with the Company's production volume at its factories being equal), are eligible as they are not for treatment of wastewater from fossil fuel operations.
- Under the Framework, the Company has set exclusionary criteria and committed that it will not allocate proceeds to projects that support the production or transaction of alcohol, gambling, tobacco, weapon, firearm, nuclear power, pornography or genetically modified food, projects that involve forced and/or child labor, illegal business or activities under local laws or regulations, or inappropriate activities including bribery, blackmail, and conversion.

- Project Evaluation and Selection:
  - Potential Eligible Green Projects will be proposed by the Sustainability Promotion Office, Chief Technology Officer Office, Corporate Strategy & Finance Division and Environment Promotion Department. Automotive Solution Business Unit, IoT and Infrastructure Business Unit, Sustainability Promotion Office, and Chief Technology Officer will evaluate and select Eligible Green Projects based on compliance with the Framework's eligibility criteria, alignment with Renesas' sustainability objectives, and applicable national and international environmental standards and regulations. The final decision will be made by the Chief Financial Officer.
  - Renesas has in place environmental and social risk management processes that are applicable to all allocation decisions made under the Framework. Sustainalytics considers these processes to be adequate. Refer to Section 2 for additional details.
  - Based on the defined process for project evaluation and selection and the presence of risk management processes, Sustainalytics considers this process to be in line with market practice.
- Management of Proceeds:
  - Renesas' Treasury team will manage the allocated and unallocated amounts of the proceeds using a spreadsheet to maintain a register of Eligible Green Projects on an annual basis. The Company will maintain a level of allocation to the Eligible Green Projects portfolio that matches or exceeds the amount equal to the net proceeds from outstanding green bonds.
  - Pending full allocation, proceeds may be held in accordance with the Company's treasury liquidity practices, in cash, cash equivalents, short-term investments, or used to repay existing borrowings. Regarding the repayment of existing borrowings, Renesas has confirmed to Sustainalytics that it will not refinance debt that is directly linked to activities/assets that are inherently emissions-intensive. The Company has also committed to completing the allocation of proceeds within 36 months from the respective issuance date.
  - Based on the commitment to maintaining an Eligible Green Projects portfolio, and the disclosure of temporary instruments for the proceeds, Sustainalytics considers this process to be in line with market practice.
- Reporting:

- Renesas intends to report on allocation and where feasible, impact of proceeds annually, until full allocation of proceeds, and thereafter in a timely manner in the event of significant changes. The reporting will be made available on its website.
- Allocation reporting will include to the extent feasible, the total amount of proceeds allocated to Eligible Green Projects, the allocated amount to Eligible Green Projects at a category level, and the balance of unallocated proceeds.
- Where feasible, Renesas will report on environmental impacts of the projects funded with the green bond proceeds, and may include qualitative and/or case-study reports on outcomes and impacts of the projects.
- Based on the annual allocation and impact reporting commitment, Sustainalytics considers Renesas' reporting to be in line with market practice.

Alignment with Green Bond Principles 2021

Sustainalytics has determined that the Renesas Electronics Corporation Green Bond Framework aligns to the four core components of the GBP. For detailed information please refer to Appendix 1: Green Bond/Green Bond Programme External Review Form.

Section 2: Sustainability Strategy of Renesas

Contribution of framework to Renesas Electronics Corporation's sustainability strategy

Renesas has defined Eco-Factory, Eco-Product, and Eco-Communication Initiatives as the three cornerstones of its environmental activities, and aims to contribute to a sustainable society through the provision of innovative technologies and products while minimizing the environmental impact of its own business activities.[7] [8]

As part of its Eco-Product Initiatives, Renesas is committed to developing products and solutions that can contribute to a long-term sustainable society through energy efficiency, robust safety and security, and so on.[9] Additionally, the Company is working to create environmentally-conscious products, by assessing the environmental impact of its products at all stages of their life cycle. Products are classified as "Renesas Green Device" if environmental performance is improved by 10% or more in the three categories of resources, energy and chemical substances compared to the indexed product. The Company is aiming to increase the percentage of these devices in the newly mass-produced products.[10] [11]

In order to reduce the negative environmental impact of its business activities, Renesas has set a goal of reducing GHG emissions by 60% from 2013 levels by 2030, and achieving carbon neutrality by 2050.[12] Moreover, as part of its Eco-Factory Initiatives, the Company participates in the "Action Plan for Low Carbon Society", which is an initiative undertaken by the Japanese electrical and electronics industry. Renesas sets out a target to reducing its energy intensity against revenue by 1% every year. The Company plans to achieve its reduction targets by implementing measures at its production sites such as improving equipment efficiency, inverter control, and installing solar panels.[13]

Based on the above, Sustainalytics is of the opinion that the Framework is aligned with the Company's overall sustainability strategy and the use of proceeds will further Renesas' initiatives on its key environmental priorities.

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

While Sustainalytics recognizes that the net proceeds from the bonds issued under the Framework will be directed towards research and development projects that are expected to have positive environmental impact, Sustainalytics is aware that the semiconductor industry is associated with negative environmental and social risks. Some key environmental and social risks that can arise from the projects financed under the Framework are the consumption of large amounts of resources such as energy, chemicals, and water in the

[7] Renesas Electronics Corporation, "Environmental Initiatives", at: https://www.renesas.com/jp/en/about/company/sustainability/environment
[8] Renesas Electronics Corporation, "Products and Solutions", at: https://www.renesas.com/jp/en/about/company/sustainability/products-and-solutions
[9] Renesas Electronics Corporation, "Products and Solutions", at: https://www.renesas.com/jp/en/about/company/sustainability/products-and-solutions
[10] Renesas Electronics Corporation, "Eco-Product Initiatives", at: https://www.renesas.com/jp/en/about/company/sustainability/eco-product
[11] Renesas Electronics Corporation, "Environmental Initiatives", at: https://www.renesas.com/jp/en/about/company/sustainability/environment
[12] Renesas Electronics Corporation, "Climate Change Initiatives", at: https://www.renesas.com/jp/en/about/company/sustainability/climate-change
[13] Renesas Electronics Corporation, "Climate Change Initiatives", at: https://www.renesas.com/jp/en/about/company/sustainability/climate-change

manufacturing process, generation of hazardous waste, emission of harmful substances, issues related to workers health and safety as well as supply chain risks.

Sustainalytics is of the opinion that Renesas is able to manage and/or mitigate potential risks through implementation of the following:

- Renesas maintains environmental management systems at each of its bases, and has obtained ISO 14001 certification, an international standard for environmental management systems, for all its production sites. Internal environmental audits are conducted annually for continuous improvement of the environmental management systems. [14]
- To ensure workers health and safety, Renesas sets out its Basic Policy on Disaster Prevention, Health and Safety. Health and safety management teams, composed of health and safety officers, have been established at each site and group companies in Japan, and health and safety officers have been appointed at sites outside Japan.[15]
- Renesas monitors the amount of water taken by each water source and the recycling rate at all of its sites. Additionally, Renesas conducts water stress analysis using World Resources Institute (WRI)'s Aqueduct Water Risk Atlas,[16] and commits to reducing the amount of water withdrawn at production sites located in areas identified with high water risk.[17]
- For the management of chemical substances in the manufacturing process, Renesas has established internal guidelines to ensure compliance with environmental laws and in-house regulations related to chemical substances. The Company has classified chemical substances into four categories: "prohibited," "to be reduced," "to managed," and "composition," and is working to properly manage and reduce their use.[18]
- In order to identify risks in the supply chain, Renesas requires its key suppliers to conduct self-assessment using Responsible Business Alliance (RBA)'s Self-Assessment Questionnaire (SAQ),[19] a risk-assessment tool to evaluate supply chain risks in the area of labor, health and safety, environment, and ethics. Renesas also requires all suppliers to comply with its Supplier Code of Conduct[20], which outlines Renesas' standards in the areas of 1) labor, 2) health and safety, 3) environment, 4) ethics, and 5) management systems. Furthermore, the Company is committed to responsible sourcing of minerals with reference to the OECD Due Diligence Guidelines for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas.[21] [22]

Based on these policies, standards and assessments, Sustainalytics is of the opinion that Renesas 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 use of proceeds categories are aligned with those recognized by the GBP. Sustainalytics has focused on the following where the impact is specifically relevant to the global context as well as Renesas' operations.

Importance of Clean Transportation

In 2018, the amount of CO_2 emissions from the global transportation sector was approximately 8.2 Gt, which accounted for around 24% of energy-related CO_2 emissions.[23] By means of transportation, road vehicles (passengers and freight) account for nearly three-quarters of CO_2 emissions from the sector.[24] According to the International Transport Forum (ITF), in order to limit the global average temperature rise to 1.5°C, CO_2

[14] Renesas Electronics Corporation, "Environmental Initiatives", at: https://www.renesas.com/jp/en/about/company/sustainability/environment
[15] Renesas Electronics Corporation, "Safe and Healthy Working Environment", at: https://www.renesas.com/jp/en/about/company/sustainability/health-and-safety
[16] World Resources Institute, "Aqueduct Water Risk Atlas", at: https://www.wri.org/applications/aqueduct/water-risk-atlas/#/?advanced=false&basemap=hydro&indicator=w_awr_def_tot_cat&lat=30&lng=-80&mapMode=view&month=1&opacity=0.5&ponderation=DEF&predefined=false&projection=absolute&scenario=optimistic&scope=baseline&timeScale=annual&year=baseline&zoom=3
[17] Renesas Electronics Corporation, "Conserving Water", at: https://www.renesas.com/jp/en/about/company/sustainability/water
[18] Renesas Electronics Corporation, "Chemical Substance Use", at: https://www.renesas.com/jp/en/about/company/sustainability/chemical-substances
[19] Responsible Business Alliance, "Self-Assessment Questionnaire (SAQ)", at: http://www.responsiblebusiness.org/tools/saq-faqs/
[20] Renesas Electronics Corporation, "Renesas Supplier Code of Conduct", at: https://www.renesas.com/us/en/document/oth/renesas-supplier-code-conduct?language=en&r=488011&r=1400486
[21] Renesas Electronics Corporation, "Supply Chain", at: https://www.renesas.com/jp/en/about/company/sustainability/supply-chain
[22] OECD, "OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas", at: https://www.oecd.org/corporate/mne/mining.htm
[23] International Energy Agency (IEA), "Tracking Transport 2020", at: https://www.iea.org/reports/tracking-transport-2020
[24] International Energy Agency (IEA), "Transport", at: https://www.iea.org/topics/transport

emissions from the transportation sector need to be reduced by 70% from the 2015 level by 2050. [25] Furthermore, the IEA's "Net Zero by 2050—A Roadmap for the Global Energy Sector" states that, to achieve the goal of net-zero emissions by 2050 on a global level, the market share of zero-emission vehicles, including electric vehicles and fuel cell vehicles, must be increased from 5% (2020) to 64% by 2030 and 100% by 2050. [26]

Under the Clean Transportation category, Renesas intends to invest green bond proceeds for the development of semiconductors used to manufacture and run electrified vehicles. Renesas' focus areas include extending the driving range and battery life. Through its investments, the Company aims to addresses "range anxiety", the fear of the battery running dead while driving, a major factor in influencing drivers away from electric vehicles. [27] The Company's internal data has shown that, Renesas' MCUs used for controlling Battery Management System (BMS), achieves 60-65% of reduction in power consumption compared with competitor's products. Renesas will also invest green bond proceeds in its development of Autonomous driving (AD) and Advanced Driver Assistance Systems (ADAS). In addition to the safety benefits of reducing collisions caused by driver error, AD and ADAS can also improve energy efficiency and reduce CO_2 emissions by assisting the driver in moving the car more efficiently, optimizing the use of engine and battery power.[28] As an example, Renesas' processor line will contribute to sensing, decision making, body control and infotainment for Level 3 and 4 autonomous driving.

Considering the above, Sustainalytics views that Renesas' use of proceeds under the Clean Transportation category is expected to generate positive environmental impact by promoting low and zero-emission vehicles and the emission reduction in the global transportation sector.

Building Automation and IoT in Home Appliances for Increased Energy Efficiency in Buildings

CO_2 emissions from buildings (indirect emissions from power generation are considered) reached a record high of 10 Gt in 2019, accounting for 28% of the world's total emissions.[29] While the floor area of the world's buildings has been increasing at an annual rate of around 2.5% since 2010, energy consumption per unit of building floor (final energy consumption per square meter) has been decreasing at an annual rate of 0.5% to 1%, meaning that the improvement of buildings' energy efficiency has been below the rate of increase in floor area.[30] According to the Sustainable Development Scenario (SDS),[31] published by the International Energy Agency (IEA) to depict the steps to achieve the Paris Agreement climate goals, energy consumption per unit must be reduced by at least 2.5% annually to limit the temperature rise up to 1.5°C. It is therefore indispensable to improve new and existing buildings' energy efficiency as measures to address climate change.

Under the Energy Efficiency category, Renesas may allocate proceeds to R&D activities of solutions and technologies for building automation and IoT in home appliances. Building automation and IoT in home appliances enable effective control and monitoring for heating, ventilating, cooling, hot water, lighting and other functions, which improve energy efficiency in buildings.[32] Renesas provides sensors, MCUs and MPUs needed to control and operate automation such as the RZ product lines for controlling building automation, with about 2.7 times improvement in performance per unit of power compared to previous products. Regarding IoT in home appliances, Renesas provides the RL78, RX, and RA product lines from its MCU portfolio that reduce power consumption by 30% compared to previous products.

Sustainalytics views positively that Renesas' use of proceeds related to building automation and IoT in home appliances are impactful as the financing is expected to contribute to the reduction of energy consumption as well as CO_2 emissions from buildings worldwide.

[25] International Transport Forum, "Executive Summary ITF Transport Outlook 2021" at: https://www.itf-oecd.org/sites/default/files/transport-outlook-executive-summary-2021-english.pdf
[26] International Energy Agency (IEA), "Net Zero by 2050 A Roadmap for the Global Energy Sector", at : https://iea.blob.core.windows.net/assets/beceb956-0dcf-4d73-89fe-1310e3046d68/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf
[27] The Drive, Americans Cite Range Anxiety, Cost as Largest Barriers for New EV Purchases, February 2019, at: https://www.thedrive.com/news/26637/americans-cite-range-anxiety-cost-as-largest-barriers-for-new-ev-purchases-study
[28] Center for Sustainable Systems, University of Michigan. 2021. "Autonomous Vehicles Factsheet." Pub. No. CSS16-18., at: https://css.umich.edu/factsheets/autonomous-vehicles-factsheet
[29] International Energy Agency (IEA)," Tracking Buildings 2020", at: https://www.iea.org/reports/tracking-buildings-2020
[30] International Energy Agency (IEA)," Tracking Buildings 2020", at: https://www.iea.org/reports/tracking-buildings-2020
[31] International Energy Agency (IEA),"Report extract Sustainable Development Scenario", at: https://www.iea.org/reports/world-energy-model/sustainable-development-scenario
[32] "Impact of Building Automation Control Systems on Energy Efficiency-University Building Case Study", at: https://www.researchgate.net/publication/321722887_Impact_of_Building_Automation_Control_Systems_on_Energy_Efficiency-University_Building_Case_Study

Improvement of the energy efficiency of data centers and communications networks

Looking at global electricity demand in 2019, data networks consumed 250 TWh, or 1% of global electricity use, while data centers consumed 200 TWh, or 0.8%.[33] Global IP traffic (data traffic) increased by about 12.1 times from 2010 to 2019,[34] and is expected to reach 4.8 Zettabyte by 2022, a 3.2-time increase from 2017.[35] With an increase in data traffic, the demand for communications networks and data centers is expected to increase. In order to curb the increase in power consumption and CO_2 emissions from information and communications infrastructure, continuous improvement of energy efficiency is required.

In the "Greenhouse gas emissions trajectories for the information and communication technology (ICT) sector compatible with the UNFCCC Paris Agreement,"[36] which outlines recommendations for the ICT industry to comply with the Paris Agreement, the International Telecommunication Union (ITU) requires the entire industry to reduce GHG emissions by 45% from 2020 levels by 2030. One of the specific measures for decarbonization of the industry that ITU illustrates is improving energy efficiency in communications networks and data centers.

In the Energy Efficiency category, Renesas may allocate proceeds to R&D activities for solutions for data centers that improve bandwidth power efficiency, as well as products for the Innovative Optical and Wireless Network (IOWN) concept, a next-generation communication infrastructure that could significantly improve electricity efficiency.[37] Renesas may also allocate the proceeds to the development of 5G and post-5G infrastructure and projects related to Smart Cellular Solutions, in particular, products and solutions which aim to improve power efficiency in 5G networks.

Sustainalytics considers that Renesas' use of proceeds will deliver environmental benefits by contributing to reduce power consumption of data centers and communications networks, whose demands are expected to grow.

Alignment with/contribution to SDGs

The Sustainable Development Goals (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 Renesas Electronics Corporation Green Bond Framework advances the following SDGs and targets:

Use of Proceeds Category	SDG	SDG target
Clean Transportation	11. Sustainable cities and communities	11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons
Energy Efficiency	7. Affordable and Clean Energy	7.3 By 2030, double the global rate of improvement in energy efficiency
Renewable Energy	7. Affordable and clean energy	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix
Sustainable Water and Wastewater Management	6. Clean water and sanitation	6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

[33] International Energy Agency (IEA), "Data Centers and Data Transmission Networks", at: https://www.iea.org/reports/data-centres-and-data-transmission-networks
[34] International Energy Agency (IEA), "Data Centers and Data Transmission Networks", at: https://www.iea.org/reports/data-centres-and-data-transmission-networks
[35] Cisco, "Cisco Visual Networking Index: Forecast and Trends, 2017–2022", at: https://twiki.cern.ch/twiki/pub/HEPIX/TechwatchNetwork/HtwNetworkDocuments/white-paper-c11-741490.pdf
[36] International Telecommunication Union (ITU), "Greenhouse gas emissions trajectories for the information and communication technology sector compatible with the UNFCCC Paris Agreement", at: https://www.itu.int/rec/T-REC-L.1470-202001-I
[37] IOWN Global Forum, "Innovative Optical and Wireless Network", at: https://iowngf.org/

Conclusion

Renesas has developed the Renesas Electronics Corporation Green Bond Framework under which it may issue green bonds and use the proceeds to finance projects related to Clean Transportation, Energy Efficiency, Renewable Energy, and Sustainable Water and Wastewater Management. Sustainalytics considers that the projects funded by the green bond proceeds are expected to have provide positive environmental impact.

The Renesas Electronics Corporation Green Bond 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 Renesas Electronics Corporation Green Bond Framework is aligned with the overall sustainability strategy of the company and that the green use of proceeds categories will contribute to the advancement of the UN Sustainable Development Goals 6, 7 and 11. Additionally, Sustainalytics is of the opinion that Renesas has adequate measures to identify, manage and mitigate environmental and social risks commonly associated with the eligible projects funded by the proceeds.

Based on the above, Sustainalytics is confident that Renesas Electronics Corporation is well-positioned to issue green bonds and that the Renesas Electronics Corporation Green Bond Framework is robust, transparent, and in alignment with the four core components of the Green Bond Principles 2021.

Appendix

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

Section 1. Basic Information

Issuer name:	Renesas Electronics Corporation
Green Bond ISIN or Issuer Green Bond Framework Name, if applicable:	Renesas Electronics Corporation Green Bond Framework
Review provider's name:	Sustainalytics
Completion date of this form:	November 11, 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:

☒	Use of Proceeds	☒	Process for Project Evaluation and Selection
☒	Management of Proceeds	☒	Reporting

ROLE(S) OF REVIEW PROVIDER

☒	Consultancy (incl. 2nd opinion)	☐	Certification
☐	Verification	☐	Rating
☐	Other *(please specify)*:		

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 eligible categories for the use of proceeds Clean Transportation, Energy Efficiency, Renewable Energy, and Sustainable Water and Wastewater Management are aligned with those recognized by the Green Bond Principles. Sustainalytics considers that investments in the eligible categories will lead to positive environmental impacts and advance the UN Sustainable Development Goals, specifically SDGs 6, 7, and 11.

Use of proceeds categories as per GBP:

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

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

2. PROCESS FOR PROJECT EVALUATION AND SELECTION

Overall comment on section (if applicable):

Automotive Solution Business Unit, IoT and Infrastructure Business Unit, Sustainability Promotion Office, and Chief Technology Officer will evaluate and select Eligible Green Projects based on compliance with the Framework's eligibility criteria, alignment with Renesas' sustainability objectives, and applicable national and international environmental standards and regulations. The final decision will be made by the Chief Financial Officer. Renesas Electronics Corporation has internal procedures in place to identify and manage environmental and social risks which are applicable to all allocation decisions made under the Framework. Sustainalytics considers these risk management systems to be adequate and the project selection process to be in line with market practice.

Evaluation and selection

☒	Credentials on the issuer's environmental sustainability objectives	☒	Documented process to determine that projects fit within defined categories
☒	Defined and transparent criteria for projects eligible for Green Bond proceeds	☒	Documented process to identify and manage potential ESG risks associated with the project

☒ Summary criteria for project evaluation and selection publicly available

☐ Other *(please specify):*

Information on Responsibilities and Accountability

☒ Evaluation / Selection criteria subject to external advice or verification

☐ In-house assessment

☐ Other (please specify):

3. MANAGEMENT OF PROCEEDS

Overall comment on section *(if applicable)*:

The Treasury team will manage the allocated and unallocated amounts of the proceeds using a separate register of Eligible Green Projects on an annual basis. The Company will ensure a level of allocation to the Eligible Green Projects portfolio that matches or exceeds the amount equal to the net proceeds from outstanding green bonds. Pending full allocation, proceeds will be held in cash, cash equivalents, short-term investments, or used to repay existing borrowings. This is in line with market practice.

Tracking of proceeds:

☒ Green Bond proceeds segregated or tracked by the issuer in an appropriate manner

☒ Disclosure of intended types of temporary investment instruments for unallocated proceeds

☐ Other *(please specify)*:

Additional disclosure:

☐ Allocations to future investments only

☒ Allocations to both existing and future investments

☐ Allocation to individual disbursements

☒ Allocation to a portfolio of disbursements

☒ Disclosure of portfolio balance of unallocated proceeds

☐ Other *(please specify)*:

4. REPORTING

Overall comment on section (if applicable):

Renesas Electronics Corporation intends to report on allocation and where feasible, impact of proceeds on its website on an annual basis until full allocation. Allocation reporting will include the amount of proceeds allocated to Eligible Green Projects at a bond level and a category level, and the balance of unallocated proceeds. Sustainalytics views Renesas Electronics Corporation's allocation and impact reporting as aligned with market practice.

Use of proceeds reporting:

☐ Project-by-project
☒ On a project portfolio basis
☐ Linkage to individual bond(s)
☐ Other *(please specify):*

Information reported:

☒ Allocated amounts
☐ Green Bond financed share of total investment
☒ Other *(please specify):* Balance of unallocated proceeds

Frequency:

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

Impact reporting:

☒ Project-by-project
☐ On a project portfolio basis
☐ Linkage to individual bond(s)
☐ Other (please specify):

Information reported (expected or ex-post):

☐ GHG Emissions / Savings
☐ Energy Savings
☐ Decrease in water use
☒ Other ESG indicators (please specify): Qualitative and/or case-study reports on outcomes and impacts of the projects funded

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): Published in the Company'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 INDEPENDENT REVIEW PROVIDERS AS DEFINED BY THE GBP

i. Second-Party Opinion: An institution with environmental expertise, that is independent from the issuer may issue a Second-Party Opinion. The institution should be independent from the issuer's adviser for its Green 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 Green Bond Principles. In particular, it can include an assessment of the issuer's overarching objectives, strategy, policy and/or processes relating to environmental sustainability, and an evaluation of the environmental 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 environmental criteria. Verification may focus on alignment with internal or external standards or claims made by the issuer. Also, evaluation of the environmentally 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 Green Bond proceeds, statement of environmental impact or alignment of reporting with the GBP, may also be termed verification.

iii. Certification: An issuer can have its Green Bond or associated Green Bond framework or Use of Proceeds certified against a recognised external green 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 Bond Scoring/Rating: An issuer can have its Green Bond, associated Green 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 performance data, the process relative to the GBP, or another benchmark, such as a 2-degree climate change scenario. Such scoring/rating is distinct from credit ratings, which may nonetheless reflect material environmental risks.

Disclaimer

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Sustainalytics, a Morningstar Company, is a leading ESG research, ratings and data firm that supports investors around the world with the development and implementation of responsible investment strategies. The firm works with hundreds of the world's leading asset managers and pension funds who incorporate ESG and corporate governance information and assessments into their investment processes. The world's foremost issuers, from multinational corporations to financial institutions to governments, also rely on Sustainalytics for credible second-party opinions on green, social and sustainable bond frameworks. In 2020, Climate Bonds Initiative named Sustainalytics the "Largest Approved Verifier for Certified Climate Bonds" for the third consecutive year. The firm was also recognized by Environmental Finance as the "Largest External Reviewer" in 2020 for the second consecutive year. For more information, visit www.sustainalytics.com.