Impact report for Green Lion 2023-1

Project: Green Lion 2023-1 BV

Subject: Reduced CO_2-emission calculation

Date: 22ND of August 2023

Status: Final

As requested by ING Bank NV, CFP Green Buildings has been asked to compare the greenhouse gas emissions[1] of a specific, energy-efficient group of residential real estate properties (defined as Selected Pool and in this document indicated as properties under the residential mortgage loan receivables of Green Lion 2023-1 B.V. with a cut-off date of June 30, 2023) to that of a comparable group of real estate with an average Dutch energy efficiency (indicated as "Reference" or "Reference Group"[2]). The objective of this analysis is to demonstrate that the selected buildings belong to the top most sustainable buildings in The Netherlands. This document outlines the results of this analysis.

The Eligible Green Building Portfolio

All of the assets in the Selected Pool that are built before 2021 have a valid and definitive energy label A or higher, as required by the EU taxonomy. Buildings that are built after 2021, have an A-label and meet the requirements for a PED lower than 10% threshold set for a Nearly Zero Energy Building (NZEB) are also included in the Selected Pool . This selection refers to the preliminary portfolio selection that is expected to be largely comparable to the portfolio at closing of the transaction.

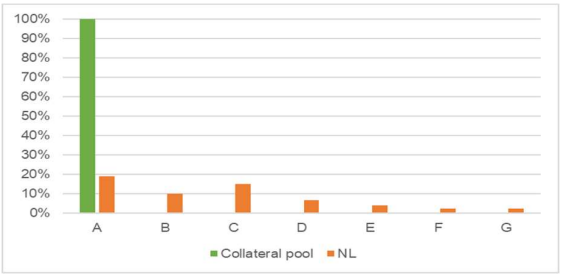

Figure 1: Distribution registered energy labels Selected Pool and residential buildings in the Netherlands

Methodology

Within this study the CO_2-emissions of 3,278 residential objects, as selected by ING, were determined using the calculated energy consumption of these objects.

The energy usage used to calculate the theoretical CO_2 emissions 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 and 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 CBS[3] and CFP. The CO_2-emissions were calculated with the Dutch market

[1] Greenhouse gas emissions are calculated in CO_2-equivalent, which will be referred to as CO_2 throughout this document.

[2] The Reference Group is a group of residential buildings with comparable floor area and average Dutch energy efficiency.

[3] The Dutch national statistical office. https://www.cbs.nl/en-gb

standard conversion factors, derived from the Green Deal CO_2-Emissionfactors. The applied factors are illustrated in table 1[4].

Applied GHG emission factors[5]		
Natural gas	2.079	kg CO_2e /m^3
Electricity	0.337	kg CO_2e /kWh

Table 1: Dutch CO_2-emission factors

Table 2 shows the distribution of the assets in the Selected Pool.

Criteria	Objects
Buildings built before 2021 with definitive A labels or higher	2,649
Buildings built since 2021 with PED of NZEB -10%	629

Table 2: Assets in the Selected Pool

Energy consumption

Table 3 shows the calculated energy consumption of the Selected Pool. The calculated energy consumption for electricity is approximately 15.23 million kWh each year and approximately 2.65 million m^3 natural gas each year.

Electricity (kWh)	Natural gas(m^3)
15,226,518	2,654,753

Table 3: Energy consumption of the selected pool

CO_2- emission

Table 4 shows the CO_2-emissions of the Selected Pool and the reference group based on calculated energy consumption. The total CO_2-emission of the properties under the residential mortgage loan receivables of Green Lion 2023-1 B.V.is 10,651 tonnes CO_2 per year. The reference CO_2-emission is 14,776 tonnes of CO_2 per year. This results in an emissions reduction of the 4,125 tonnes of CO_2 per year versus reference group.

Emission Selected Pool (tonnes CO_2)	Emission reference (tonnes CO_2)	Emission reduced (tonnes CO_2)
10,651	14,776	4,125

Table 4: Total CO_2-emission Selected Pool compared to Reference group

Table 5 gives a summarized overview of the reduced CO_2-emissions in relation to the reference group for the two different criteria building groups with registered A labels.

Approximately 80.2% (in square meters) of the portfolio consists of A label buildings or higher built before 2021. The CO_2-emissions of the A label buildings built before 2021 is 9,371 tonnes of CO_2 per year. The reference CO_2-emission for this group is 11,844 CO_2 per year.

Approximately 19.8% of the portfolio consists of buildings that are eligible for this transaction due to meeting the requirements for a PED lower than 10% threshold set for a Nearly Zero Energy Building (NZEB). The total CO_2-emissions of the Selected Pool for these new buildings is 1,280 tonnes of CO_2 per year. The reference CO_2-emission is 2,932 tonnes of CO_2 per year. The reduction in CO_2-emissions for the two building groups can be found in table 5 below:

[4] Source: https://www.co2emissiefactoren.nl using WTW emissions for natural gas in kg/CO_2 per m^3.

[5] Source: https://www.co2emissiefactoren.nl using WTW emissions for electricity (unknown) in kg/CO_2 in kWh.

	#	m²	Emission Selected Pool (tonnes CO_2)	Emission reference (tonnes CO_2)	Emission reduced (tonnes CO_2)
Buildings A label Built before 2021	2,649	337,837	9,371	11,844	2,473
Buildings built since 2021 with A label and PED of NZEB -10%	629	83,632	1,280	2,932	1,652
Total	3,278	421,469	10,651	14,776	4,125

Table 5: Summarized overview of the reduced CO2 emissions compared to the reference

Conclusion

The following conclusions are drawn from this study:

- Based on the calculated energy consumption, the Selected Pool has a CO_2-emission that is 4,125 tonnes per year lower than the reference, which is a difference of 27.9%.
- The current indexed loan to value of the portfolio is 73.16%. The total financed emissions for the under the residential mortgage loan receivables of Green Lion 2023-1 B.V. are 7,792 tonnes per year.
- Properties under the residential mortgage loan receivables of Green Lion 2023-1 B.V built before 2021 deliver a substantial contribution to climate change mitigation following the EU Taxonomy definition, by having an EPC class A rating or higher. This also holds for buildings built after 2021 by meeting the requirements for a PED lower than 10% threshold set for a Nearly Zero Energy Building (NZEB).