Impact assessment Eligible Asset Portfolio NN Group

Project: Impact Assessment Eligible Asset Portfolio NN Group

Subject: Avoided CO_2-emission calculation

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Status: Final

CFP Green Buildings has been asked to compare the greenhouse gas emissions[1] of a specific, energy-efficient group of residential real estate (in this document indicated as Eligible Asset Portfolio[2,3]) to that of a comparable group of residential real estate with an average energy efficiency (indicated as "Reference" or "Reference Group"[4]). The objective of this analysis is to report the positive impact of the sustainable residential real estate of NN Group. The sustainable residential real estate of NN Group complies with the criteria of the EU Taxonomy Delegated Regulation from June 2021. This document outlines the results of this analysis.

Preface

NN Group N.V. ("NN Group" or "the Group") is a financial services company, operating in 11 countries with a strong presence in Europe and Japan. NN Group has approximately 20 million customers, is listed on Euronext Amsterdam and employs more than 16,000 people.

Climate change represents an urgent and potentially irreversible threat to livelihoods and the well-being of society. To mitigate the worst effects, we must transition to a low-carbon economy, limiting the global temperature to 1.5°C of warming as part of the 2015 Paris Agreement. The latest science shows that emissions will need to reach net-zero around 2050 to meet this goal and prevent the worst impacts of climate change. As a financial institution, NN Group recognizes that we have an important role to play in promoting the low-carbon transition especially through our investments. This recognition of responsibility is also reflected in our support of various pledges and commitments. NN Group's commitment to strive for a net-zero greenhouse gas emissions portfolio by 2050. This is a key initiative under the strategic commitment Society: we contribute to the well-being of people and the planet. The Group's climate change strategy broadly consists of decarbonizing the portfolio in line with trajectories consistent with the Paris goals and increasing allocations to green investments.

To underline their ambition, NN Group has endorsed various pledges and commitments, such as the Commitment of the financial sector to the Dutch Climate Agreement (Klimaatakkoord), and the Paris Aligned

[1] Greenhouse gas emissions are calculated in CO_2-equivalent, which will be referred to as CO_2 throughout this document.
[2] When referring to the Eligible Asset Portfolio in this document, we refer to Dutch Residential Green Buildings only, so not the other Eligible Assets, as defined in the Sustainability Bond Framework by NN Group.
[3] The Eligible Asset Portfolio consists of 27,762 objects and covers 21% of the total portfolio on the NN Group insurance entities' balance sheets of Dutch mortgages originated and/or serviced by our own banking business.
[4] The Reference Group is an anonymized portfolio from several clients from CFP Green Buildings, which contains about 140.000 comparable buildings.

Investment Initiative Net Zero Asset Owner Commitment.

Building year and energy label comparison

Figure 1 shows the distribution of energy labels in the Eligible Asset Portfolio and the registered energy labels in the Netherlands for residential buildings. As per end 2022 there are 1,541,218 registered energy labels with an A rating in the Netherlands[5]. This is 19.16% of all buildings in the Netherlands (8,045,580 buildings as per end 2022[6]). The Eligible Asset Portfolio also takes the year of construction into account as criterion for the selection of the portfolio, as described in the Green Residential Buildings Methodology Assessment Document of February 2022. This is because the Dutch Building Regulation sets out energy efficiency requirements for different building types. As an example, the Dutch Building Code 2000 requires an EPC score of at least 1.0. Over time the Dutch Building Regulation becomes more stringent in terms of energy-efficiency and sustainability requirements for new buildings. The year of construction that is used as selection criterion is 2005. Approximately 14.8% of the total Dutch housing stock are residential buildings built since 2005. Because NN Group has chosen to use both criteria (building year and EPC A), buildings in the Eligible Asset Portfolio belong to the top 14.8% most energy-efficient buildings of the Dutch real estate market. In addition, buildings built in or after 2021 meeting the requirements for a PED lower than 10% threshold set for a Nearly Zero Energy Building (NZEB) are also included in the Eligible Asset portfolio.

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Figure 1: Distribution energy labels Eligible Asset Portfolio and residential buildings in the Netherlands

Methodology

The CO_2-emissions of the 27,762 eligible objects as selected by NN Group are determined by using the calculated energy consumption of these objects. The energy usage is based on algorithms and benchmarks from the expert system of CFP Green Buildings. CFP's Expert system is a database containing over 21 million square meters of actual energy data of buildings. A section of this anonymized data provides live energy data derived from CFP's Energy Monitoring projects. Moreover, public big data, for example yearly updated average energy usage of homes in the Netherlands provided by Centraal Bureau Statistiek (CBS), is used to improve and check the benchmarking model. In this study, the calculated energy consumption of the Reference Group was determined based on data from Centraal Bureau Statistiek[7] (CBS) and CFP.

The total energy consumption can be converted to CO2 emissions by using standard conversion factors. The Dutch government created a widely accepted and uniform list with grid emission factors: http://www.co2emissiefactoren.nl. The grid emissions related to the direct emissions are

[5] Source for EPC labels: http://www.ep-online.nl/
[6] Source: Kadaster. The Dutch Land Registry and Mapping Agency.

[7] Source: the Dutch national statistical office: https://www.cbs.nl/en-gb

used, which is also known as Tank-To-Wheel (TTW10). This is in accordance with the generally accepted PCAF11 methodology.[8] Whenever the origin of the consumed electricity is unknown, the emission factor for electricity from an undefined energy source should be used. The factor for electricity is updated regularly to reflect changes in the Dutch electricity mix. This leads to the following emission factors:

Applied GHG emission factors[9]		
Natural gas	1.782	kg CO_2e /m^3
Electricity	0.29	kg CO_2e /kWh

Table 1: Dutch CO_2-emission factors

Table 2 shows the distribution of the assets in the NN Group green residential building portfolio among eligibility criteria:

1. A label and the top 15% of the national stock as described in the Green Residential Buildings Methodology Assessment Document of February 2022.
2. Buildings built since 2021 that meet a PED that is 10% lower than the NZEB requirements.

Criteria	Objects
Buildings built between 2005 -2020 A label and top 15%	26,325
Buildings built since 2021 with PED of NZEB -10%	1,437

Table 2: Assets in the Eligible Asset Portfolio

Energy consumption

Table 3 shows the calculated energy consumption of the Eligible Asset Portfolio. The calculated annual energy consumption is approximately 95.5 million kWh of electricity and around 29.5 million m^3 of natural gas.

To calculate the total energy consumption in kWh, the natural gas consumption in m^3 needs to be converted to kWh. One m^3 natural gas is equal to 9.769 kWh. Therefore, the gas consumption of 7.1 m^3 per m^2 is multiplied by 9.769 kWh, which results in a consumption of 69.26 kWh per m^2. The total calculated energy consumption is therefore 92 kWh per m^2.[10]

	Electricity consumption		Natural gas consumption	
	(x1,000 kWh)	(kWh/m^2)	(x1,000 m^3)	(m^3/m^2)
Buildings built between 2005 -2020 A label and top 15%	90,416	22.8	29,466	7.4
Buildings built since 2021 (NZEB-10%)	5,088	25.7	0	0
Total Eligible portfolio	95,505	23	29,466	7.1

Table 3: Calculated energy consumption Eligible Asset Portfolio

[8] PCAF is a global partnership of financial institutions that work together to develop and implement a harmonized approach to assess and disclose the greenhouse gas (GHG) emissions associated with their loans and investments.
[9] Source: https://www.co2emissiefactoren.nl using TTW emissions.
[10] The sum of 23 kWh per square meter plus 69 kWh per square meter

CO_2-emission

Table 4 shows the CO_2-emissions of the Eligible Asset Portfolio and the Reference Group, based on the calculated energy consumption. The total CO_2-emissions of the Eligible Asset Portfolio is 87,927 tonnes CO_2 per year while the annual CO_2-emission for the Reference Group is 137,684 tonnes.

Thus, the buildings are estimated to emit 49,757 tonnes of CO_2 per year less than the Reference Group.

	GHG emission Eligible Asset Portfolio (tonnes CO_2e)	GHG emission Reference (tonnes CO_2e)	GHG emissions Avoided (tonnes CO_2e)
Buildings built between 2005 -2020 A label and top 15%	86,050	131,133	45,084
Buildings built since 2021 (NZEB-10%)	1,878	6,551	4,673
Total Eligible portfolio	87,927	137,684	49,757

Table 4: CO_2-emission Eligible Asset Portfolio compared to the Reference Group

Annual development of climate impact

CFP Green Buildings also gave insights in the energy consumption and reduced CO_2-emissions of the Eligible Asset Portfolio compared with the numbers of the year-end 2020.

Figure 2 shows the energy consumption of the Eligible Asset Portfolio in 2020 and 2022. In order to compare outcomes of both reports the numbers are converted to consumption/ CO_2-emissions per m^2.

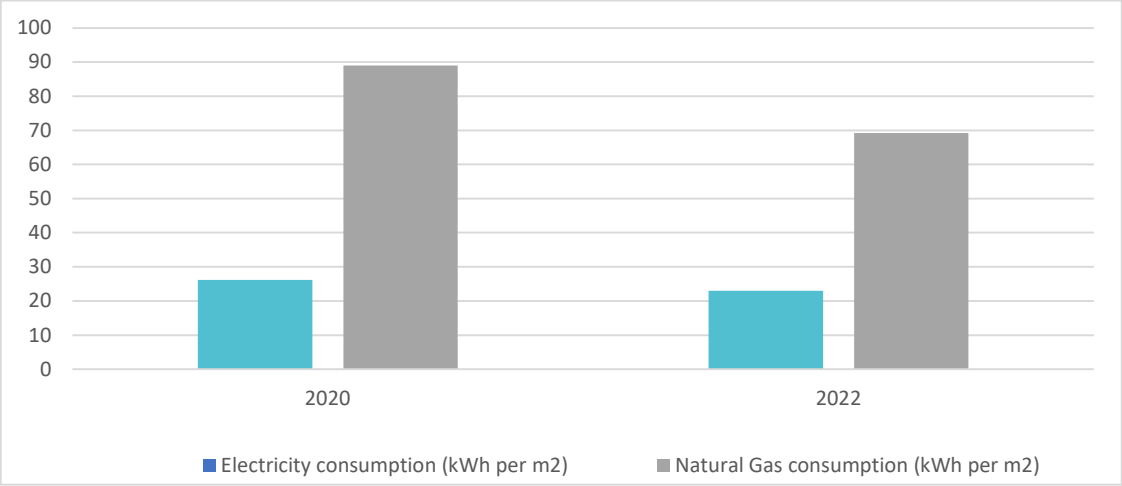

Figure 2: Energy consumption comparison for the years 2020 and 2022

Figure 3 gives insights on the CO_2-emissions per m^2 of the Eligible Asset Portfolio in 2020 and 2022. The total energy consumption is converted to CO_2-emission by using standard conversion factors. The CO_2-emission is calculated over the entire portfolio, divided by the total amount of square meters. This graph shows that the GHG emissions per m^2 of the Eligible Asset Portfolio have decreased, from 26.86 CO_2 per m^2 to 21.15 CO_2 per m^2. The avoided emissions have increased from 10.34 kg CO_2 per m^2 to 11.97 kg CO_2 per m^2.

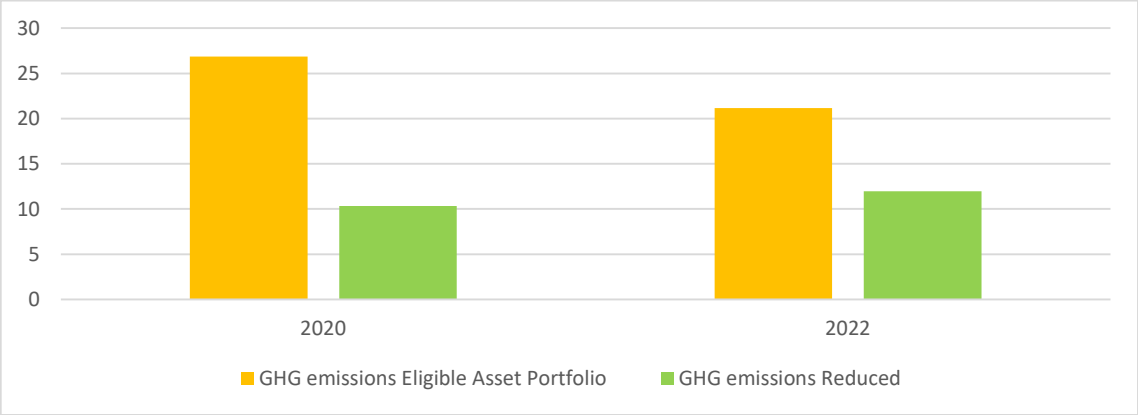

Figure 3: Reduced CO_2-Emissions relative to the reference group for the years 2020 and 2022

Conclusion

The following conclusions are drawn from this study:

- The buildings in the Eligible Asset Portfolio for NN Group are estimated to emit 49,757 tonnes of CO_2 per year less than the Reference Group, which is a difference of 36%.
- The total energy consumption is calculated at 92 kWh/m^2.
- The avoided emissions have increased from 28% for 2020 to 36% for the year 2022. A total of 8% increased avoided emission performance in relation to the reference group.
- All buildings in the Eligible Asset Portfolio deliver a substantial contribution to climate change mitigation following the EU Taxonomy definition, either by having an EPC class A rating and belonging to the top 15% of the national building stock expressed as operational PED, or meeting the requirements for a PED lower than 10% threshold set for a Nearly Zero Energy Building (NZEB).