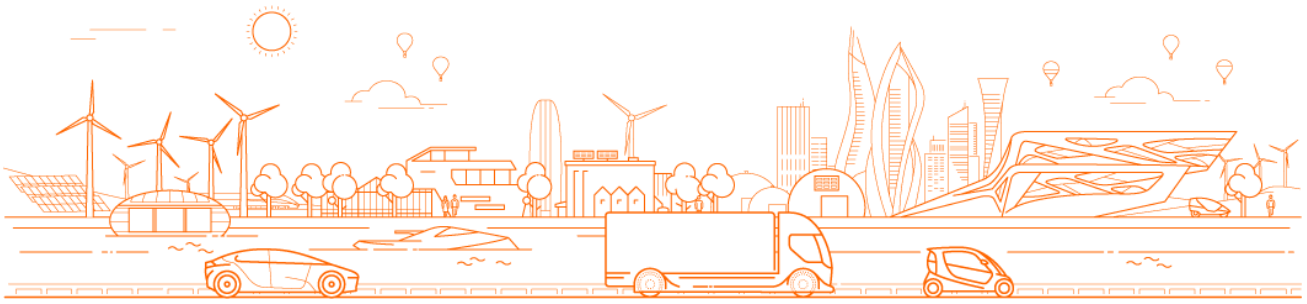

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Post-Issuance Green Bond Impact Report

Financial Year 2019

ING Green Bond Impact Report 2019

Portfolio date: 31 December 2019

Eligible Project Category a/	Number of Loans		Signed Amount (EUR) b/	Share of Total Portfolio Financing c/	Eligibility for Green Bonds d/	Total Installed Capacity of Renewable Energy in MW e/	Pro-rata Installed Capacity of Renewable Energy in MW e/	GHG Emissions Avoided in tCO2e e/
Renewable Energy	172	€	4.942.828.282	60,1%	100%	29.247	5.028	6.150.384
Green Buildings	2.573*	€	3.280.747.892	39,9%	100%			33.846
Total	**2.745**	**€**	**8.223.576.174**	**100%**	**100%**			**6.184.230**

Portfolio-based Green Bond Report according to the Harmonized Framework for Impact Reporting

a/ Eligible category

b/ Signed amount represents the amount legally committed by the issuer for the portfolio or portfolio components eligible for Green Bond financing

c/ This is the share of the total portfolio per Eligible Category

d/ This is the share of the total portfolio costs that is Green Bond eligible

e/ Impact indicators

- Installed capacity of renewable energy in MW (total and pro-rata)
- GHG emissions avoided in tCO2e (pro-rata)
- For refurbished buildings: GHG emissions reduced in tCO2e when compared to the reference building code of the construction year

*Each loan can include multiple buildings, this explains the difference between the number of buildings reported in the CFP (4.144) report below and number of loans in the table above (2.573)

External consultant reports detailing the environmental impact of the Eligible Green Loan Portfolio as per December 31st 2019, are presented in the next pages.

ING RENEWABLE ENERGY PORTFOLIO

CLIMATE IMPACT ASSESSMENT

PORTFOLIO AS OF
31 DECEMBER 2019

APRIL 17, 2020

ING

NAVIGANT
A Guidehouse Company

ING RENEWABLE ENERGY PORTFOLIO

CLIMATE IMPACTS – PORTFOLIO AS OF 31 DECEMBER 2019

By the Numbers

Total ING Portfolio (M€)
4,943

Number of Projects
172

Annual, avoided Emissions (megatons CO_2eq)
6.2

Average Emissions per Euro Invested ($kgCO_2eq/€$)
1.3

Avoided emissions are equal to…

Passenger flights London to New York
4.5 million

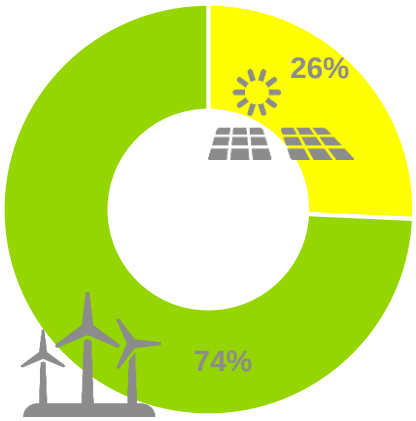
Reduction in global beef consumption
103 kton

Key Findings

» The total ING Renewable Energy Portfolio was successful in creating positive climate impacts

» The annual avoided emissions for this total portfolio was **6.2** megatons CO_2eq, or an average **1.3** $kgCO_2eq$ per euro invested

Avoided Emissions by Technology



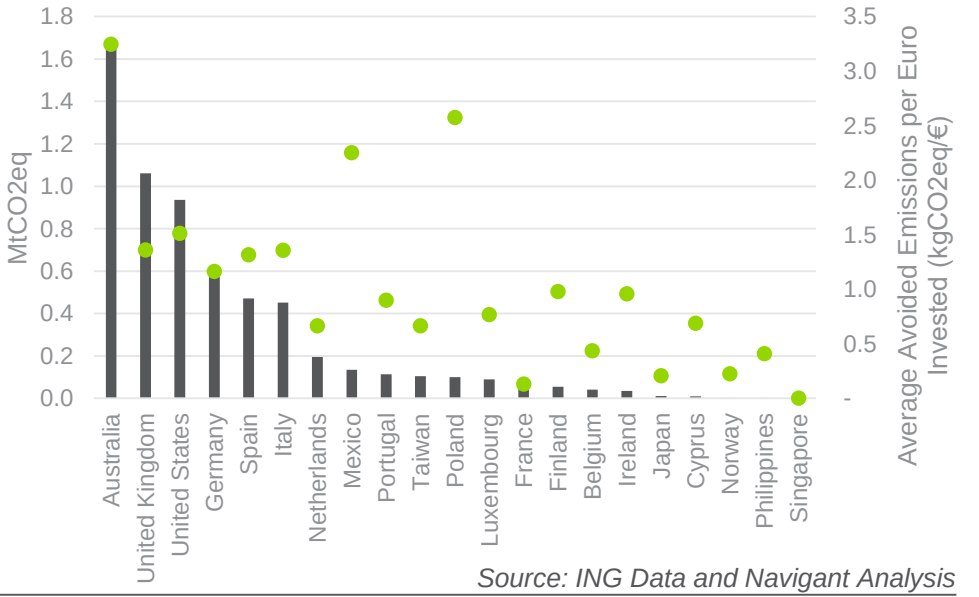
Total avoided Emissions (kton CO_2eq)
(number of projects in parentheses)

Wind	4,568 (124)
Solar	1,582 (48)

Total Installed Capacity (MW)
29,247

Capacity Currently Financed by ING (MW)
5,028

Avoided Emissions in megatons CO2eq (Bars) and Average Avoided Emissions per Euro Invested (Dots) by Project Country



Source: ING Data and Navigant Analysis

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ING RENEWABLE ENERGY PORTFOLIO
CLIMATE IMPACTS - METHODOLOGY

Introduction

ING Bank contributes to sustainability by financing projects that accelerate its clients' transition to a low-carbon economy. By financing projects that reduce the need for carbon intensive technologies on the electricity grid, ING can contribute to a low-carbon economy and help its clients' contribution as well. Such renewable energy projects diversify the grid and reduce the need for electricity generated by fossil fuel technologies (such as natural gas, coal or oil).

Navigant, a Guidehouse Company, was appointed to calculate the positive climate impacts of ING's renewable energy portfolio. The positive climate impacts are expressed by the avoided greenhouse gas (GHG) emissions from solar and wind projects financed through ING.

Methodology

The method used to calculate the avoided GHG emissions for ING's portfolio is based on Chapter 4.3 of PCAF's *Paving the way towards a harmonised carbon accounting approach for the financial sector*[1] and the *IFI Approach to GHG Accounting for Renewable Energy Projects.*[2]

Navigant measured the climate impacts from ING's renewable energy portfolio by calculating the avoided GHG emissions from projects financed through ING. The avoided GHG emissions were calculated by:

- Taking the estimated electricity production of the project, measured in P50 MWh, multiplied by a country specific emissions factor
- The country specific emissions factor is a weighted average of a *build margin* (BM) and *operating margin* (OM). The OM represents the marginal generating capacity in the existing dispatch hierarchy that will most likely be displaced by the project. The BM is the cohort of the prospective power plants whose construction and operation would be affected by the project, based on an assessment of planned and expected new generation capacity. The weighting varies by generation type. The difference is driven by the fact that wind and solar are forms of variable generation. The OM/BM split for these generation technologies is 75%/25%
- In cases where the estimated electricity production was not provided by ING, production is calculated by multiplying (1) the annual load hours of wind and solar by (2) the project capacity (MW)
- In most cases, ING does not finance the entire project, therefore the avoided emissions are adjusted by the share for which is financed by ING. This share is calculated by taking (1) the amount outstanding on the deal and dividing by (2) the original deal size amount
- The calculations are valid based on the portfolio as of December 31st, 2019

[1] https://www.dnb.nl/binaries/PCAF_tcm46-360394.pdf
[2] https://www.nib.int/filebank/a/1449216433/c78bcf00c64ba92b3a73673a2217be4d/5023-Joint_GHG_RE.pdf

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A Guidehouse Company

MEMO

Project:	Impact assessment ING green commercial building portfolio assessment
Subject:	CO_2-emission reduction calculation
Date:	21 April 2020
Status:	Final

As requested by ING, CFP Green Buildings compared the CO_2-emission of a specific, energy-efficient group of real estate (in this document indicated as ING green commercial building portfolio) to that of a comparable group of real estate with an average energy-efficiency (indicated as Reference). The objective of this analysis is also to demonstrate that the selected buildings belonged to the top most sustainable buildings in The Netherlands. In this document the results are shown.

Energy label comparison

Figure 1 shows the distribution of the energy labels of ING green commercial building portfolio and the Reference group. In the ING green commercial building portfolio, 95% of the objects have a definitive energy label. The other 5% has a calculated energy label, based on the construction year. All objects in the ING green commercial building portfolio have an energy label A. The top 10% of the Reference has an energy label A. Therefore buildings in the ING green commercial building portfolio belong to the top 10% most energy efficient buildings of the Dutch real estate market.

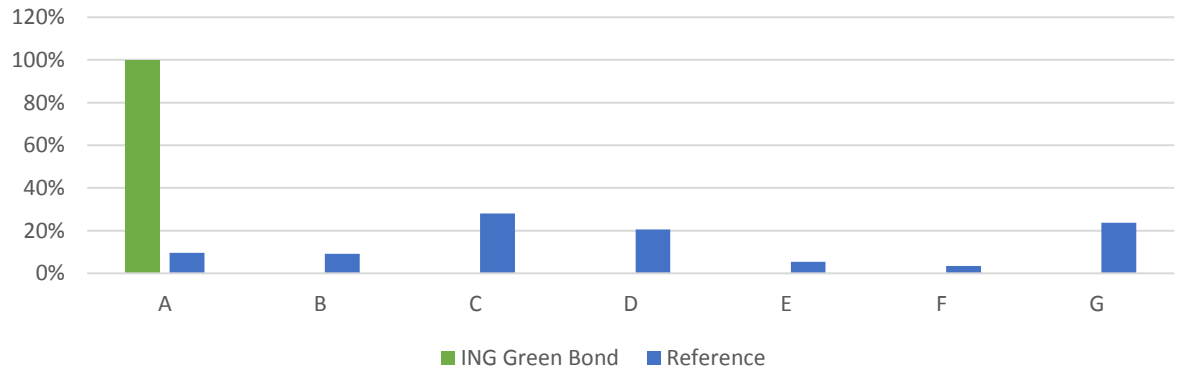

Figure 1: Distribution of energy labels ING green commercial building portfolio and Reference

Methodology

Within this study the CO_2-emission of 4.144 objects, as selected by ING, was determined using the calculated real energy consumption of these objects. The energy usage is based on the algorithms and benchmarks from the expert system of CFP Green Buildings. This is the largest building database in The Netherlands with actual data on energy consumption and building characteristics. These algorithms and benchmarks are the same as those used in the online tool www.ingrefduurzaam.nl. In this study, the calculated real energy consumption of Dutch real estate (the Reference) was determined using this methodology. The CO_2-emissions were calculated with the Dutch market standard conversion factors, derived from the Green Deal CO_2-Emissionfactors.

CO_2-emission - natural gas
The CO_2-emission of Dutch natural gas is 1,884 kg/m3.[1]

CO_2-emission - electricity
Values for carbon intensity, in kg per produced kWh of electricity, vary depending on assumptions made in the calculation method. In this assessment, an emission of 0,475 kg/kWh was used.[2]

Group composition

The group composition of the 4.144 objects is shown in table 1. Residential buildings account for 64% of the portfolio (2.645 from 4.144). Retail buildings have the largest footprint with 39% of total square meters. More than half of the portfolio (54%) are new buildings[3], 46% is refurbished to obtain an energy label A.

	#	m^2	Refurbished	New
Industry	207	602.180	155	52
Office	252	622.112	198	54
Retail	964	1.229.955	818	146
Residential building	2.645	592.550	656	1.989
Other	76	84.386	60	16
Total	***4.144***	***3.131.183***	***1.887***	***2.257***

Table 1: Group composition ING Green Buildings Loan Portfolio

Energy consumption

Table 1 shows the calculated real energy consumption of the ING green commercial building portfolio. Calculated real energy consumption for electricity is 89 million kWh each year and 53 million m^3 natural gas each year.

Electricity consumption (kWh)	Natural gas consumption (m^3)
89.452.885	*52.623.999*

Table 2: Calculated energy consumption ING green commercial building portfolio

CO_2-emission

Table 2 shows the CO_2-emisions of both groups, based on calculated real energy consumption. The total CO_2-emission of the ING green commercial building portfolio is 141.634 ton CO_2 per year. The Reference CO_2-emission is 200.507 ton CO_2 per year.

CO_2-emission ING green commercial building portfolio (ton CO_2)	CO_2-emission Reference (ton CO_2)	CO_2-emission Reduction (ton CO_2)
141.634	*200.507*	*58.873*

Table 3: CO_2-emission ING green commercial building portfolio compared to Reference

Approximately 46% of the portfolio consists of refurbished buildings. Another way of calculating reduced CO_2-emissions can be done by comparing the current emissions with the original built quality emissions. Table 3 shows an overview of the calculated CO_2-emissions reduction for the refurbished buildings, compared to the theoretical original built quality based on the expected Energy Index. The

[1] Source: https://www.co2emissiefactoren.nl with WTW emission for natural gas in kg/CO_2 per m^3
[2] Source: https://www.co2emissiefactoren.nl with WTW emission for electricity (unknown) in kg/CO_2 per kWh
[3] New buildings are defined as constructed in 2006 or later.

total CO_2-emissions of the ING green commercial building portfolio for refurbished buildings is 94.421 ton CO_2 per year. The original built quality CO_2-emission is 121.260 ton CO_2 per year.

CO_2-emission ING green commercial building portfolio Refurbished (ton CO_2)	***CO_2-emission according to building code (ton CO_2)***	***CO_2-emission Reduction (ton CO_2)***
94.421	*121.260*	*26.840*

Table 4: CO_2-emission ING green commercial building portfolio Refurbished compared to original built quality

Approximately 54% of the portfolio consists of non-refurbished buildings or new buildings whose construction year is 2006 or later. Table 4 shows an overview of the calculated CO_2-emissions reduction for the new buildings, compared to the theoretical original built quality based on the expected Energy Index. The total CO_2-emission of the ING green commercial building portfolio for new buildings is 47.213 ton CO_2 per year. The original built quality CO_2-emission is 54.220 ton CO_2 per year.

CO_2-emission ING green commercial building portfolio New (ton CO_2)	***CO_2-emission according to building code (ton CO_2)***	***CO_2-emission Reduction (ton CO_2)***
47.213	*54.220*	*7.007*

Table 5: CO_2-emission reduction (avoided) ING green commercial building portfolio New (new buildings that were more energy efficient than the building code required at the time of construction help to avoid CO_2-emission).

Table 5 below shows the summary of reduced CO_2-emissions according to building code for both refurbished and new buildings with a definitive energy label.

	Number	**%**	**CO_2-emission ING green commercial building portfolio (ton CO_2)**	**CO_2-emission Original building code (ton CO_2)**	**CO_2-emission Reduction (ton CO_2)**
Refurbished buildings	1.887	46%	94.421	121.260	26.840
New buildings	2.257	54%	47.213	54.220	7.007
Total	***4.144***	***100%***	***141.634***	***175.480***	***33.846***

Table 6: CO_2-emission ING green commercial building portfolio compared to original building code

Conclusion

From this study the following conclusions are determined:

- Based on the calculated real energy consumption, the ING green commercial building portfolio has a CO_2-emission that is 58.873 tons per year lower than the reference, which is a difference of 29,4%.
- Compared to the original building code, the ING green commercial building portfolio has a CO_2-emission reduction that is 33.846 tons per year, which is a reduction of 19,3%.
- Based on the official and calculated energy labels, buildings in the ING green commercial building portfolio belong to the top 10% most energy efficient buildings of the Dutch real estate market.