

Landsvirkjun Green Bond Annual Impact Report 2019

In 2018 Landsvirkjun established a Green Bond Framework¹ under which the company issued a Green Bond in March the same year. The total amount issued was USD 200 million. In accordance with the Green Bond Framework, Landsvirkjun appointed CIRCULAR Solutions (CIRCULAR) to conduct this Annual Impact Assurance. This Impact Report details the assessment of compliance of (1) the Eligible Green Projects with the respective Eligibility Criteria, and (2) Reporting Criteria of the aforementioned Framework.

Eligible Projects and Avoided Greenhouse Gas Emission

Two projects were funded under the Green Bond Framework in 2018, Theistareykir geothermal power plant and Búrfell II (the expansion of Búrfell hydropower plant). Both projects comply with the Eligibility Criteria as shown in Table 1.

Table 1: Eligibility criteria for the use of proceeds and reported emissions in 2019

Projects	Project type	Capacity and production (MW/GWh)	Installed capacity criteria (MW)	Reported direct/annual emissions (gCO ₂ e/kWh)	Direct/annual emissions criteria (gCO ₂ e/kWh)
Theistareykir	Geothermal	90/649	Not defined	10.2	< 100
Búrfell II	Hydropower	100/790	<= 100	0	< 4

Table 2: Environmental impact of funded projects for the period 2018 - 2019

Project portfolio	Installed electrical capacity (MW)	Electricity generated (GWh)	Total tCO ₂ e avoided	Green bonds tCO ₂ e avoided	Kg CO ₂ e avoided per USD from Green Bond
2018	190	1,016	212,583	90,907	0.455
2019	190	1,439	298,625	147,270	0.736
Total	-	2,455	511,208	238,177	1.191

¹ [Landsvirkjun Green Bond Framework](#).

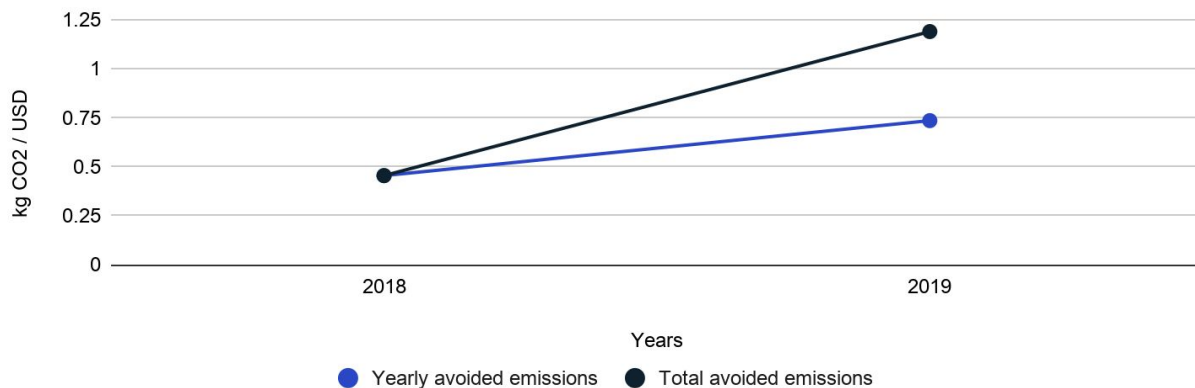


Figure 1: Yearly and total avoided emissions per green bond dollar allocated to eligible projects

Impact Calculation Methodology

Both projects supply electricity to users in Iceland. The electricity users in Iceland have been divided into two types as shown below. Both will contribute to EU's 2030 emission reduction targets defined in the Paris Agreement but will have a different role in the EU's 2030 climate & energy framework. Methodologies used for impact calculations are based on relevant international guidelines and standards.²

Type 1: Industry operating within the European Union (EU) Emission Trading System (ETS), representing about 78% of total use in Iceland (estimated for the year 2019).³

- The benchmark emission factor for this group was calculated using a methodology from the International Financial Institutions (IFI) using the combined margin method and the IFI (Interim) Dataset of Harmonized Grid Factors V02.⁴
- The EU ETS benchmark emission factor for the year 2019 is estimated to be 256 gCO₂e/kWh.

Type 2: Other Industries and households in Iceland, representing about 22% of total consumption in Iceland (estimated for the year 2019).

- The benchmark emission factor for Type 2 users was calculated using the same methodology as used for Type 1 users.
- The Icelandic benchmark emission factor for the year 2019 is estimated to be 61 gCO₂e/kWh.

²The International Financial Institution; Green Bonds: Working Towards a Harmonized Framework for Impact Reporting. And, International Financial Institution; Approach to GHG Accounting for Renewable Energy Projects (2015), International Capital Market Association's & Green Bond Principles' Handbook on Harmonized Framework for Impact Reporting (June 2019), the European Union's Technical Expert Group on Sustainable Finance Report on EU Green Bond Standard (June 2019), and the Nordic Public Sector Issuers: Position Paper on Green Bonds Impact Reporting (January 2019).

³ National Energy Authority of Iceland, Electricity consumption forecast 2018 - 2050, 2019.

⁴ International Financial Institution; (Interim) Dataset of Harmonized Grid Factors Projects, 2019.

Using the above methodology, the Green Bond projects' emission benchmark is 212 gCO₂e/kWh. As shown in Table 1, the emission intensity in 2019 at Theistareykir is 10.2 gCO₂e/kWh and 0 gCO₂e/kWh at Búrfell II. The resulting avoided emissions accredited to the bond in 2019 was found to be 147,270 tCO₂e, resulting in a total avoided impact of 238,177 tCO₂e over the years 2018 and 2019 as shown in Table 2.

Impact Assurance Review by CIRCULAR⁵

The projects funded under the Green Bond Framework were evaluated based on the following criteria according to Landsvirkjun's Green Bond Framework:

1. Project Eligibility (Framework's Use of Proceeds chapter)
2. Reporting (Framework's Reporting chapter)

The Eligibility criteria of the Green Bond Framework lists three investment activities or Eligible Green Projects as detailed below:

- Geothermal: Investments in or expenditures for the acquisition, expansion, renovation, construction, development, and installation of new and existing geothermal projects with direct emissions of less than 100 gCO₂/kWh.
- Hydropower: Investments in or expenditures for the acquisition, expansion, renovation, construction, development, and installation of new and existing hydropower facilities in the capacity of no more than 100 MW and with annual emissions of less than 4 gCO₂/kWh.
- Wind: Investments in or expenditures for the acquisition, expansion, renovation, construction, development, and installation of new and existing wind power facilities.

The projects funded by Landsvirkjun under its Green Bond Framework comply with the Eligible Project criteria detailed in the Framework. Based on the aforementioned methodologies, the funded projects demonstrate a positive environmental impact, i.e. facilitate the avoidance of greenhouse gas emissions. The total avoided greenhouse gas emissions for the green bond project portfolio amounts to 147,270 tCO₂e in 2019.

⁵ *Disclaimer by CIRCULAR:* CIRCULAR is an independent and leading provider of green bond and sustainability consulting in Iceland. Landsvirkjun was responsible for providing CIRCULAR accurate documentation and information relating to the details of the funded projects. CIRCULAR made all efforts to ensure the highest quality and rigour during its assurance process. CIRCULAR will not accept any form of liability and/or any liability for damage arising from the use and/or decisions, financial or otherwise, based on the the information provided in this document.