°CICERO Shades of Green

Reykjavik Energy (OR)
Green Financing Second Opinion

November 18, 2021

Reykjavik Energy (OR) is Iceland's largest energy provider, servicing around two-thirds of the Icelandic population with electricity and hot water for heating. OR also provides additional services through its subsidiaries ON Power (energy generation with two geothermal plants and one small hydro plant), Veitur (utilities and distribution, and sewage systems), Ljósleiðarinn (the fiber network), and Carbfix (carbon capture and storage).

Nearly half of the proceeds will be attributed to the renewable energy project category, and around one third to the energy distribution infrastructure and management project category. The remaining share of proceeds is expected to be attributed to sustainable land use/environmental management, clean transportation, sustainable water and wastewater management, carbon capture and storage, and information and communication. The latter includes fiber optic cables, which is the most energy efficient technology for broadband access networks. OR has invested in technology development, such as CarbFix, which, as of today, recaptures and stores 35% of OR's largest geothermal plant's emissions. The issuer aims to increase the capacity to 95% of emissions stored from two of its plants by 2030. The issuer further mentioned that purchase of fuel, vehicles, and heavy machinery which runs on fossil fuels are excluded.

OR aims to become carbon neutral by 2030 via its carbon capture and storage technology, and has set specific and ambitious targets to reach this goal. This is an improvement since the previous framework as OR aimed to reduce greenhouse gas emissions by 60% by 2030. OR's approach to project identification, screening and approval is thorough and technically sound. On reporting, OR already issues an integrated annual report that uses quantitative indicators. OR will continue to report on annual allocation and impacts. The allocation of financing to eligible assets will be categorized by project categories, where OR will analyse the balance sheet showing the percentage of eligible assets allocated green financing. This balance sheet approach may however complexify how the administrative and finance costs are reported. OR already considers long-term climate resilience, and aims to report in line with the TCFD recommendations as of 2021.

Based on the overall assessment of the eligibility criteria in this framework, governance and transparency considerations, and the prioritized use of proceeds, the framework receives a **CICERO Dark Green** shading and a governance score of **Excellent.** CICERO encourages OR to continue its efforts to transition towards a fully electric fleet of vehicles, as 59% of its actual fleet are diesel vehicles, and to request GHG reporting from suppliers.

SHADES OF GREEN

Based on our review, we rate Reykjavik Energy's green financing framework **CICERO Dark Green Green.**

Included in the overall shading is an assessment of the governance structure of the green financing framework. CICERO Shades of Green finds the governance procedures in Reykjavik Energy's framework to be **Excellent**.

GREEN BOND AND LOAN PRINCIPLES

Based on this review, this Framework is found to be aligned with the principles.

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1 Terms and methodology

This note provides CICERO Shades of Green's (CICERO Green) second opinion of the client's framework dated September 2021**.** This second opinion remains relevant to all green bonds and/or loans issued under this framework for the duration of three years from publication of this second opinion, as long as the framework remains unchanged. Any amendments or updates to the framework require a revised second opinion. CICERO Green encourages the client to make this second opinion publicly available. If any part of the second opinion is quoted, the full report must be made available.

The second opinion is based on a review of the framework and documentation of the client's policies and processes, as well as information gathered during meetings, teleconferences and email correspondence.

Expressing concerns with 'Shades of Green'

CICERO Green second opinions are graded dark green, medium green or light green, reflecting a broad, qualitative review of the climate and environmental risks and ambitions. The shading methodology aims to provide transparency to investors that seek to understand and act upon potential exposure to climate risks and impacts. Investments in all shades of green projects are necessary in order to successfully implement the ambition of the Paris agreement. The shades are intended to communicate the following:

CICERO Shades of Green	Examples
Dark green is allocated to projects and solutions that correspond to the long-term vision of a low carbon and climate resilient future. Fossil-fueled technologies that lock in long-term emissions do not qualify for financing. Ideally, exposure to transitional and physical climate risk is considered or mitigated.	Wind energy projects with a strong governance structure that integrates environmental concerns
Medium green is allocated to projects and solutions that represent steps towards the long-term vision, but are not quite there yet. Fossil-fueled technologies that lock in long-term emissions do not qualify for financing. Physical and transition climate risks might be considered.	Bridging technologies such as plug-in hybrid buses
Light green is allocated to projects and solutions that are climate friendly but do not represent or contribute to the long-term vision. These represent necessary and potentially significant short-term GHG emission reductions, but need to be managed to avoid extension of equipment lifetime that can lock-in fossil fuel elements. Projects may be exposed to the physical and transitional climate risk without appropriate strategies in place to protect them.	Efficiency investments for fossil fuel technologies where clean alternatives are not available

Sound governance and transparency processes facilitate delivery of the client's climate and environmental ambitions laid out in the framework. Hence, key governance aspects that can influence the implementation of the green bond are carefully considered and reflected in the overall shading. CICERO Green considers four factors in its review of the client's governance processes: 1) the policies and goals of relevance to the green bond framework; 2) the selection process used to identify and approve eligible projects under the framework, 3) the management of proceeds and 4) the reporting on the projects to investors. Based on these factors, we assign an overall governance grade: Fair, Good or Excellent. Please note this is not a substitute for a full evaluation of the governance of the issuing institution, and does not cover, e.g., corruption.

2 Brief description of Reykjavik Energy (OR)'s green financing framework and related policies

Reykjavik Energy (OR) is Iceland's largest energy provider, servicing around two-thirds of the Icelandic population with electricity and hot water for heating. OR also provides potable water, operates sewerages, and has an optical fibre network. OR is responsible for the management of geothermal and water resources the company utilizes, and is the parent-company of the following subsidiaries: ON Power (energy generation with two geothermal plants and one small hydro plant), Veitur (utilities and distribution, and sewage systems), Ljósleiðarinn (the fiber network), and Carbfix (carbon capture and storage). OR is a partnership of – and is owned by - three municipalities. The partners are the City of Reykjavík (~93.5%), the Township of Akranes (~5.5%), and the Municipality of Borgarbyggð (~1%).

OR has now updated its 2019 Green Bond Framework with a new green financing framework, intended to allow issuance of more types of debt financing, not only limited to bonds but also commercial papers, and loans (together referred to as green instruments), to finance eligible assets.

Environmental Strategies and Policies

One of OR's environmental priorities is to become carbon neutral by 2030. This is an improvement since the previous framework as OR aimed to reduce greenhouse gas emissions by 60% between 2015 and 2030. OR aims to reach this carbon neutrality target through the implementation of a carbon reduction strategy and goal set across emission categories across the subsidiaries for scope 1, 2, and 3. Other decarbonization activities being undertaken by OR include transitioning the company's vehicle fleet to zero-emission vehicles, incorporating emissions into business flight decision making, the establishment of a sewage cleaning station to separate sewage waste for improved management, as well as the use and expansion of CarbFix to sequester emissions from OR's geothermal power plants. Any remaining emissions (mostly from car fleet and flights) will be offset in 2030 using certified offsetting schemes according to the issuer. The Icelandic wetland reclamation fund scheme[1] is expected to be the selected carbon credit scheme, according to the issuer.

In 2020, scope 1 emissions (i.e., mostly emissions from power plants and fuel use) amounted approximately 49,250 tonnes of CO_2e. The issuer informed that between 2019 and 2020, emissions increased by 3.8%. OR does not have scope 2 emissions (i.e., usage of electricity and hot water in the Group's core operations) since the group produces electricity for the national grid and emissions from that production are already accounted for in scope 1. Approximately 99% of the energy used in OR's operations comes from renewable sources. The issuer informed that the remaining 1% comes from fossil fuels used to power generators and machinery for Veitur's trench work as well as the remaining fossil fuel vehicles in the company's car fleet. OR's Scope 3 emissions (i.e., flights, waste, commuting, and use of contractors for construction and maintenance for the sewage and cold- and hot water infrastructure) amounted to approximately 1,300 tonnes of CO_2. The issuer informed that the calculated emissions for scope 1,2 and 3 represent OR as a whole, where the breakdown for emissions from each subsidiary is as follows: ON Power (96.9%), Veitur (2.3%,), OR (0.2%,), Ljósleiðarinn (the fiber nextwork) (0.5%,), and CarbFix (0%).

The issuer informed us that CarbFix was capturing 5,200 tons of CO_2 in 2015, and up to 12,000 tons of CO_2 in 2021, representing about 35% of emissions from its largest geothermal plants Hellisheiði, the only plant where

[1] Votlendissjóður - Færum land til fyrra horfs.

CarbFix is operating at the moment. By 2025, OR plans to expand the carbon capture and storage plant at Hellisheiði with the aim to capture 95% of the CO_2 coming from the power plant. By 2030, OR plans to implement CarbFix at the other geothermal plant, Nesjavellir, with the aim to capture 95% of the CO_2 coming from the plant.

OR aims to consider systematically life cycle emissions, by including scope 3 and downstream emissions such as waste and emissions from maintenance and construction activities. The company is not yet doing GHG reporting on suppliers, but informed that it is working towards requiring suppliers to provide life cycle impacts of their products in line with the Environmental Product Declaration (EPD). No specific timeframe is yet given, but Eidsiva mentioned that it has started to set EPD requirements in its tenders as of 2021. Additionally, OR has incorporated environmental criteria in their standardized tender documents for contractors. The company has further published multiple LCAs on its largest geothermal power plant[2], and Climeworks recently published a life cycle analysis for their Orca project that included energy use from Hellisheiði and reinjection with Carbfix[3].

OR considers long-term climate resilience by working with the City of Reykjavik to respond to uncertainty in future water temperatures, sea level rise, and wastewater management. For example, the sewerage utilities monitor sea levels and extreme precipitation forecasts, as well as earthquakes risks and shifting temperatures on geothermal utility operations. The issuer further mentioned that since the previous SPO, OR has developed a climate crisis action and adaption plan for its operations, particularly for Veitur's sewage and water works operations. However, the issuer is not reporting in line with the TCFD recommendations yet, but aims to report in accordance with the TCFD recommendations, through an iterative development process, as of 2021.

OR's operations are certified in accordance with the ISO 14001 environmental management system. The company also issues a Group's annual report in accordance with the Global Reporting Initiative's G.4. standard, and in accordance with Nasdaq ESG reporting guidelines, and additionally reports on issues related to UN Sustainable Development Goals (SDGs).

Use of proceeds

An amount equal to the net proceeds of the green instruments will be used to finance or refinance, investments, and expenditures, in whole or in part, for eligible assets. Proceeds will be used within the following seven project categories: Sustainable land use/environmental management (approx. 4%), clean transportation (approx. less than 1 %), renewable energy (approx. 44%), energy distribution infrastructure and management (approx. 30%), sustainable water and wastewater management (approx. 14%), carbon capture and storage (approx. 1%), and information and communication (7%). Each subsidiary can utilize all assets categories as part of OR. Investments can include the following: Property, plant and equipment; projects under construction; development costs; intangible assets (e.g., heating rights, software development and other minor R&D); financial assets (e.g., Hedge contracts: presumptions when calculating fair value from profit or loss) (partly); and/or current assets (partly). Net proceeds can finance both existing and new eligible expenditures. The issuer further informed that OR aims to refinance projects back to 2017, but that is has not defined specific maximum look-back period for refinancing.

Net proceeds will not be placed in assets, projects, or in entities related to the following activities focused on fossil energy generation or use, nuclear energy generation, research and/or development within weapons and defence, environmentally negative resource extraction (such as rare-earth elements or fossil fuels), gambling, or tobacco. The issuer further mentioned that specific examples, such as purchase of fuel, vehicles, and heavy machinery which runs on fossil fuels, are excluded.

[2] Karlsdottir, M. R., Heinonen, J., Palsson, H., & Palsson, O. P. (2020). Life cycle assessment of a geothermal combined heat and power plant based on high temperature utilization. Geothermics, 84, 101727.

[3] Life-cycle assessment of an industrial direct air capture process based on temperature–vacuum swing adsorption | Nature Energy

Selection

The selection process is a key governance factor to consider in CICERO Green's assessment. CICERO Green typically looks at how climate and environmental considerations are considered when evaluating whether projects can qualify for green finance funding. The broader the project categories, the more importance CICERO Green places on the governance process.

Evaluation and selection of eligible green assets will be overseen by the environmental and finance departments. All eligible green assets are subject to an environmental impact assessment process (EIAs), in accordance with local regulations. OR has developed a due diligence Geothermal Sustainability Assessment Protocol, which provides a review of 16 factors for each new project, such as governance, environmental and social issues management, geothermal resource management, biodiversity and invasive species, induced seismicity and subsidence, and air and water quality. The assessment flags and reports on potential challenges such as impact on geothermal reservoirs, use of cold-water resources for cooling, landscape disturbance and restoration, and air and water pollution. OR scored a 3 or above (on a scale of 1 to 5), 5 being "meets basic good practice and proven best practice) on all 16 factors in the 2018 assessment, indicating strong environmental management and governance (e.g., the company's seismic research, monitoring and procedures). Considered projects must also align with OR's environmental priorities and must have quantifiable environmental benefits, such as substantial contribution to climate change mitigation, as per defined in the EU Taxonomy. Rebound effects are also considered as part of the screening process.

OR has a two-step selection and approval process in addition to the due diligence described by the Geothermal Sustainability Assessment Protocol. First, eligible projects are proposed by OR subsidiaries, using the framework as a basis for selection. The selection is then reviewed, confirmed, or rejected by OR's Committee. The committee has at least one sustainability expert that is given veto power in the final approval of project. OR's committee will also be responsible for reviewing the sustainability registry and validating and categorizing the assets listed in it. The issuer further informed that with the new balance sheet approach, OR aims to have a new selection process in which projects are first screen for exclusion and DNSH criteria, as per the EU Taxonomy, and are then categorized into project types, where previously each project would require its own assessment.

In evaluating and selecting eligible assets and allocating sustainable financing, the environmental and finance departments will also consider aspects such as human and labour rights as defined in the EU Taxonomy, and alignment with international and local environmental and social standards, and with local laws and regulations. The issuer further informed that it screened for project-affected communities and livelihoods, stakeholder engagement, resettlement, indigenous peoples, labour and working conditions, cultural heritage, biodiversity and invasive species, induced seismicity and subsidence, and air and water Quality. The issuer further informed that all large projects within the OR group require an environmental and social impact assessment prior to development.

Management of proceeds

CICERO Green finds the management of proceeds of Reykjavik Energy (OR) to be in accordance with the Green Bond and Loan Principles.

In its updated framework, OR will change its allocation procedures from a project-based approach to a balance sheet approach, in which it can be considered that all projects undertaken by OR outside of the exclusion criteria can be financed using green instruments. Non-green assets, captured by OR's exclusion criteria, will not be funded with green instruments.

OR intends to fully allocate the proceeds from any financing within 36 months of the date of funding. Unallocated net proceeds may temporarily be placed in cash, cash equivalents, or other liquid marketable instruments. Until

disbursement, proceeds can be used for short-term investments in mutual funds, money market deposits, bank notes, covered bonds, and government bonds. Proceeds will not be used to invest directly or indirectly in stocks or investments in fossil-fuel based-technologies. OR confirms that it will disclose the portfolio balance of unallocated proceeds.

Reporting

Transparency, reporting, and verification of impacts are key to enable investors to follow the implementation of green finance programs. Procedures for reporting and disclosure of green finance investments are also vital to build confidence that green finance is contributing towards a sustainable and climate-friendly future, both among investors and in society.

OR will provide an annual allocation and impact report to its investors and other stakeholders as a part of its annual report until net proceeds are fully allocated. The allocation of financing to eligible assets will be categorized by project categories, where OR will analyse the balance sheet showing the percentage of eligible assets allocated green financing. The impacts will then be estimated per project category invested in. The report will be publicly available. The reporting will be conducted in line with best market practice and international guidelines and protocols (e.g., the Green Bond/ Loan Principles, the Climate Bonds Standard, and the EU Sustainable Finance Taxonomy), at an aggregated level and on a portfolio basis and will include at least the below information:

Allocation reporting:

- Summary of financing activities
- Types of financing instruments
- Outstanding amounts
- Balance of unallocated proceeds
- New vs. refinancing ratio
- Project category allocation
- An example list of projects financed

Impacts reporting:

- Methodologies
- Impact indicator results

The Position Paper on Green Bonds Impact Reporting published by the Nordic Public Sector Issuers will be used as a guide, in addition to the above mentioned international guidelines and protocols, to select relevant indicators for each project category, such as hectares of disturbed land restored, area covered by sustainable land and water resources management practices, estimated avoided GHG emissions (tons CO_2e) per year (based on the grid factor used, i.e., a mix of the European and Icelandic grid, as Iceland sells guarantee of origin certificates to the European market), number of clean vehicles and/or infrastructure deployed (categorized e.g., electric, plug-in hybrid) per year, energy use (in kWh) per cubic meter water supply, volume of sewage/wastewater treated, and estimated sequestered CO_2 emissions and H_2S emissions (in tons) per year. Wherever possible, the quantifiable impacts will be provided per invested monetary unit.

OR intends to request an independent external party to provide limited assurance, verification, and/or consulting to prepare and/or assure, verify, or confirm its post-issuance allocation and impact reporting. The report will be made available on the company's website, according to the issuer.

3 Assessment of Reykjavik Energy (OR)'s green financing framework and policies

The framework and procedures for Reykjavik Energy's green financing investments are assessed and their strengths and weaknesses are discussed in this section. The strengths of an investment framework with respect to environmental impact are areas where it clearly supports low-carbon projects; weaknesses are typically areas that are unclear or too general. Pitfalls are also raised in this section to note areas where Reykjavik Energy should be aware of potential macro-level impacts of investment projects.

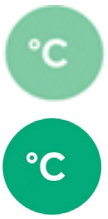
Overall shading

Based on the project category shadings detailed below, and consideration of environmental ambitions and governance structure reflected in Reykjavik Energy's green financing framework, we rate the framework **CICERO Dark Green.**

Eligible projects under Reykjavik Energy's green financing framework

At the basic level, the selection of eligible project categories is the primary mechanism to ensure that projects deliver environmental benefits. Through selection of project categories with clear environmental benefits, green bonds aim to provide investors with certainty that their investments deliver environmental returns as well as financial returns. The Green Bonds Principles (GBP) state that the "overall environmental profile" of a project should be assessed and that the selection process should be "well defined".

Category	Eligible project types	Green Shading and some concerns
Sustainable Land Use / Environmental management	• Research and development such as geomonitoring of various activity in the areas surrounding the OR Group operations such as reservoir health, H2S emissions, restoration of disturbed areas and earthquake activity. • GPS monitoring of areas affected by operations • Restoration and land recovery from disturbed areas • Terrestrial and aquatic biodiversity conservation	**Dark Green** ✓ This project category is associated with OR. ✓ Restoration and land recovery with appropriate species can contribute to the sequestration of greenhouse gases and increased biodiversity. ✓ Direct investments in fossil fuel equipment, incineration of peat and deforestation are excluded as part of the exclusion list. ✓ The issuer informed that the reservoir health refers to the ability to sustainably utilize the resource considering to the system's ability to replenish itself through natural geothermal processes. ✓ For the restauration of disturbed areas, the issuer informed that the vegetative cover is reserved and replanted. ✓ OR informed that it is responsible for about 19,000 ha of land, where some 16,000 ha are within protected areas. These include water protection areas, nature reserves, and areas belonging to the Nature Conservation Register, or areas that are under special protection. Areas can be disturbed due to the need to build new pipelines to a borehole or construct drill sites.

Clean Transportation 	OR will invest in: • (a) for vehicles of category M1 and N1, both falling under the scope of Regulation (EC) No 715/2007: (i) until 31 December 2025, specific emissions of CO_2, as defined in Article 3(1), point (h), of Regulation (EU) 2019/631, are lower than 50gCO_2/km (low- and zero-emission light-duty vehicles); (ii) from 1 January 2026, specific emissions of CO2, as defined in Article 3(1), point (h), of Regulation (EU) 2019/631, are zero. • (b) for vehicles of category L, the tailpipe CO_2 emissions equal to 0g CO_2e/km calculated in accordance with the emission test laid down in Regulation (EU) 168/2013. ON will invest in: • Infrastructure: Installation of charging stations for EV's on national highways, in populated areas, and for homes and businesses across the country.	**Light to Medium Green** ✓ Electric modes of transportation are a key factor in the transition to a low carbon economy; however, we should continue monitoring indirect GHG emissions stemming from construction of roads and other transportation infrastructure, production and use of vehicles, and strive to keep increasing their efficiency. ✓ The issuer does not plan to invest in this category at the moment. ✓ The criteria set for OR's investments are in line with the EU Taxonomy, which wants that passenger cars and light commercial vehicles have a specific emission of CO_2 that is lower than 50gCO_2/km until 2026, and zero emission from 2026 onwards. The eligibility criteria do however not go beyond what is suggested by the Taxonomy. ✓ Investors should also be aware that, based on these criteria in line with the EU Taxonomy, vehicles with emissions can qualify, such as plug-in hybrid vehicles, which can run on fossil fuels. However, the issuer informed that it would most likely invest in electric vehicles if investments in this category are to be made. ✓ According to the issuer, the fleet of today is composed of 208 vehicles, 59% of which are diesel, 23% battery electric vehicles (BEV), 10% methane (from captured landfill gas), 5% Plug-in Hybrid Electric vehicles (PHEV), 3% Hydrogen, and 1% hybrid electric vehicles (HEV). ✓ The issuer mentioned that the only methane used is produced from a landfill capture site in the capital area (Sorpa) only.
Renewable Energy 	• All expenses supporting the production and sales of electricity and heat from renewable	**Dark Green** ✓ This project category is associated with OR's subsidiary ON. ✓ The issuer informed that is has no plans to develop new plants, but to expand the existing plants.

	energy sources emitting below 100gCO2e/kWh. • All expenses supporting the development of industrial symbiosis with renewable electricity and heat production at its center.	✓ The emissions threshold is likely aligned with the EU Taxonomy mitigation criteria for geothermal power activity. However, this criterion is not relevant in the case of the issuer, as the issuer mentioned that biggest geothermal plant, has now between 7 and 8 gCO_2/kwh due to CCS, and that is aims to be carbon neutral as of 2030. ✓ This category includes access roads, and their construction, as well as drill sites, according to the issuer. ✓ Construction materials like cement, and equipment for construction and exploitation are likely to be fossil fuel intensive. The issuer has confirmed that emissions from construction and maintenance are considered thought the publication of peer-reviewed LCAs[4]. ✓ The company's geothermal assessment protocol considers ecosystem values, habitat, species and specific issues such as threatened species in the geothermal development areas and surrounding, as well as potential impacts arising from pest and invasive species associated with the operating geothermal facility. ✓ 99% of the energy produced comes from geothermal energy, the remaining 1% comes from a small run-of-the-river hydropower plant (Andakill), according to the issuer. ✓ On the "development of industrial symbiosis", examples are that OR and Carbfix have partnered with ClimeWorks, a direct air capture company within the geothermal park, and ON Power is partnered with VAXA, an algae alternative protein producer who is already operating within OR's geothermal park. Additional discussions are ongoing with geothermal hot spring companies, greenhouses, and biogas production companies about potential use cases within the geothermal resource park.
Energy distribution infrastructure and management	• All expenses supporting the distribution of electricity and hot water from renewable energy sources emitting below 100gCO_2e/kWh. • All expenditures supporting installation	**Dark Green** ✓ This project category is associated with OR's subsidiary Veitur. ✓ According to the issuer, the development of new power grids and the maintenance of existing lines are included. ✓ 99.9% of the grids are underground to manage the Icelandic exceptional weather conditions. ✓ The energy distribution is for domestic consumption only, according to the issuer.

[4] Karlsdottir et al. 2015; Karlsdottir et al. 2020

	and maintenance of infrastructure to deliver information for smart grid applications.	✓ Issuer has confirmed that no fossil fuel sources are used in the operation of the district heating system; it relies entirely on renewable energy, except for the emissions emitted during construction.
Sustainable water and wastewater management 	• All expenses supporting the development and operation of systems to deliver potable water and to handle wastewater, along with water conservation.	**Dark Green** ✓ This project category is associated with OR's subsidiary Veitur. ✓ According to the issuer, this project category can include construction of treatment plants, powered by renewable energy. This can also include projects such as Veitur's new partnership with Reykjavik City for the implementation of Sustainable Drainage Systems. Consider emissions from construction materials and equipment ✓ Water conservation work for OR includes the monitoring, in areas such as Heiðmörk, of, e.g., the transport of oil, petrol and other hazardous chemicals. The issuer further mentioned that the Heiðmörk area is next to the main highway and is thus subject to risk of debris and spillage from passing vehicles. Therefore, OR monitors Heiðmork to ensure safe drinking water for the Reykjavik population. Accidents and incidents, caused by dangerous behaviour within the protected water areas, are registered, addressed, and appropriate action taken. Furthermore, the issuer mentioned that in order to reduce the risk of accidents from oil- or hazardous chemicals accidents in protected water zones within the area, Veitur utilities has consulted with the Icelandic Road and Coastal Administration (IRCA), the Association of Local Authorities, and local health inspectorates about the closure and improvement of roads, in addition to further groundwater research in the area. ✓ Water conservation initiatives do not include construction of stormwater ponds or reservoirs according to the issuer. ✓ OR adheres to EU standards for wastewater treatment.
Carbon capture and storage 	• All expenses supporting the development, construction, installation and maintenance of projects to capture and mineralize CO_2	**Dark Green** ✓ This project category is associated with OR's subsidiary Carbfix. ✓ CCS is a critical component of a sustainable low carbon future. OR's investment in and application of this technology advances much needed innovation that can have broad, positive impacts. The CO_2 mineral storage technology developed and proven by Carbfix has broad and international cross-sectoral application potential.

	emissions in the subsurface.	✓ The development of the CarbFix technologies is expected to be implemented at two geothermal plants within Iceland, as well as in relation to local aluminium and ferrosilicon production. Carbfix is further working on expanding internationally and currently projects are at an early-stage development in Europe, North America and Asia, according to the issuer. ✓ According to the issuer, potential related environmental risks associated with this project category are the same environmental impacts as associated with the reinjection of geothermal waters at geothermal power plants, i.e., seismic risk and groundwater mixing. At Hellisheiði, these risks are accounted for within the operation of the power plant. ✓ OR mentioned measuring both CO_2 and H2S capture and monitors how much of the injected emissions are permanently sequestered. To date, approx. 75 thousand tons of CO_2 and 41 thousand tons of H2S have been captured and injected with the Carbfix technology at the Hellisheidi plant according to the issuer.
Information and communication  	• All expenditures supporting the construction, installation, improvement, operation, repair, and maintenance of fiber optic telecommunication networks enable energy efficient, digitalised, and electrified solutions for smart cities.	**Medium to Dark Green** ✓ This project category is associated with OR's subsidiary Ljósleiðarinn. ✓ Fibre optic cables is the most energy efficient technology for broadband access networks. Fibre's reliance on fewer intermediate devices and amplifiers than other technologies facilitates its energy efficiency[5]. ✓ The extent of material climate benefits from digitalisation and expanding networks is still disputed. The IEA predicts that increase in data demand from such technologies as machine learning, blockchain, 5G and virtual reality will likely outstrip efficiency gains of current technologies. ✓ OR acknowledges that there are trade-offs on emissions and energy use from increasing demand for data centres, for which OR provides connectivity. The issuer further informed that it will provide connectivity to households and SMEs, which could potentially include crypto currency mining. Be aware of high energy intensity that could be related to crypto currency mining. ✓ The electricity grid in Iceland is relying on almost 100% renewable energy, mostly geothermal and ✓ hydroelectricity. ✓ As exact data on the improvement is difficult to quantify, the extent of digital access provided through number of

[5] Fibre is the most energy efficient broadband technology | Shaping Europe's digital future (europa.eu)

	connections of meters of fibre optic infrastructure installed or copper wires replaced can be used as a metric. However, no likely threshold for energy saving is yet given. ✓ Examples of "electrified solutions for smart cities" include the development of Time-of-Use (ToU) tariffs aiming to lower peaks in the system and sustain the existing system assets. ✓ Investors should be aware of construction emissions related to the installation of cables.

Table 1. Eligible project categories

Background

Management of living natural resources and land use

Only 1 % of land is covered by forests in Iceland, with some 36 % being grassland and 9 % wetland. Given the size of the land use, land use change and forestry (LULUCF) sector in Iceland, the 2020 revision of the Climate Action Plan targets an increase in carbon sequestration in this sector, by restoration of woodlands and wetlands, revegetation and afforestation. The measures in the LULUCF sector in the Climate Action Plan are projected to increase carbon sequestration by some 515 % by 2030 compared to 2005 levels.

Transportation

Transportation currently accounts for more than 30 % of Iceland's emissions outside the scope of the EU ETS. Transport emissions have increased by 68 % since 1990. The largest increase comes from road transport, which has increased by 83% since 1990, owing to a rising number of cars per capita, population growth, more mileage driven and until 2007 an increase in larger vehicles[6]. A low share of travels is done in public transport, and the tourism industry also makes a significant contribution to transport emissions through car rentals. According to the International Energy Agency (IEA), technology and policy can steer transport towards increased sustainability. Electrification emerges as the major low-carbon pathway for the transportation sector. Iceland is currently among the top five countries in terms of share of electric cars as a proportion of all passenger cars on the road, with 5.5% in December 2020, but far behind Norway with 18.1 %. EV sales have seen a sharp increase in Iceland in recent years, with electric car market share in new car sales rising from 14 % in 2018 to 25 % in 2020.

Renewable Energy

Iceland ranks first among OECD countries in the per capita consumption of primary energy. The cool climate and sparse population call for high energy use and related transport. While Iceland currently has close to 100 % of its electricity coming from renewable energy, and 90 % of residential heating comes from geothermal sources, the transition to a low carbon future, including the electrification of the transport sector, will require more electricity. All sources of renewable energy are key to a low carbon transition.

Carbon capture and storage

According to the IEA, Carbon capture and storage (CCS) technologies offer an important opportunity to achieve deep carbon dioxide (CO_2) emissions reductions in key industrial processes and in the use of fossil fuels in the power sector. CCUS can also enable new clean energy pathways, including low-carbon hydrogen production, while providing a foundation for many carbon dioxide removal (CDR) technologies. In the IEA Clean Technology

[6] National Inventory Report for 2019.

Scenario (CTS), a cumulative 107 $GtCO_2$ are permanently stored in the period to 2060, requiring a significant scale-up of CO_2 storage from today's levels[7].

Information & Telecommunication

Fibre optic cables have been largely found to reduce environmental impact, compared to conventional alternatives. In addition to acting as an enabling technology for digitalization, which is a key part of the low carbon transition, plastic and glass-based fibre optic cables are direct substitutes for copper wire cables, which contribute to significant emissions from mining. Furthermore, the demand for data and digital services is expected grow exponentially over the coming years, with global internet traffic expected to double by 2022 to 4.2 zettabytes per year (4.2 trillion gigabytes), where the vast majority of internet traffic goes through data centres[8].While data transmission networks have felt significant (annual 10-30%) improvements in energy efficiency in recent years, the IEA predicts that increase in data demand from such technologies as machine learning, blockchain, 5G and virtual reality will likely outstrip efficiency gains of current technologies.[9] To reduce the risk of rising energy use and emissions, investments in R&D for efficient next-generation computing and communications technologies are needed, alongside continued efforts to decarbonise the electricity supply. GHG emissions arising from data centres depends heavily on local grid emissions factors, and type of technology used.

Governance Assessment

Four aspects are studied when assessing Reykjavik Energy's governance procedures: 1) the policies and goals of relevance to the green bond framework; 2) the selection process used to identify eligible projects under the framework; 3) the management of proceeds; and 4) the reporting on the projects to investors. Based on these aspects, an overall grading is given on governance strength falling into one of three classes: Fair, Good or Excellent. Please note this is not a substitute for a full evaluation of the governance of the issuing institution, and does not cover, e.g., corruption.

OR has set the ambitious target to be carbon neutral by 2030, which is a significant improvement since the previous framework as OR aimed to reduce greenhouse gas emissions by 60% between 2015 and 2030. The issuer has set specific goals to reach its carbon neutrality targets. The issuer report on scope 1,2 and 3, and aims at including the emissions from its suppliers in scope 3 emissions going forward. However, no specific timeline is yet given. OR considers long-term climate resilience by working with the City of Reykjavik to respond to uncertainty in future water temperatures, sea level rise, and wastewater management. The issuer further mentioned that since the previous SPO, OR has developed a climate crisis action and adaption plan for its operations. The issuer is not reporting in line with the TCFD recommendations yet, but aims to report following the TCFD recommendations, through an iterative development process, as of 2021.

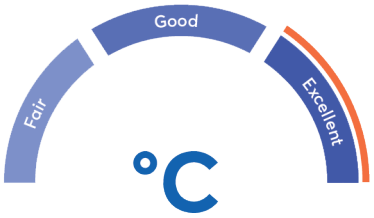
OR's approach to project identification, screening and approval is thorough and technically sound. The company has voluntarily adapted existing sustainability assessment protocols to the geothermal sector to screen all potential projects before initial consideration for the green bond portfolio, and includes a sustainability expert with veto power on its selection committee during final screening and approval.

[7] The Role of CO2 Storage – Analysis - IEA

[8] Data Centres and Data Transmission Networks – Analysis - IEA

[9] https://www.iea.org/commentaries/the-carbon-footprint-of-streaming-video-fact-checking-the-headlines

OR will provide an annual allocation and impact report to its investors and other stakeholders as a part of its annual report until net proceeds are fully allocated, based on a balance sheet approach. All project categories are covered by at least one relevant indicator. The issuer will provide transparency on methodologies and baselines. OR intends to request an independent external party to provide limited assurance, verification, and/or consulting to prepare and/or assure, verify, or confirm its post-issuance allocation and impact reporting. The report will be made available on the company's website, according to the issuer.



The overall assessment of Reykjavik Energy's governance structure and processes gives it a rating of **Excellent.**

Strengths

With regards to the renewable energy project category, CICERO Green notes that OR's geothermal projects are in line with the EU Taxonomy's suggested threshold of 100gCO_2/kwh. However, geothermal can be a significant source of emissions, with some plants generating higher GHG emissions than fossil fuel equivalents. In order to be considered net environmentally positive, new and existing geothermal projects should have direct emissions of less than 100gCO_2/kwh[10]. OR's projects fall well below this threshold, with average direct emissions of less than 10gCO_2/kwh, and with the aim to become net zero emission with CCS. This is a critical underlying strength for the overall, long-term impact potential of OR's geothermal portfolio.

OR invests in research and development of technologies to continue improving its environmental performance – most notably GHG sequestration – and builds its environmental policies and approaches on this research, which is considered particularly progressive. The GHG sequestration research and resulting technology, CarbFix, has been voluntarily applied to operations of OR's largest geothermal plant successfully for ten years. The technology captures CO_2 through direct air capture (DAC) and reinjects emitted carbon dioxide from geothermal plant operations into basaltic rock for mineralization. OR's progressive investment in and application of this technology has raised the bar for CCS technology and represents exciting potential for broader application across Iceland and abroad. Approximately 35% of emissions from OR's largest geothermal plant are now recaptured and stored using the CarbFix technology, and OR aims to increase the capacity to 95% of emissions stored from Hellisheiði and Nesjavellir, by 2025 and 2030, respectively.

Transportation currently accounts for more than 30 % of Iceland's emissions outside the scope of the EU ETS Consequently, electric vehicles are an essential component of a low carbon future. OR's investment in zero emissions vehicles and other electrification initiatives may have a positive impact on upstream and downstream value chains. In addition, OR's anticipated investments in smart grid applications may help to increase the overall capacity of Iceland's power systems to handle variable renewables efficiently and to help reduce overall systems costs, which is a clear strength.

OR's sustainable land use project category supports the restoration of disturbed areas around working sites. OR preserves indigenous species from disturbed areas and replaces them in its restoration efforts to minimize both waste and impact.

Fiber-optic cables have been found to reduce environmental impacts, compared to conventional alternatives and is an enabling technology for digitalisation which is a key part of the low carbon transition. It is therefore a strength that OR aims to increase its activity related to telecommunication networks focusing on fiber.

[10] https://www.climatebonds.net/standard/geothermal

Weaknesses

We find no material weaknesses in OR's Framework.

Pitfalls

Within the renewable energy and sustainable water and wastewater management project category, investments may include construction of facilities and other supporting infrastructure, such as access roads. Construction materials like cement, and equipment for construction and geothermal exploitation are likely to be fossil fuel intensive. OR partially addresses this concern by considering emissions from construction and maintenance and investing in electrification of traditionally fossil fueled equipment, an initiative that is highly commended. CICERO encourages OR to continue its efforts to transition towards a fully electric fleet of vehicles and equipment, and to consider alternatives to emissions intensive construction materials.

The clean transport project category and its eligibility criteria based on the EU Taxonomy could also represent a risk, as fossil fuel vehicles can be eligible, thus representing a risk of lock-in. However, the issuer informed that it does not plan to invest in that category at the moment, and that it would most likely invest in electric vehicles if investments in this category are to be made.

There is no consensus yet on the extent to which fibre-optic networks will contribute to climate benefits. While it is expected to enable digitalisation and decarbonisation in multiple other sectors, including in the transport sector, the IEA reports that increase in demand from developments in energy intensive end uses e.g., in 5G, machine learning, virtual reality, data centres, and crypto currency mining, and will likely outstrip efficiency improvements from current technologies as more energy will be consumed, producing significant rebound effects. This may lead to lock-in effects of less efficient technologies, as the lifetime of the fiber optic networks are likely to be longer than the desired efficiency improvements. OR partly mitigates this by choosing fiber, the most energy efficient technology for broadband access networks as it relies on fewer intermediate devices and amplifiers than other technologies[11]. However, CICERO Green would encourage OR to ensure that these lock-in effects and rebound effects are considered.

OR aims to consider systematically life cycle emissions, by including scope 3 and downstream emissions such as waste and emissions from maintenance and construction activities. The company is however not yet doing GHG reporting on suppliers, but informed that it is working towards requiring suppliers to provide life cycle impacts of their products in line with the Environmental Product Declaration (EPD). No specific timeframe is yet given, but the issuer mentioned that it has started to set EPD requirements in its tenders as of 2021. CICERO Green encourages OR to keep working with the supply chain to include supplier's emissions in scope 3.

On the reporting, the issuer informed that is reported avoided emissions, based on the European and the Iceland grid factor, as the Icelandic grid is selling guarantee of origin certificates to the European market. However, reporting based on a mix European/Icelandic grid factor, and not only the Iceland grid factor, which is very low compared to the European grid, can bring the risk of overshowing the impacts of avoided emissions. This also represents an inconsistency and can lead to confusion for investors. Furthermore, the reporting based on a balance sheet approach can represent a pitfall as using such approach can blur and complexify how the administrative and finance costs are reported.

[11] Fibre is the most energy efficient broadband technology | Shaping Europe's digital future (europa.eu)

Appendix 1:
Referenced Documents List

Document Number	Document Name	Description
1	Reykjavik Energy Framework	Dated September 2021
2	Environmental and resource policy	Environmental and resource policy (or.is)
3	OR annual report 2020	Annual Report 2020

°CICERO
Shades of
Green

Appendix 2:
About CICERO Shades of Green

CICERO Green is a subsidiary of the climate research institute CICERO. CICERO is Norway's foremost institute for interdisciplinary climate research. We deliver new insight that helps solve the climate challenge and strengthen international cooperation. CICERO has garnered attention for its work on the effects of manmade emissions on the climate and has played an active role in the UN's IPCC since 1995. CICERO staff provide quality control and methodological development for CICERO Green.

CICERO Green provides second opinions on institutions' frameworks and guidance for assessing and selecting eligible projects for green bond investments. CICERO Green is internationally recognized as a leading provider of independent reviews of green bonds, since the market's inception in 2008. CICERO Green is independent of the entity issuing the bond, its directors, senior management and advisers, and is remunerated in a way that prevents any conflicts of interests arising as a result of the fee structure. CICERO Green operates independently from the financial sector and other stakeholders to preserve the unbiased nature and high quality of second opinions.

We work with both international and domestic issuers, drawing on the global expertise of the Expert Network on Second Opinions (ENSO). Led by CICERO Green, ENSO contributes expertise to the second opinions, and is comprised of a network of trusted, independent research institutions and reputable experts on climate change and other environmental issues, including the Basque Center for Climate Change (BC3), the Stockholm Environment Institute, the Institute of Energy, Environment and Economy at Tsinghua University, the International Institute for Sustainable Development (IISD) and the School for Environment and Sustainability (SEAS) at the University of Michigan.