

Annual Green Bond – Use of Proceeds Report, November 2019

The MFC 3.0% SGD 500 million subordinated debt due 21 November 2029

Manulife issued its first green bond¹, 3.0% SGD 500 million subordinated debt (the ‘Green Bond’) on November 21, 2017. In the Manulife Green Bond Framework² (the ‘Framework’), we committed to publishing an annual use of proceeds report.

This report presents the allocation of the debt proceeds by category per the Eligibility Criteria defined in the Framework, examples of renewable energy projects and environmental performance indicators. Sustainalytics, a provider of environmental, social, and governance research to institutional investors issued the second-party opinion on the Framework and the annual review for this report³.

Use of Proceeds and Environmental Performance

The proceeds of the Green Bond were fully allocated at issuance to renewable energy projects, specifically wind and solar. There is a zero balance of unallocated proceeds. The allocations were consistent with our pre-issuance disclosures, and they have not changed over this reporting period.

The portfolio consists of wind and solar energy projects, located in Canada and the US. They include some of the largest Canadian projects, such as the Rivière-du-Moulins wind farm in the Province of Quebec, Canada, and the Grand Renewable solar project in the Province of Ontario, Canada.

The table below summarizes the allocated amounts on an aggregate portfolio basis. Based on the Manulife’s share of investment in the projects, we report the share of installed capacity and annual wind and solar energy generation. The annual environmental benefit of the Green Bond in 2019 is estimated at 56,740 tons of avoided carbon dioxide emissions, or 114 CO₂ tons per SGD 1 million invested⁴.

Table 1: Use of Proceeds and Environmental Indicators of 3.0% SGD 500 Million Green Bond
[SGD 497 million net proceeds, net of SGD 3 million of transaction costs]

Category as per Green Bond Principles	Criteria in the Manulife Green Bond Framework	Location	Green Bond amount allocated to renewable energy projects (SGD million)	Manulife's share of installed capacity, allocated to Green Bond (MegaWatt) ^a	Manulife's share of annual energy generation, allocated to Green Bond (MegaWatt hour) ^a	Manulife's share of estimated annual avoided carbon dioxide emissions, allocated to Green Bond (tons) ^{a,b}
Renewable Energy: Wind	Development, construction, operation, maintenance and upgrades of wind energy facilities and equipment	Canada	219	83	297,360	41,310
Renewable Energy: Solar	Development, construction, operation, maintenance and upgrades of solar energy facilities and equipment	Canada and US	278	44	59,878	15,430
Total			497	127	357,238	56,740

Notes: see the Methodology section for references to green bond reporting norms

a. Manulife's share of installed capacity, annual energy generation and avoided carbon dioxide emissions was based on our debt and equity investments deployed in the projects as a proportion of the projects' total enterprise value at the time of investment

b. Avoided carbon dioxide emissions were estimated based on the energy mix in local country grids and the life-cycle emission factors for wind and solar technologies (see detail in the Methodology).

¹ Manulife's green bond is a fixed income instrument with an amount equal to the net proceeds intended to be used to finance or re-finance new and/or existing Eligible Assets consistent with Manulife's Green Bond Framework

² Manulife Green Bond Framework is aligned with the International Capital Market Association's Green Bond Principles 2017, and directs the use of proceeds towards renewable energy, green buildings, sustainably-managed forests, energy efficiency, clean transport, sustainable water management and/or pollution prevention and control: https://www.manulife.com/content/dam/corporate/global/en/documents/pas/MFC_GBF_2017_EN.pdf

³ The *Second-Party Opinion* on the Framework, the *Annual Review* of this Green Bond report (the limited assurance procedure), and the *Climate Bonds Initiative Post-Issuance Verification* documents are available on the Manulife Investor Relations webpage: <https://www.manulife.com/en/investors/results-and-reports.html>

⁴ Annual emission avoidance fluctuates with renewable energy production. The reported environmental benefit is 7.7% higher than 56,700 tons reported in the November 2018 report, due to a) production delta, and b) methodological change to actual versus forecast production figures.

Example of Projects

Rivière-du-Moulins Wind Project

This project is the largest wind energy facility in Canada under a single Power Purchase Agreement, a 20-year agreement with Hydro Quebec. The wind farm constructed in 2014 is located in the Province of Quebec, has a total installed capacity of 350 Megawatt, is financed by several financial institutions including Manulife, and is estimated to power 59,500 homes.

Grand Renewable Solar Project

Located in Haldimand County, Ontario, Canada on the north shores of Lake Erie, this solar project is one of the largest in Canada. The total installed capacity of 100 Megawatt is financed by multiple partners, including Manulife. Since 2015, the project has had a 20-year feed-in-tariff contract with HydroOne. The 800-acre farm incorporates 450,000 solar panels and powers 17,000 homes.

On Methodology

The decision on which environmental impact metrics to report was informed by the *Harmonized Framework for Impact Reporting*⁵ published by a consortium of the global development banks. This framework sets out market practices for green bond reporting, including metrics for renewable energy projects such as installed capacity, annual energy generation, and reduced/avoided carbon dioxide emissions.

Avoided emissions in Table 1 are estimated by multiplying annual renewable energy production (in megawatt-hours) by the carbon dioxide emissions factors (tons per one megawatt-hour).

Emission factors reflect emissions from fossil-fuel-powered electricity generation that are displaced by wind or solar technologies in the local country energy mix. We used emission factors for Canada and the U.S. from the tool developed by the International Renewable Energy Agency [IRENA]⁶. We relied on Natural Resources Canada⁷, the agency of the Government of Canada for the Canadian energy mix, and the U.S. Energy Information Administration⁸ for the U.S. energy mix. IRENA's dataset is based on the lifecycle assessments by the Intergovernmental Panel on Climate Change, documented in the Special Report on Renewable Energy Sources and Climate Change Mitigation.

Our avoided emissions estimation provides a general indication of avoided emissions and is not an absolute number. We expect the estimation to evolve over time, as better information on countries' electricity use and technology displacement options becomes available.

External Review

This report has been reviewed by Sustainalytics, an environmental, social, and governance research firm, on whether:

1. The assets meet the Use of Proceeds the Eligibility Criteria outlined in the Framework
2. Manulife reported on at least one Key Performance Indicator for each Use of Proceeds criteria in the Framework

The associated Annual Review document utilizing the limited assurance procedure can be found on the Manulife Investor Relations webpage.

⁵ The World Bank, *Harmonized Framework for Impact Reporting*, 2015
<https://www.ifc.org/wps/wcm/connect/f932dc004ad996538a1fea4fb4720a61/Updated+logo+FINALPROPOSALIRH+CLEAN.pdf?MOD=AJPERES>

⁶ International Renewable Energy Agency, *Avoided Emissions Calculator*, 2014
<http://www.irena.org/climatechange/Avoided-Emissions-Calculator>

⁷ Natural Resources Canada, 2016
<https://www.nrcan.gc.ca/energy/electricity-infrastructure/about-electricity/7359#generation>

⁸ US Energy Information Administration, 2017
<https://www.eia.gov/tools/faqs/faq.php?id=427&t=3>