

W/E report 32015

Avoided CO₂ emissions Green Bond Portfolio NIBC

Status per 31-12-2021

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Project

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1 NIBC Green Bond

As requested by NIBC, W/E consultants have calculated the CO₂ impact indication of the assets which are financed by the outstanding NIBC Green Bond portfolio as per 31 December 2021. This report covers the impact calculations of the current green bond NIBC portfolio, consisting of ISIN code XS2384734542.

In this report the carbon impact is calculated per eligible asset category (mortgages for residential buildings and for commercial real estate) depending on the distribution of allocated assets per 31 December 2021. Core indicators are reported in accordance with the 'The Global GHG Accounting & Reporting Standard for the Financial Industry' of PCAF¹.

The method for calculating the avoided CO₂-emissions is described in chapter 2. The calculated CO₂-emissions of the NIBC portfolio per use function (in Dutch: gebruiksfunctie) can be found in chapter 3. The benchmark CO₂-emissions are calculated and compared to the CO₂-emissions of the NIBC portfolio in chapter 4. The PCAF CO₂ coefficients and the distribution of the m² useful floor area of the average buildings in the Netherlands can be found in chapter 5, the Annex. The calculated total financed CO₂-emission reduction of the current green bond NIBC portfolio compared to the benchmark is 3,828.7 tonnes CO₂ per year (-28,0%; Table 2).

1.1 Characteristics NIBC portfolio

Table 1 Data portfolio NIBC per use function².

Use function	number of property units ³	useful floor area [m ²]	property value [€]	current loan [€]
Health	1	3,944	8,292,880	4,975,728
Office	20	99,878	273,251,035	151,251,110
Shop	5	5,509	17,061,541	8,530,771
Residential	2,294	314,348	935,805,791	643,598,397
TOTAL	2,320	423,679	1,234,411,247	808,356,005

1.2 Total (financed) CO₂-emission NIBC portfolio

The proceeds of the current green bond portfolio are allocated to the retail mortgages and the CRE selection project categories of NIBC. For each of these categories, the annual avoided CO₂ emissions (compared to a national benchmark) have been calculated (Table 2).

Table 2 Avoided CO₂-emissions all assets within the Green Bond Portfolio⁴.

	NIBC [tonnes/a]	Benchmark [tonnes/a]	Reduction [tonnes/a]	Reduction [%]
CO ₂ -emission	15,654.8	21,590.9	-5,936.0	-27.5%
Financed CO ₂ -emission	9,837.8	13,666.5	-3,828.7	-28.0%

¹ PCAF (2020). 'The Global GHG Accounting and Reporting Standard for the Financial Industry. First edition.' 'PCAF-Global-GHG-Standard.pdf', 18th November 2020, <https://carbonaccountingfinancials.com/standard>

² NIBC provided data in two spreadsheets: '2021Q4 NIBC CRE selection for green bond.xlsx' (use functions: office, health, shop, residential buildings), '2021Q4 NIBC retail mortgages selection for green bond.xlsx'.

³ In Dutch: 'verblijfsobject'.

⁴ In this report, we use metric tonnes (1,000 kilograms).

2 Calculation method CO₂-emissions

The method for calculating the financed CO₂ emissions is derived from chapters '5.4 Commercial real estate' and '5.5 mortgages' of the PCAF publication.

The following calculations are made:

- The CO₂-emissions of the buildings in the NIBC portfolio.
- The financed CO₂-emissions of these buildings. This is the calculated CO₂-emission per building multiplied by the attribution factor.
- Avoided emissions: The comparison of these (financed) CO₂-emissions to a relevant benchmark, in this case, the average CO₂-emissions of a comparable set of buildings in the Netherlands.

The annual CO₂-emissions are calculated using CO₂ coefficients per use function per energy label G-A⁺⁺⁺ (tonnes/m².a; see Table 8 in the Annex, taken from the PCAF database⁵) and the relevant data for all buildings in the NIBC portfolio: use function (office, shop, dwelling, etc.), useful floor area [m²] and the energy label. See formula [1] in the Annex.

The financed CO₂-emissions, as calculated according to formula [3] in the Annex, include the attribution factor in the calculations. The attribution factor is the ratio between the outstanding loan amount and the property value at origination, as calculated in formula [2] in the Annex. Per building the calculated CO₂-emission is multiplied by the attribution factor of that building.

To compare the calculated CO₂-emissions to a benchmark, an average CO₂ coefficient [tonnes/m².a] per use function is calculated, using the average set of privately-owned dwellings in the Netherlands derived from WoON2018⁶ and the average set of other use functions in the Netherlands as derived from the recent calibration for new energy labels of utility buildings in the Netherlands⁷.

WoON2018 provides the useful floor area per dwelling. The corresponding energy labels of these dwellings have been calculated with NTA 8800:2022⁸.

The calculations of the (financed) CO₂-emission reduction of the buildings in the NIBC portfolio compared to the benchmark are made per building and then summed up per use function and then to a total.

2.1 Step-by-step

Calculations are made per building and then summed per use function and then total.

1. Collect the following data for all buildings in the NIBC portfolio:
 - Use function
 - Current loan amount [euro]
 - Loan amount at origination [euro]
 - % NIBC financing [%]
 - Energy label
 - Useful floor area according to BAG [m²]

⁵ PCAF: Enabling financial institutions to assess greenhouse gas emissions | PCAF (carbonaccountingfinancials.com)

⁶ WoON2018: <https://2018.woononderzoek.nl/jive/jivereportcontents.ashx?report=homenew>

⁷ Inijkingsstudie energielabels utiliteitsgebouwen, 2020: <https://www.rijksoverheid.nl/documenten/publicaties/2020/04/29/advies-klassenindeling-energielabel-op-basis-van-nta-8800-voor-woningen-en-utiliteitsgebouwen>

⁸ NTA 8800 <https://www.nen.nl/nta-8800-2022-nl-290717>

2. Collect the CO₂ coefficients per m² useful floor area, per energy label from the PCAF website.
3. Use data from the first steps and the formulas of paragraph 5.3 in the Annex to calculate the CO₂-emission of the buildings in the NIBC portfolio (results in chapter 3).
4. Calculate the average CO₂ coefficient [tonnes/m².a] per use function in the Netherlands using the average distribution of the m² useful floor area per energy label in the Netherlands and the PCAF CO₂ coefficients per use function and energy label. The average distribution of useful floor area over the energy labels comes from WoON2018 (dwellings) and the calibration for new energy labels of utility buildings in the Netherlands (other use functions).
5. Calculate the benchmark CO₂-emission per building, using the useful floor area of the building and the calculated average CO₂ coefficient for the corresponding use function. See paragraph 4.
6. Sum up all the calculated (financed) CO₂-emissions per building to the CO₂-emissions per use function and the total CO₂-emission.
7. The reduction is calculated to subtract the CO₂-emissions for the NIBC portfolio from the CO₂-emissions of the average building set.

3 CO₂-emissions - Portfolio NIBC

The CO₂ emissions of dwellings are determined on the basis of data on single family dwellings provided in the spreadsheet '2021Q4 NIBC retail mortgages selection for green bond.xlsx' and the data on residential buildings in the spreadsheet '2021Q4 NIBC CRE selection for green bond.xlsx'.

3.1 Energy label distribution

The distribution of useful floor area per use function and per energy label.

Table 3 Useful floor area per use function and per energy label [m²]

Use function	A+++	A++	A+	A	Total
Health				3,944	3,944
Office	1,890	19,668	14,879	63,441	99,878
Shops				5,509	5,509
Residential buildings				6,873	6,873
Single family dwellings	1,073	1,178	2,601	302,623	307,475
TOTAL	2,963	20,846	17,480	382,390	423,679

3.2 CO₂-emissions portfolio NIBC

To calculate the CO₂ emissions of all buildings within the NIBC portfolio, the data from Table 3 (useful floor area in m²) and Table 8 (CO₂ coefficient in tonnes/m².a) are combined. The results are given per energy label and use function to be able to follow the calculation.

Table 4 CO₂-emission all buildings within NIBC portfolio [tonnes/a]

Use function	A+++	A++	A+	A	Total
Health				334.0	334.0
Office	75.5	1,078.4	978.3	5,241.9	7,374.0
Shops				517.1	517.1
Residential buildings				133.4	133.4
Single family dwellings	12.2	18.5	49.2	7,216.5	7,296.4
TOTAL	87.7	1,096.9	1,027.5	13,442.8	15,654.8

3.3 CO₂-emissions of financed part portfolio NIBC

Table 5 CO₂-emission of financed part of all buildings within NIBC portfolio [tonnes/a]

Use function	A+++	A++	A+	A	Total
Health				200.4	200.4
Office	41.5	618.3	866.1	2,749.3	4,275.1
Shops				258.5	258.5
Residential buildings				88.3	88.3
Single family dwellings	9.2	14.9	35.6	4,955.7	5,015.5
TOTAL	50.8	633.2	901.7	8,252.2	9,837.8

4 CO₂-emissions - Benchmark

The CO₂-emissions of the buildings in the NIBC portfolio are compared to the benchmark: the average CO₂-emissions of buildings in the Netherlands. Calculations are made per building and then summed per use function and then for all buildings.

The basic principle of calculating the average CO₂-emissions is the same as used for the NIBC portfolio (formula [1] in the Annex). The deciding parameters are the distribution of useful floor area of Dutch buildings per use function over the energy labels and the CO₂ coefficients per use function and energy label in the PDAC data. The difference between the distribution of useful floor area of the buildings in the NIBC portfolio compared to the average distribution in the Netherlands. In the Annex data are given of the distribution of useful floor area and the average CO₂ coefficients per use function (see Table 9 and Table 10 in the Annex). See paragraph 4.1.

For comparing the financed CO₂-emissions of the buildings in the NIBC portfolio, the calculated 'average' CO₂-emission per building is multiplied by the attribution factor for that building (formulas [1], [3]).

4.1 CO₂-emissions NIBC and Benchmark NL

Table 6 CO₂-emission of the NIBC portfolio (calculated with actual energy labels) compared to an equivalent building stock (calculated with average CO₂ coefficients for Dutch buildings).

Use function	Benchmark CO ₂ -emission [tonnes/a]	NIBC CO ₂ -emission [tonnes/a]	Reduction CO ₂ -emission [tonnes/a]
Health	444.7	334.0	-110.7
Office	10,511.7	7,374.0	-3,137.7
Shops	499.5	517.1	+17.5
Residential buildings	180.8	133.4	-47.4
Single family dwellings	9,954.1	7,296.4	-2,657.7
TOTAL	21,590.9	15,654.8	-5,936.0

4.2 Financed CO₂-emission reduction

Table 7 CO₂-emission of the financed part of the NIBC portfolio (calculated with actual energy labels) compared to an equivalent building stock (calculated with average CO₂ coefficients for Dutch buildings).

Use function	Benchmark CO ₂ -emission [tonnes/a]	NIBC CO ₂ -emission [tonnes/a]	Reduction CO ₂ -emission [tonnes/a]	[%]
Health	266.8	200.4	-66.4	-24.9%
Office	6,184.4	4,275.1	-1,909.3	-30.9%
Shops	249.8	258.5	+8.8	+3.5%
Residential buildings	119.7	88.3	-31.4	-26.2%
Single family dwellings	6,845.8	5,015.5	-1,830.4	-26.7%
TOTAL	13,666.5	9,837,8	-3,828,7	-28.0%

5 Annex

5.1 CO₂-coefficients PCAF

PCAF has CO₂-emissions available for several commercial real estate classes (use function) per energy label.

Table 8 CO₂ coefficients on PCAF website (July 2022) [tonnes CO₂/m²a]

CRE	A++++	A+++	A++	A+	A	B	C	D	E	F	G
Healthcare	0.031	0.041	0.056	0.067	0.085	0.102	0.120	0.141	0.158	0.176	0.195
Office	0.030	0.040	0.055	0.066	0.083	0.100	0.117	0.137	0.154	0.172	0.190
Retail – high street	0.034	0.045	0.062	0.075	0.094	0.113	0.133	0.156	0.175	0.195	0.216
Residential buildings	0.007	0.010	0.013	0.016	0.019	0.023	0.027	0.032	0.036	0.040	0.044
Single family dwelling	0.008	0.011	0.016	0.019	0.024	0.029	0.034	0.040	0.045	0.050	0.055

5.2 Distribution m² useful floor area over energy labels & CO₂ coefficient NL

Table 9 The current distribution of m² useful floor area per use function over the energy labels in the Netherlands [% per use function]. Sources are WoON2018 (single family dwellings and residential buildings) and the calibration study for energy labels (non-residential).

CRE	A++++	A+++	A++	A+	A	B	C	D	E	F	G
Healthcare	0.2%	3.9%	12.3%	8.3%	13.7%	11.6%	16.0%	11.7%	8.8%	4.5%	9.2%
Office	0.1%	3.5%	13.9%	9.5%	20.9%	11.1%	12.6%	9.2%	4.9%	3.4%	11.0%
Retail – high street	0.3%	11.1%	31.9%	15.5%	14.5%	7.0%	6.6%	4.5%	3.1%	2.3%	3.2%
Residential buildings	0.0%	0.0%	0.3%	2.2%	35.5%	12.3%	22.4%	9.2%	7.7%	3.6%	6.8%
Single family dwelling	0.2%	0.6%	1.0%	1.6%	19.1%	21.0%	35.6%	10.4%	6.0%	3.0%	1.4%

Table 10 Average CO₂-emission per use function [tonnes/m².a]

Use function	CO ₂ -emission [tonnes/m ² .a]
Healthcare	0.1128
Office	0.1052
Retail – high street	0.0907
Residential buildings	0.0263
Single family dwelling	0.0324

5.3 Formulas

The following formulas are used to calculate the CO₂ emission of the buildings in the portfolio. All calculations have been done per building. Summed results per use function (and when necessary per energy label) are presented in the report.

- [1] CO₂-emission = CO₂ coefficient PCAF * useful floor area
 - > CO₂ emission [tonnes CO₂/a]
 - > CO₂ coefficient PCAF, as given in Table 8 in the Annex [tonnes CO₂/m².a]
 - > useful floor area, as given in the NIBC datasheets [m²]

- [2] Attribution factor = outstanding amount / property value at origination
 - > attribution factor, ratio between outstanding amount and property value at origination [-]
 - > outstanding amount, as is found in the NIBC data under 'current loan amount' [€]
 - > property value at origination, as can be calculated with the NIBC data:
= 'loan amount at origination' / '% NIBC financing' [€]

- [3] Financed CO₂-emission = CO₂-emission * attribution factor
 - > Financed CO₂-emission, as the main result of the calculation [tonnes CO₂/a]