Greenhouse Gas Emissions of BNG's assets

Reporting year 2024

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Management summary

In 2015, the Paris Climate Agreement set the goal of limiting global warming to less than two degrees Celsius above pre-industrial levels. The aim is to keep warming limited to one and a half degrees. Subsequently, the Netherlands set a specific target in the 2019 National Dutch Climate Agreement: to reduce greenhouse gas (GHG) emissions by 55% by 2030, compared to 1990 levels. The Netherlands wants to be carbon neutral in 2050.[1] Much remains to be done to make the transition to a low-carbon society. While many organisations are taking action, many others are still lagging behind.

Since the Paris Climate Conference in 2015, the banking sector has been actively engaged in helping to realise the ambitions of the Paris Agreement. Given the scale of the climate challenge and the crucial role of the banking industry and the financial sector in general in facilitating the transition to net zero carbon, the Partnership for Carbon Accounting Financials (PCAF) was established.

BNG committed itself to PCAF in 2019. Using the PCAF methodology, the GHG emissions of BNG's loan portfolio have been calculated and disclosed in BNG's annual report from 2019 onwards.[2] The loan portfiolio includes the following sectors: housing, public sector, healthcare institutions, educational institutions, public infrastructure, sector 'others' and energy. Identifying ways to improve the methodology is part of the PCAF project for BNG. This includes improving the methodology by, for example by using better data sources. These improvements can be seen as an additional contribution made by BNG to the further development of the PCAF methodology. In this report, the summary tables include the results of the loan portfiolio for the years 2018, 2022, and 2023 and the results of the bonds and medium term notes for the years 2022 and 2023. The 2023 results are the most recent. The results are therefore one year behind. Calculating and presenting GHG emissions over a period of time allows the bank to monitor the evolution of GHG emissions over time.

This report describes the results and methodology of the GHG emissions assessment of BNG's loan portfolio and bonds and medium term notes for the year 2023. The climate impact has been (re)calculated in accordance with the latest available harmonized approach for the financial sector in the Netherlands[3] and the global GHG accounting & reporting standard.[4]

First, the results of the loan portfolio are discussed. As shown in Table S-1, 99.6% of BNG's loan portfolio is covered in this GHG emissions report. The coverage ratio increased by 9.8%pt compared to 2022. This increase in coverage ratio is due to an improved coverage ratio within sectors such as social housing, healthcare and education, but also new sectors have been added. Some sectors have been added but with poorer data quality. The GHG footprint is now more complete, but a challenge remains to improve the data quality in the

[1] Klimaatbeleid | Klimaatverandering | Rijksoverheid.nl
[2] https://www.bngbank.com/Financials/Annual-report
[3] Accounting GHG emissions and taking action: harmonised approach for the financial sector in the Netherlands PCAF The Netherlands, report 2019
[4] https://carbonaccountingfinancials.com/standard
PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.

coming years. Although the coverage ratio for 2023 is 99.6%, not all sectors in Table S-2 include scope 1, 2 and 3 emissions (Appendix A). Where scope 3 emissions are included, they are not always complete, for instance, in sectors such as healthcare.

Table S-1 Total outstanding loans of BNG and part covered in the GHG assessment for the years 2018, 2022, and 2023[5]

Market segment	Sector	Total loan portfolio (million euro)			Coverage ratio by GHG footprint of total loan portfolio (%)		
		2018	**2022^**	**2023**	**2018**	**2022**	**2023**
Housing	Social housing associations	38,947	44,118	45,957	94.0	96.8	100.0
	Housing related	496	715	784	0.0	0.0	100.0
Public sector	Municipalities	26,066	25,765	25,104	99.6	100.0	100.0
	Provinces	137	421	449	100.0	100.0	100.0
	Water boards	233	197	220	100.0	100.0	100.0
	Joint arrangements	1,362	1,270	1,303	0.0	2.8	100.0
	Other public institutions	768	560	510	0.0	0.0	100.0
Healthcare	Healthcare	7,031	6,724	6,629	87.7	95.7	100.0
Education	Educational institutions	979	1,057	1,035	54.2	62.2	100.0
Public infrastructure	Public transport	909	986	1,153	0.0	27.7	100.0
	Infrastructure	1,220	1,126	1,028	72.6	71.4	100.0
	Waste collection and processing	754	710	697	0.0	0.0	100.0
	Drinking water companies[#]	811	548	677	0.0	94.3	92.2
	Spatial planning	754	631	592	0.0	0.0	100.0
	Network operators (energy, telecom)	451	603	486	0.0	0.0	100.0
Others	Others	381	317	281	0.0	18.3	100.0
Energy	Renewable energy	309	867	808	0.0	0.0	65.9
	Sustainability projects	19	48	52	0.0	0.0	0.0
Total		**81,628**	**86,664**	**87,767**	**86.4**	**89.8**	**99.6**

^The current report does not include data for 2019, 2020, and 2021. It is decided to calculate 3 years: The reference year (2018) and the two most recent years, 2022 and 2023.

[#]For drinking water companies, the reference year is not 2018, but 2020. Sector specific data is presented in chapter 16.

Table S-2 shows that for 99.6% of BNG's loan portfolio, the total financed GHG emissions are 2,445,423 tCO_2e, the relative financed GHG emissions are 28.2 tCO_2e per million euro and the overall data quality score is 2.8 on a scale of 1 (best) to 5 (poor). Due to the addition of new sectors in this year's report and an overall increase in coverage ratio of 9.8%pt, the absolute and relative financed GHG emissions cannot be compared with previous years. To be able to compare the GHG footprint between 2022 and 2023, an extra row called 'sectors in scope in 2022' has been added to Table S-2. This comparison shows that the financed GHG emissions decreased by 12,855 tCO_2e and the relative financed GHG emissions decreased by 1.1 tCO_2e/million (Table S-2). This shows that for the majority of the loan portfolio (92%), the absolute and relative financed GHG emissions decreased between 2022 and 2023. The same picture emerges when comparing scope 1 and 2 of the sectors for

[5]Reference date for the year 2023 is 31-12-2023, reference date for the year 2022 is 31-12-2022, and reference date for the year 2018 is 31-12-2018.

which BNG has set targets in their climate action plan (Table S-2: social housing, municipalities, healthcare and education). This is supported by the figures for financed GHG emissions per financed m^2 for these four sectors (see the individual chapters). The social housing sector has the lowest financed GHG emissions per financed m^2 (22.0 $kgCO_2e/m^2$; 2023) and the healthcare institutions have the highest (72.4 $kgCO_2e/m^2$; 2023). For all four sectors, financed GHG emissions per financed m^2 have decreased over time.

Most of the newly added sectors have high financed GHG emissions per million euro (relative GHG emissions). The three newly added sectors with the highest relative financed GHG emissions are: waste collection and processing, infrastructure and network operators (energy, telecom). Together, these sectors cover only 2.5% of BNG's loan portfolio, but the financed GHG emissions per million euro are 263 tCO_2e. For the new sectors, BNG's aim is to improve data quality in the coming years and to monitor whether GHG emissions per million euro are decreasing.

BNG also finances renewable energy projects such as wind- and solar parks. These projects displace emissions that would otherwise have occurred without these projects. The net avoided emissions of these projects demonstrate a quantifiable positive contribution to decarbonisation. The financed avoided emissions are reported separately in Chapter 20. The net financed avoided GHG emissions were calculated for 65.9% of BNG's clients in the renewable energy sector.

Table S-2 Absolute and relative financed GHG emissions for the years 2018, 2022, and 2023

Market segment	Sector ^	Scope#	Loans of clients for which a GHG footprint was calculated (million euro)			Financed GHG emissions (tCO_2e)			Relative financed GHG emissions (tCO_2e/million euro)			Data quality **
			2018	**2022^**	**2023**	**2018**	**2022**	**2023**	**2018**	**2022**	**2023**	**2023**
Housing	Social housing associations*	1-2	36,617	42,688	45,957	635,242	492,426	458,990	17.3	11.5	10.0	2.0
	Housing related	1-2-3	0	0	784	-	-	5,395	-	-	6.9	5.0
Public sector	Municipalities*	1-2-3	25,973	25,765	25,104	1,078,520	881,339	913,282	41.5	34.2	36.4	3.7
	Provinces	1-2-3	137	421	449	8,703	16,537	12,546	63.6	39.2	27.9	4.0
	Water boards	1-2-3	233	197	220	33,677	15,675	14,244	144.4	79.4	64.7	2.8
	Joint arrangements	1-2-3	0	36	1,303	-	513	86,175	-	14.2	66.1	5.0
	Other public institutions	1-2-3	0	0	510	-	-	32,008	-	-	62.7	5.0
Healthcare	Healthcare*	1-2-3	6,167	6,432	6,629	285,245	207,946	199,885	46.3	32.3	30.2	3.2
Education	Educational institutions*	1-2	531	657	1,035	15,923	12,919	13,679	30.0	19.7	13.2	3.4
Public infrastructure	Public transport	1-2-3	0	273	1,153	-	1,099	16,592	-	4.0	14.4	3.6
	Infrastructure	1-2-3	885	804	1,028	14,017	120,520	237,024	15.8	149.9	230.6	3.8
	Waste collection and processing	1-2-3	0	0	697	-	-	270,500	-	-	387.8	2.0
	Drinking water companies	1-2-3	0	517	624	-	20,356	21,717	-	39.3	34.8	2.2
	Spatial planning	1-2-3	0	0	592	-	-	66,444	-	-	112.2	5.0
	Network operators (energy, telecom)	1-2-3	0	0	486	-	-	74,226	-	-	152.7	4.2
Others	Others	1-2-3	0	58	281	-	214	22,717	-	3.7	80.7	5.0
Energy	Renewable energy##	3	0	0	533	-	-	-	-	-	-	-
Total	**All Sectors**		**70,542**	**77,848**	**87,388**	**2,071,328**	**1,769,542**	**2,445,423**	**29.4**	**22.7**	**28.2**	**2.8**
Total	**Sectors in scope in 2022^^**			**76,677**	**80,019**		**1,647,196**	**1,634,343**		**21.5**	**20.4**	

^In current report, data of the years 2019, 2020 and 2021 are not included. It is decided to calculate 3 years: the reference year (2018) and the two most recent years, 2022 and 2023 current report.

#This column presents which sectors contain only scopes 1 and 2 and which sectors contain (parts of) scope 3 in 2023.

**Weighted average data quality score. More details about the data quality score can be found in section 2.3.

^^Social housing, municipalities, provinces, water boards, healthcare, education and drinking water companies.

Net avoided emissions have been calculated for wind and solar farms but are not included in this table because generated and avoided emissions may not be added together.

Table S-3 Avoided financed GHG emissions for the energy portfolio in 2023

Sector	Loans of clients for which a GHG footprint was calculated (million euro)	Financed GHG emissions (tCO_2e)	Relative financed GHG emissions (tCO_2e/million euro)	Data quality*
Energy / financed Net avoided GHG emissions	533	380,410	714.3	3.0

*Weighted average data quality score. More details about the data quality score can be found in section 2.3.

This table only includes financed net avoided emissions of renewable energy projects and does not include avoided emissions from housing associations and drinking water companies (see Table 21-4 in chapter 21), as only gross financed avoided emissions are known for the housing associations and drinking water companies.

In addition to the GHG footprint of BNG's loan portfolio, this report also includes the GHG footprint of the bonds and medium term notes. BNG holds debt securities of sovereigns and supranationals and multilateral development banks, municipalities, public infrastructure and others. Table S-4 shows the outstanding amounts and coverage ratio of the GHG footprint of the bonds and medium term notes issued by sovereigns and supranationals and multilateral development banks. Table S-6 shows this for the bonds and medium term notes issued by municipalities, public infrastructure and others. For all bonds and medium term notes except municipal bonds and medium term notes, the outstanding amounts increased between 2022 and 2023 (Table S-4 and S-6).

The coverage ratio of the GHG footprint of the bonds and medium term notes issued by sovereigns and supranationals and multilateral development banks is 87.1% for 2023 (Table S-4). For these bonds and medium term notes the total outstanding amounts with a GHG footprint increased by 3,146 million euro. Total financed GHG emissions for the bonds and medium term notes issued by sovereigns and supranationals and multilateral development banks are 1,889,958 tCO_2e, the relative financed GHG emissions are 234.1 tCO_2e per million euro (excl. LULUCF) and the overall data quality score is 3.8 on a scale of 1 (best) to 5 (poor). Total financed GHG emissions for these bonds and medium term notes increased by 565,112 tCO_2e (excl. LULUCF) between 2022 and 2023. The total relative financed GHG emissions excluding and including LULUCF decreased by 34.7 tCO_2e per million euro and 35.9 tCO_2e per million euro, respectively (Table S-5). This shows that GHG emissions per million euro have reduced. These bonds and medium term notes are relatively CO_2 intensive (relatively high CO_2e per million euros). It will be interesting to see if this will be reduced in the coming years.

Table S-4 Total outstanding bonds and medium term notes issued by Sovereigns and Supranationals and Multilateral development banks and part covered in the GHG assessment for the years 2022 and 2023[6]

Bonds and medium term notes	Total bonds and medium term notes (million euro)		Coverage ratio by GHG footprint of total bonds and medium term notes (%)	
	2022	**2023**	**2022**	**2023**
Sovereigns	3,294	3,808	100.0	100.0
Supranationals and Multilateral development banks	2,785	5,462	58.7	78.1
Total	**6,079**	**9,270**	**81.1**	**87.1**

[6]Reference date for the year 2023 is 31-12-2023 and reference date for the year 2022 is 31-12-2022.

Table S-5 Absolute and relative financed GHG emissions for bonds and medium term notes issued by Sovereigns and Supranationals and Multilateral development banks in the years 2022 and 2023

Bonds and medium term notes	Scopes	Bonds and medium term notes for which a GHG footprint was calculated (million euro)		Financed GHG emissions (tCO_2e)		Relative financed GHG emissions (tCO_2e/million euro)		Data quality **
		2022	**2023**	**2022**	**2023**	**2022**	**2023**	**2023**
Sovereigns excl. LULUCF	1-2-3	3,294	3,808	1,038,470	1,159,639	315.3	304.5	2.5
Supranationals and Multilateral development banks excl. LULUCF	1	1,634	4,266	286,376	730,319	175.3	171.2	5.0
Total excl. LULUCF		**4,928**	**8,074**	**1,324,846**	**1,889,958**	**268.8**	**234.1**	**3.8**
Sovereigns incl. LULUCF*	1-2-3	3,294	3,808	1,016,476	1,136,087	308.6	298.3	
Supranationals and Multilateral development banks incl. LULUCF	1	1,634	4,266	261,176	667,603	159.8	156.5	
Total incl. LULUCF		**4,928**	**8,074**	**1,277,652**	**1,803,689**	**259.3**	**223.4**	

*LULUCF is Land Use, Land Use Change and Forestry. LULUCF is the only sector where net removal of CO_2 from the atmosphere is possible through carbon sequestration in biomass (wood, plants) and soil. In this table, GHG emissions including LULUCF are therefore lower than those excluding LULUCF.

The coverage ratio of the GHG footprint of the bonds and medium term notes issued by municipalities, public infrastructure and others is 15.2% for 2023 (Table S-6). For these bonds and medium term notes the total outstanding amounts for which a GHG footprint was calculated increased by 20 million euro. Total financed GHG emissions for the bonds and medium term notes issued by municipalities and public infrastructure are 94,977 tCO_2e, the relative financed GHG emissions are 56.5 tCO_2e per million euro and the overall data quality score is 3.1 on a scale of 1 (best) to 5 (poor). Total financed GHG emissions increased by 7,607 tCO_2e between 2022 and 2023 (Table S-7). The total relative financed GHG emissions also increased by 3.0 tCO_2e per million euro (Table S-7). This shows that GHG emissions per million euro have increased. The bonds and medium term notes issued by public infrastructure are relatively CO_2 intensive (relatively high CO_2e per million euros).

Table S-6 Total outstanding bonds and medium term notes issued by municipalities, public infrastructure and others and part covered in the GHG assessment for the years 2022 and 2023[7]

Bonds and medium term notes	Total bonds and medium term notes (million euro)		Coverage ratio by GHG footprint of total bonds and medium term notes (%)	
	2022	**2023**	**2022**	**2023**
Municipalities	1,297	1,247	100.0	100.0
Public infrastructure	336	436	100.0	100.0
Others	8,971	9,410	0.0	0.0
Total	**10,603**	**11,093**	**15.4**	**15.2**

[7]Reference date for the year 2023 is 31-12-2023 and reference date for the year 2022 is 31-12-2022.

Table S-7 Absolute and relative financed GHG emissions for bonds and medium term notes issued by municipalities and public infrastructure in the years 2022 and 2023

Bonds and medium term notes	Scopes	Bonds and medium term notes for which a GHG footprint was calculated (million euro)		Financed GHG emissions (tCO_2e)		Relative financed GHG emissions (tCO_2e/million euro)		Data quality **
		2022	**2023**	**2022**	**2023**	**2022**	**2023**	**2023**
Municipalities	1-2-3	1,297	1,247	33,259	32,261	25.7	25.9	3.8
Public infrastructure	1-2-3	336	436	54,111	62,716	161.0	143.8	1.1
Total		**1,633**	**1,682**	**87,370**	**94,977**	**53.5**	**56.5**	**3.1**

External factors will always have an impact on GHG emissions. In the last five years, events such as the COVID-19 crisis and the conflicts in the world have affected energy prices, energy consumption and travel patterns. Changes in weather conditions, especially in winter, can have an impact on GHG emissions. The energy consumption of social housing associations, municipalities, healthcare and education institutions has been corrected for weather conditions. In other sectors, the figures are not adjusted for weather conditions. Rainfall affects, for example, the energy consumption of water boards. Long term monitoring of the GHG footprint of BNG's loan portfolio will show whether the reduction is temporary, e.g. due to external factors, or whether it is a long-term positive development due to structural changes in behavior or investments in sustainable energy sources and/or investments in more sustainable real estate.

This year, 99.6% of BNG's loan portfolio is included in the GHG footprint. The introduction of new sectors and clients to this year's report makes comparisons with previous years difficult. Now that the coverage ratio is close to 100%, the focus in the coming years will be more on improving data quality and making scope 3 more complete.

Index

1 Introduction

The Paris Climate Agreement in 2015 agreed to limit global warming to less than two degrees Celsius above pre-industrial levels. The goal is to limit warming to one and a half degrees. Subsequently, the Netherlands set a specific target in the 2019 National Dutch Climate Agreement: to reduce greenhouse gas (GHG) emissions by 55% by 2030, compared to 1990 levels. The Netherlands wants to be carbon neutral in 2050.[8]
Meeting these targets will require an energy transition. Already, more and more electricity is being generated by renewable sources. Renewable energy will come not only from wind and sun, but also from geothermal heat, hydrogen and biogas. In addition to the transition to renewable energy, it remains important to become more energy efficient. This is also addressed in the Paris Climate Agreement. Saving energy remains important because demand for electricity is expected to increase in the (near) future as more cars become electric, industry replaces more oil and gas with clean energy, and buildings use more district heating or electricity for heating. Significant efforts are still needed to complete the transition to a low carbon-society. While many organisations are acting, many others are still lagging behind.

Since the Paris Climate Conference in 2015, the Dutch financial sector has been involved in contributing to the realization of the ambitions of the Paris Agreement. Banks play a crucial role in realising these ambitions. Not only because they represent the majority of the world's available capital, but also because the largest banks have still invested almost $4.6 trillion in the fossil fuel sector since the Paris Climate Agreement in 2015. This is equivalent to $1.8 billion every day since the end of 2015, with no downward trend and no assessment of the carbon impact of this funding.[9]
In 2019, 54 financial institutions signed the Climate Commitment. Banks, insurers, pension funds and asset managers agreed on how they, as the financial sector, will actively contribute to the Paris Climate Agreement and the Dutch Climate Agreement.[10] The participating institutions agreed on four actions: to participate in financing the energy transition, to measure the GHG emissions of their relevant financing and investments, to prepare action plans including GHG emission reduction targets, and to organise consultations with relevant stakeholders on the progress of the GHG emission reductions.

1.1 A Partnership for Carbon Accounting Financials: PCAF

PCAF is a global partnership of financial institutions working together to develop and implement a harmonized approach to assess and disclose the GHG emissions associated with their loans and investments.[11]

In 2015, the Dutch Carbon Pledge started with eleven institutions under the leadership of ASN Bank. These financial institutions wanted to take responsibility and take new and meaningful steps to keep global warming below safe levels. Since then, more financial

[8] Klimaatbeleid | Klimaatverandering | Rijksoverheid.nl
[9] https://carbonaccountingfinancials.com/about
[10] Commitment van de financiële sector | Publicatie | Klimaatakkoord
[11] https://carbonaccountingfinancials.com/about

institutions have joined forces under PCAF to develop and implement open-source methodologies to measure the GHG emissions of all asset classes within their loan and investment portfolios.[12] In 2019, BNG formally committed to the PCAF initiative.

Building on the GHG accounting activities in the Netherlands and North America, ABN AMRO, Amalgamated Bank, ASN Bank, Global Alliance for Banking on Values (GABV), and Triodos Bank decided to launch a global initiative to develop a global GHG accounting standard and increase the number of financial institutions applying this standard to over 250 institutions worldwide, ultimately making GHG accounting common practice in the financial industry and facilitating the transition in line with the Paris Climate Agreement.[13]

In November 2024, 553 financial institutions have committed to measure and disclose the GHG emissions associated with their portfolio of loans and investments with total financial assets of $ 92.4 trillion.[14]

All financial institutions have found great value in assessing and disclosing the GHG emissions of their loans and investments, as this stimulates an institution-wide discussion on climate change and the role of the financial institution in facilitating the transition to reach net zero emissions by 2050.

1.2 BNG and PCAF

In 2018, in preparation for joining the PCAF initiative, BNG asked Telos[15] to measure the GHG emissions related to the BNG's public loan portfolio, using the PCAF methodology. The first GHG emissions report was for the year 2018. Since then, the GHG emissions have been reported annually and disclosed in BNG's annual report.[16] Each year, BNG reports on the reference year, which is 2018, the most recent year and one year before.

For this report, the GHG footprint was calculated for BNG's loan, bond and medium term notes portfolio. This year, the important goal for BNG was to achieve a coverage rate of close to 100%.

1.3 From GHG footprint to action

Measuring and disclosing the GHG emissions associated with the financial institutions' lending and investment activities is necessary for transparency and accountability. But PCAF is not only about measuring and disclosing the GHG emissions of a financial institution's portfolio. It is also about identifying and setting targets for reducing the carbon footprint and taking action (Figure 1).

[12] https://carbonaccountingfinancials.com/about
[13] https://carbonaccountingfinancials.com/about#our-mission
[14] https://carbonaccountingfinancials.com/financial-institutions-taking-action#overview-of-financial-institutions
[15] At that time Telos was an independent research institute, based at Tilburg University. In January 2020 Het PON and Telos have merged into one organisation called Het PON & Telos. At the same moment this new institute , Het PON & Telos, became official partner of Tilburg University.
[16] Annual report 2022 (bngbank.com)

Figure 1. Visualization from GHG footprint to action

BNG has published its climate action plan in 2022. This plan sets out the BNG's strategy to reduce GHG emissions in the sectors social housing, municipalities, healthcare, and education. In its annual progress report, BNG tracks its progress on its targets.

1.4 Reading guide

This report describes the methodology and results of the GHG emissions assessment of BNG's loan, bond and medium term notes portfolio.

Chapter 2 describes the PCAF methodology in general. In chapter 3, the loan portfolio of BNG is presented. Chapters 4 to 20 describe the results of the coverage ratio, absolute and relative financed GHG emissions, and a description of the methodology for the sectors that are part of BNG's loan portfolio.

The following sectors of the loan portfolio are included in this report:

- Housing: Social housing sector and Housing related
- Public sector: Municipalities, Provinces and Water boards, Joint Arrangements and other public institutions
- Healthcare sector
- Educational institutions
- Public infrastructure: Public transport, Infrastructure, Waste collection and processing, Drinking water companies, Spatial planning and Network operators (energy and telecom)
- Sector 'others'
- Energy: Renewable energy and sustainability projects.

Chapter 21 summarises the results for all sectors of the loan portfolio.

Chapter 22 summarises the results for the bonds and medium term notes. The following bonds and medium term notes are part of the GHG footprint:

- Sovereigns
- Supranationals and Multilateral development banks
- Municipalities
- Public infrastructure companies.

Compared to last year, the methodology has been further improved for the following sectors:

- Scope 2 district heating for the social housing sector
- Public sector: scope 3 for municipalities and provinces

The details of the reasoning behind and the justification for the methodological improvements in the above-mentioned sectors are discussed in the individual chapters.
If the financed GHG emissions are recalculated and represented for 2018 and 2022, the files for those years are also included in the different factsheets, but if only 2023 is calculated, only that year is included in the factsheets.

The GHG footprint of the following sector have been added:

- Housing: Housing related
- Public sector: Joint Arrangements and other Public institutions
- Public infrastructure: Public transport, Infrastructure, Waste collection and processing, Spatial planning and Network operators (energy and telecom)
- Sector 'others'
- Energy: Renewable energy.

The bonds and medium term notes (Chapter 22) have also been added.

This report presents GHG emissions of the loan portfolio for 2018 (reference year), 2022 and 2023. In the management summary and in chapter 21, the loan portfolio, the coverage ratio, and financed GHG emissions are presented for the years 2018, 2022, and 2023. This allows the Bank to monitor the development of GHG emissions over time. For each year, the reference date of the loan portfolio was the end of the year. GHG emissions were calculated using the latest available data. For 2023 these data are either from 2022 or 2023.
This report also presents GHG emissions of the bonds and medium term notes for 2022 and 2023. In the management summary and in chapter 22, the bonds and medium term notes portfolio, the coverage ratio, and financed GHG emissions are presented for the years 2022 and 2023.

Previous reports used the term 'reporting year'. To calculate the GHG emissions of the reporting year 2024 the loan portfolio as of 31-12-2023 was used and the most recent energy data or data needed for the calculation of energy data were either from 2023 or 2022.
In the current report, the term 'reporting year' is no longer used. The year corresponds to the year of the loan portfolio in use. For the current report, the most recent loan portfolio in use is 31-12-2023 and the most recent energy data or data required to calculate energy data is from either 2023 or 2022. In the current report, this is stated as 2023 instead of 'reporting year 2024'.
In previous reports, the reference year was 'reporting year 2019', whereas in the current report this is '2018'.

2 PCAF methodology

The methodology that has been used in current study, is based on a couple of reporting standards: *The Greenhouse Gas Protocol, A corporate accounting and reporting standard, revised edition*[17], *The harmonized approach for the financial sector in the Netherlands*[18] and *The global GHG accounting & reporting standard*.[19] The overall reporting requirements and recommendations are:

- Principles: GHG accounting and reporting by financial institutions shall be based on the following principles: relevance, completeness, consistency, transparency, and accuracy.
- Purpose: A financial institution's reporting should be aligned with its specific business objectives; for instance, to identify and manage climate-related transition risks or to achieve a specific emissions reduction target.
- Frequency: Financial institutions shall disclose at least annually and at a fixed point in time in line with the financial accounting cycle. Financial institutions shall ensure that the chosen point in time provides a representative view of the emissions for that reporting year and shall transparently disclose if major changes close to (before or after) the reporting date have affected the results.
- Recalculation and significance thresholds: Financial institutions shall, in accordance with the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard requirement, establish a baseline recalculation policy to define under which circumstances a recalculating of (reference year) financed emissions is necessary to ensure the consistency, comparability, and relevance of the reported GHG emission data over time. As part of this reference year emissions recalculation policy, financial institutions shall establish and disclose the significance threshold that triggers reference year emissions recalculations.
- Form of reporting: Financial institutions shall disclose in publicly available reports such as (semi) annual reports, website articles, or other publicly available sources as deemed appropriate by the financial institution.
- Past performance: Where appropriate and relevant to their business objectives, financial institutions should disclose their financed emissions for multiple comparable time periods, e.g., years.

2.1 Scopes

The GHG Protocol is the most widely used GHG accounting standard. The GHG Protocol defines three different scopes that all entities can report on separately (see Figure 2). As shown in Figure 2, GHG emissions include CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6. In the current report these scopes are defined from the perspective of the reporting financial institution such as BNG and focus on all the direct and indirect GHG emissions for which BNG is responsible for financing different types of organisations. Emissions resulting from a

[17] ghg-protocol-revised.pdf (ghgprotocol.org)
[18] https://carbonaccountingfinancials.com/standard
PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.
[19] https://carbonaccountingfinancials.com/standard
PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.

reporting company's loans and investments fall under Scope 3 downstream emissions (see blue circle in Figure 2). In the PCAF methodology, scopes 1, 2, and 3 refer to the scope from the perspective of the investee, project, company or government.

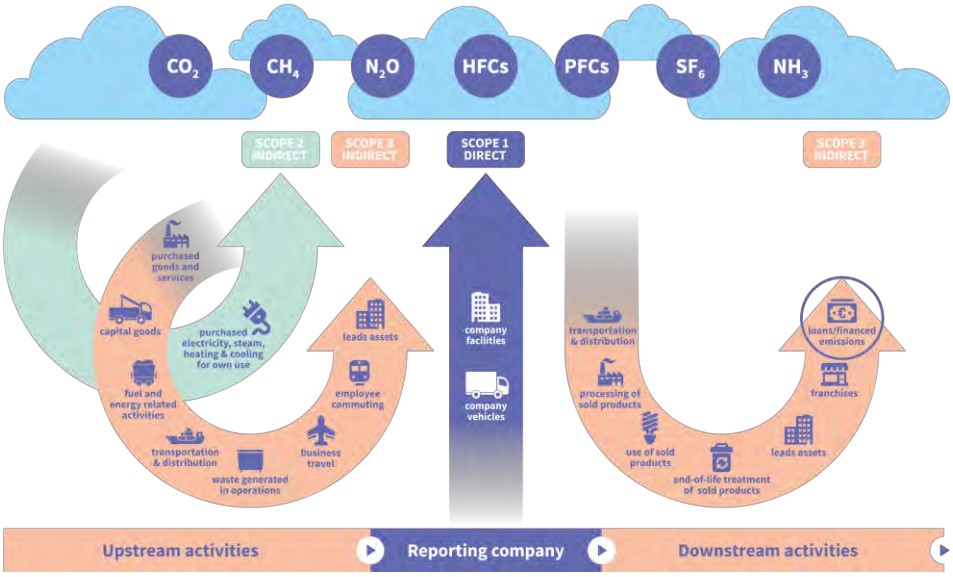

Figure 2. The scope definitions from the GHG Protocol (Image created from GHG Protocol).

According to *the GHG Protocol Corporate Value Chain Accounting and Reporting Standard*, a financial institution's GHG footprint should include:

- Scope 1: All direct GHG emissions that occur from sources owned or controlled by the reporting company, such as natural gas use and fuel for company cars of the investee, project, company or government.
- Scope 2: Indirect emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the investee, project, company or government. Scope 2 emissions physically occur at the facility where the electricity, steam, heat, or cooling is generated.
- Scope 3 covers all other indirect emissions (not included in Scope 2) that occur in the value chain of the investee, project, company or government. Scope 3 can be divided into upstream emissions that occur in the supply chain (for example, from production or extraction of purchased materials) and downstream emissions that occur because of the use of the organisation's products or services.

Disclosure of total generated emission data is mandatory for scopes 1 and 2. Disclosure of emission intensity data (tCO_2e per million euro) for scope 1 and 2 is voluntary. For scope 3 emissions, disclosure of total generated data is mandatory if relevant and available (i.e., recommended by the methodology). Disclosure of scope 3 emission intensity data (tCO_2e per million euro) is voluntary. If not provided, institutions should explain why they are unable to provide it. Appendix A provides more information on what exactly is included in the three different scopes.

Scope 2 and scope 3 location-based and market-based emissions

Scope 2 and some scope 3 emissions can be calculated in two ways: location-based and market-based. Location-based emissions refer to what the company physically consumes at the site. It is based only on the average emission intensity of the local energy grid where the electricity comes from. It doesn't consider any sustainable energy purchase contracts the company might have. The way to reduce your emissions using the location-based method is to use less energy or to use more energy directly from your own solar panels, for example.

Unlike the location-based method, the calculation of market-based emissions focuses on the individual company and its contractual arrangements in the market. Market-based emissions are associated with the energy a company buys, which is different from the energy generated by the local grid.

The location-based method shows what the company physically puts into the air, while the market-based method shows the emissions the company is responsible for through its purchasing decisions.

In this report, the method that is used depends on the availability of data. For the social housing sector, municipalities, provinces, healthcare and education, the location-based emissions are calculated because for these sectors it is not known what type of energy contracts the clients have.
For water boards and drinking water companies, however, it is largely known what type of energy contracts the companies have. For these sectors, market-based emissions are calculated. According to the method recommended by CO2emissiefactoren.nl, a distinction is made in the calculation between sustainable energy sources from the Netherlands (emission for sustainable energy source used) and sustainable energy sources outside the Netherlands (grey electricity emission factor used).

2.2 Attribution

The GHG footprint of BNG's loan portfolio and bonds and medium term notes issued to municipalities and public infrastructure was calculated using the attribution approach. The attributed GHG emissions are calculated by using the following formula:

$$\sum \boldsymbol{CO_2eq} \times \frac{\boldsymbol{Outstanding\ loan\ volume}}{\boldsymbol{Total\ balance\ sheet\ (equity + debt)}}$$

The GHG emissions of all individual organisations are added up at sector level to calculate the total emissions in CO_2 equivalent per sector. All sectors together account for the total CO_2 equivalent emissions of BNG's loan portfolio.

When interpreting the results in this report, it is important to note that due to the methodology used (especially for smaller sectors), changes in the ratio of outstanding loan

volume to total balance sheet between years will affect the change in GHG emissions attributable to the bank (financed GHG emissions).

Therefore, an increase or decrease in the absolute GHG emissions between years may be the result of a change in the ratio of outstanding loan volume to total balance sheet rather than, for example, structural changes in energy consumption at sector level. The total balance sheet has an impact on both absolute and relative GHG emissions. If the ratio of outstanding loan volume to total balance sheet affects the financed GHG emissions this is indicated in the results section.

2.3 Data quality

An important element of carbon accounting is the quality of data of emissions attributed to loans and investments. Different asset classes present unique challenges and opportunities with respect to emission data. This section provides some overarching principles on the quality and preferred hierarchy of emission data.

High quality emission data is defined as follows:

- Emission data are consistent, both across entities and over time
- Emission data reflect the underlying emissions generating activities of the entity and are not influenced by unrelated factors
- Emission data are accompanied by a relevant level of assurance.

It is possible that emission data may not meet all the criteria listed above. This will depend on the specific characteristics of the loan or investment and the best practice in the sector or market. To comply with the PCAF reporting guidelines, participating institutions are asked to publish the existing PCAF hierarchy in accordance with Table 2-1. The table provides guidance on the disclosure of data quality scores overall and per asset class. In addition, the PCAF (2022) report provides a more detailed table presented by asset class that can be used to determine the data quality by sector.[20] These asset class tables are used as a reference for this report.

The data quality presented in each chapter refers to the data quality of the most recent year (2023). In Table 2-2 the data quality scores are rounded to a whole number. In Table S-2 (Management summary) and Table 21-2 (Chapter 21) the data quality scores are presented to one decimal place and are calculated according to the percentage of emissions per sector per scope.

The average data score for each sector is generated in several ways:

1. If the same data quality score is given for each scope in the sector, this is also the average score. This is the case for housing related, joint arrangements, other public institutions, spatial planning, sector 'others' and wind- and solar parks.

[20] https://carbonaccountingfinancials.com/standard.
PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.

2. Where different scopes within a sector have different data quality scores, the average data score is calculated by multiplying the data score per scope by the percentage of GHG emissions per scope. This is the case for municipalities (loans, bonds and medium term notes), provinces, water boards, drinking water companies and sovereigns bonds and medium term notes.
3. If, within a sector, a data quality score differs between clients, the data quality score per client is multiplied by the loan amount, then summed and finally divided by the total loan amount within the sector, as indicated in Chapter 6 of the *Financed Emissions The Global GHG Accounting & Reporting Standard Part A*.[21] This is the case for social housing associations, education institutions, public transport, infrastructure, waste collection and processing, network operators (energy, telecom), supranationals and public infrastructure bonds and medium term notes.
4. If, within a sector, a data quality score for a specific scope differs between clients, the data quality score per client is multiplied by the loan amount, then summed and finally divided by the total loan amount within the sector, as indicated in Chapter 6 of the *Financed Emissions The Global GHG Accounting & Reporting Standard Part A*.[22] Afterwards the average data score is calculated by multiplying the data score per scope by the percentage of GHG emissions per scope. This is the case for healthcare institutions.

As the data source and calculation method may differ between scopes and between items within a scope, several data quality scores are given for different scopes within a sector. The general factsheets explain the reason behind the data quality scores. In section 2.3.1, the data quality scores per sector are explained and summarized.

Table 2-1 Generic data quality table

Data quality (highest to lowest)	Description
1	Audited GHG emission data or actual primary energy data
2	Non-audited GHG emission data, or other primary data
3	Averaged data that is peer/(sub)-sector-specific
4	Proxy data on the basis of region or country
5	Estimated data with very limited support

2.3.1 Data quality per sector

As the data source and calculation method may differ between scopes and items within a scope, multiple data quality scores are assigned to the different scopes within a sector. The data quality score is explained in the sector factsheets. This section provides an overview of the data quality (see Table 2-2).

[21] https://carbonaccountingfinancials.com/standard.
PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.
[22] Ibid

Table 2-2 Data quality scores per sector per scope

Sector	Scope	Data quality score	Explanation
Social housing sector	1: natural gas consumption 2: electricity consumption 2: consumption of district heating	2-4-5	**For social housing associations with energy consumption data** For 99.5% of outstanding loans to this sector, the data quality is score 2. Primary data on actual building energy consumption (adjusted for annual temperature variations, energy density per m^3 and gas pressure) are available. According to option 1b in Table 5-14 on page 92 of the PCAF (2022) report[23], the data quality is 2. Part of the data is based on energy consumption data provided by the three largest energy suppliers in the Netherlands for clusters of buildings. Due to privacy regulations, it is not possible to collect these data for individual dwellings. The data is therefore collected for small clusters (10 to 15 buildings) of similar dwellings, which is sub-sector specific. The data has been aggregated to the level of a housing association. However, as the energy consumption data is more specific than sector specific, the data score is 2. **For social housing associations lacking energy consumption data** For 0.07% of outstanding loans to this sector, the data quality is score 4. The calculations rely on Level 4 data, GHG emissions are calculated based on revenue and an emission factor. For 0.4% of outstanding loans to this sector, the data quality is score 5. GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.
Housing related	1, 2 and 3: direct and indirect emissions from the upstream value chain	5	GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.
Municipalities	1: natural gas consumption 2: electricity consumption	3	The indicators are based on actual energy consumption in 2018 and 2020. For the 2021 and 2022 data, estimates have been made based on the developments in energy consumption according to the sector trends published by CBS.
Municipalities	1: company cars	5	GHG emissions are calculated based on average car information. Brand, model, and type are not known and distance travelled is based on local or regional statistical data. Therefore, the data quality score is 5.
Municipalities	3: purchase of goods and services	4	GHG emissions are calculated based on economic activity. Expenditure related to GHG emissions were multiplied by an emission factor per sector. The emission factor is based on Dutch proxy data. Therefore, the data quality score is 4. In the PCAF database the data quality score is also 4. See for more details section 5.2.2.
Provinces	1: natural gas consumption 2: electricity consumption	4	GHG emissions are calculated based on the energy supply to the public administration and government services sector at the aggregated level of a whole province. This is not only the energy supply to the provincial organisations, but also to other government authorities. Therefore, the data is used on a regional basis and the data quality score is 4.
Provinces	1: company cars	5	GHG emissions are calculated based on average car information. Brand, model, and type are not known and distance travelled is

[23] https://carbonaccountingfinancials.com/standard
PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.

			based on local or regional statistical data. Therefore, the data quality score is 5.
Provinces	3: purchase of goods and services	4	GHG emissions are calculated based on economic activity. Expenditure related to GHG emissions were multiplied by an emission factor per sector. The emission factor is based on Dutch proxy data. Therefore, the data quality score is 4. In the PCAF database the data quality score is also 4. See for more details section 5.2.2.
Water boards	1: **without** GHG emissions from the sewage treatment plant 2 & 3	2	GHG emissions are calculated based on data provided by the water boards themselves, but the data are not audited. Therefore, the data quality score is 2.
Water boards	1: for GHG emissions from the sewage treatment plant	3	GHG emissions of methane and nitrous oxide from wastewater treatment plants were determined using an IPCC model. This does not consider the individual situation of the sewage treatment plants. However, the data are sector specific. Therefore, the data quality score is 3.
Joint arrangements	1, 2 and 3: direct and indirect emissions from the upstream value chain	5	GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.
Other public institutions	1, 2 and 3: direct and indirect emissions from the upstream value chain	5	GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.
Healthcare	1: natural gas consumption 2: electricity consumption	2-3-5	**For healthcare associations with energy consumption data** For 83.9% of outstanding loans to this sector, the data quality score is 3. GHG emissions are calculated based on energy consumption data based on sector-specific key figures, taken into account floor area classes. The data are sector specific. Therefore, the data quality score is 3. For 14.7% of outstanding loans to this sector, the data quality score is 2. Energy consumption data is obtained from annual reports or environmental reports. The energy consumption data are not verified by an accountant and therefore the data quality score is 2. **For healthcare associations lacking energy consumption data** For 1.5% of outstanding loans to this sector, the data quality score is 5. GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.
Healthcare	3: Commuting and business travel	5	GHG emissions are calculated based on average car information. Brand, model, and type are not known and distance travelled is based on local or regional statistical data. Therefore, the data quality score is 5.
Education	1: natural gas consumption 2: electricity consumption	3-4-5	**For education institutions with energy consumption data** For 73.2% of outstanding loans to this sector, the data quality score is 3. GHG emissions were calculated using sector-specific key figures, accounting for building type and educational institution classification. The data are sector specific. Therefore, the data quality score is 3. **For education institutions lacking energy consumption data**

			For 16.3% of outstanding loans to this sector, the data quality is score 4. The calculations rely on Level 4 data, GHG emissions are calculated based on an emission factor per floor area. For 10.5% of outstanding loans to this sector, the data quality is score 5. GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.
Public transport	1, 2 and 3: direct and indirect emissions from the upstream value chain	1-5	For 34.7% of outstanding loans to this sector, the data quality score is 1. GHG emission data is obtained from annual reports or environmental reports. The energy consumption data are verified by an accountant and therefore the data quality score is 1. For 65.3% of outstanding loans to this sector, the data quality is score 5. GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.
Infrastructure	1, 2 and 3: direct and indirect emissions from the upstream value chain	1-2-5	For 28.4% of outstanding loans to this sector, the data quality score is 1. GHG emission data is obtained from annual reports or environmental reports verified by an accountant. Therefore, the data quality score is 1. For 2.5% of outstanding loans to this sector, the data quality score is 2. GHG emission data is obtained from annual reports or environmental reports. The energy consumption data are not verified by an accountant and therefore the data quality score is 2. For 69.1% of outstanding loans to this sector, the data quality is score 5. GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.
Waste collection and processing	1, 2 and 3: direct and indirect emissions from the upstream value chain	1-5	For 74.5% of outstanding loans to this sector, the data quality score is 1. GHG emission data is obtained from annual reports or environmental reports verified by an accountant. Therefore, the data quality score is 1. For 25.5% of outstanding loans to this sector, the data quality is score 5. GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.
Drinking water companies	1: direct GHG emissions 2: electricity consumption	2	GHG emissions are calculated based on data provided by the drinking water companies themselves, but the data are not audited. Therefore, the data quality score is 2.
Drinking water companies	3: commuting and business travel and some purchase data	3	GHG emissions for scope 3 are less certain than for scopes 1 and 2, as the distances travelled are known, but details on the means of transport are sometimes missing. Therefore, the data quality score is 3.
Spatial planning	1, 2 and 3: direct and indirect emissions from the upstream value chain	5	GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.
Network operators (energy, telecom)	1, 2 and 3: direct and indirect emissions from the upstream value chain	1-3-5	For 12.6% of outstanding loans to this sector, the data quality score is 1. GHG emission data is obtained from annual reports or environmental reports verified by an accountant. Therefore, the data quality score is 1.

			For 14.0% of outstanding loans to this sector, GHG emissions were calculated based on production data of heating networks. Data quality score is 3. For 73.4% of outstanding loans to this sector, GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.
Others	1, 2 and 3: direct and indirect emissions from the upstream value chain	5	GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.
Renewable energy	3: GHG emissions for production, installation, maintenance and dismantling	3	GHG emissions are calculated based on data received from the wind parks themselves, but the data are not verified. Information on GHG emissions for production, installation, maintenance and dismantling is mainly obtained from scientific literature. Therefore, the data quality score is 3.

2.4 Emission factors

To calculate the GHG footprint of BNG's loan portfolio, emission factors have been used to calculate emissions per tonne GHG emissions. The choice of the right emission factors is crucial. For this publication, the emission factors from CO2emissiefactoren.nl have been used in most cases. This list of emission factors is developed by the Dutch government, SKAO, Stimular, Connekt, and Milieu Centraal.[24] This list is frequently updated and includes information on the system boundaries used and provides a list of widely accepted and consistent emission factors.

PCAF has chosen to use the emission factors expressed in the 'Tank to Wheel' (TTW) column on CO2emissiefactoren.nl. This emission factor only includes emissions from the use of the energy source and not the production of the energy source. Where the term emission factor is used, this refers to CO_2-equivalents per unit.

An emission factor may change over time. Factors may change due to changes in methodology based on scientific evidence or due to changes in the context of the emission factor (gradual changes over time). For example, the emission factor for electricity from an unknown source. This emission factor is calculated based on the national energy production mix (e.g. the ratio between coal, nuclear, and renewable energy sources). This factor changes every year due to changes in the national energy mix.

[24] In March 2014, the Green Deal CO_2 equivalent emission factors was signed by the Dutch national government, SKAO, Stimular, Connekt and Milieu Centraal. Due to an increase in attention for CO_2 emission factors, more and more tools are created to calculate a footprint. However, confusion arises when companies and organisations use different figures. Creating an uniform list is a solution to this and that is why the Green Deal CO_2 equivalent emission factors was developed.
The aim of the Green Deal is to arrive at a single, widely supported and scientifically substantiated list of CO_2 emission factors, based on generally accepted principles. The list concerns CO_2 data of energy carriers, passenger transport, goods transport and refrigerants. The primary target group consists of companies and organisations that use CO_2 equivalent emission data or calculation tools in their communications or reports. This shifts the discussion about the accuracy of the figures to what really matters: reducing GHG emissions.

Changes in CO_2 emission factors can affect the development of GHG emissions. Therefore, when calculating GHG emissions, it may be necessary to recalculate the GHG footprint of previous years to make a correct comparison between years. CO2emissiefactoren.nl advises whether the revised emission factor should be used retroactively and specifies the effective date.

In this report, when emission data are presented longitudinally, the following three basic principles have been used to determine the emission factor:

1. Changes in emission factors over time due to changes in the national energy mix: use the emission factor corresponding to the year of the data. E.g. Use the 2023 emission factor for 2023 data.
2. Changes in emission factors over time due to technological development: use the emission factor corresponding to the year of the data. E.g. Use the 2023 emission factor for 2023 data.
3. Changes in emission factors over time due to new methodology or scientific evidence: use the most recent emission factor. E.g. Use the 2023 emission factor for 2022 data.

An overview of the emission factors used per year is shown in Table 2-3. In general, emission factors have been chosen for each calculation and approach according to the data year.

An exception was made for district heating for the social housing sector. Last year, it was decided that the emission factor for 2022 would also be used for 2018 when calculating the GHG emissions for district heating.
Before 2022, the list of emission factors on CO2emissiefactoren.nl only contained one emission factor for a combined heat and power plant (heat from a large or small gas-fired CHP plant). This had to be used when the heat source of the heat network was unknown. The emission factor for this was 32.53 $kgCO_2e$ per GJ. However, from 2022, the list of emission factors on CO2emissiefactoren.nl includes an emission factor for average heat networks. This emission factor is 23.4 $kgCO_2e$ per GJ, which is much lower than the emission factor for before 2022. Because of this large difference and the lack of another emission factor for 2018, it was decided last year to use the emission factor for 2022 for both 2018 and 2022.
The sustainable performance of heating networks improves over time. By using the same emission factor for the years 2018 and 2022 in last years and this year's report, this improvement in performance is unfortunately not taken into account.
This year, the specific heat network emission factor has been used as much as possible. Emission factors are known from large and medium-sized heat networks, but not for smaller heat networks. For the smaller networks, the average emission factor from CO2emissiefactoren.nl for 2023 was used. The specific emission factor used for large and medium-sized heat networks can be found in Appendix B of this report.

Table 2-3 Emission factors used per data year

Source	Unit	Emission factor ($kgCO_2e$/unit) (TTW)							If an emission factor has changed over the years, which one should be used?
		2017	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	
Petrol (E10) (NL)	Liter	2.233	2.233	2.233	2.141	2.141	2.141	2.176	There are different types of petrol in the list from CO2emissiefactoren.nl. It is advised by CO2emissiefactoren.nl to use these values (see CO2emissiefactoren.nl 2023, comments at Benzine).
Diesel (B7) (NL)	Liter	2.514	2.514	2.514	2.474	2.474	2.474	2.468	There are different types of Diesels in the list from CO2emissiefactoren.nl. It is advised by CO2emissiefactoren.nl to use these values (see CO2emissiefactoren.nl 2023, comments at Diesel).
LPG (NL)	Liter	1.61	1.61	1.61	1.61	1.631	1.631	1.635	Use of emission factor according to data year.
Bio-diesel (HVO)	Liter						0.038	0.032	Values before 2021 were indicative. Advised by CO2emissiefactoren.nl to use values of the year 2022 for previous years.
CNG	Liter	2.234	2.234	2.234	2.234	2.284	2.284	2.255	Use of emission factor according to data year.
Bio-CNG	Liter						0.137	0.112	Values before 2021 were indicative. Advised by CO2emissiefactoren.nl to use values of the year 2022 for previous years.
Gas-to-liquid	Liter					2.471	2.471	2.465	Use of emission factor according to data year.
Propane	Liter					1.53	1.53	1.53	Use of emission factor according to data year.
Fuel oil	Liter	3.185 (WTW)	3.185 (WTW)	3.185 (WTW)	3.185 (WTW)	3.185 (WTW)	3.185 (WTW)	2.468	Use of emission factor according to data year. For 2023, CO2emissiefactoren.nl recommends using the emission factor for diesel instead of the emission factor for fuel oil.
Natural gas	Nm^3	1.791	1.791	1.791	1.785	1.785	1.788	1.782	Use of emission factor according to data year.
Grey energy	kWh	0.464	0.572	0.572	0.476	0.476	0.454	0.396	Use of emission factor according to data year.
Electricity from unknown sources (kWh)	kWh				0.405	0.405	0.369	0.290	Advised by CO2emissiefactoren.nl to use values of the year 2020 and 2021 also for the previous years.
Car, unknown fuel & weight	Vehicle km	0.181	0.181	0.181	0.163	0.163	0.145	0.145	Use of emission factor according to data year.
Car, electric	Vehicle km	0	0	0	0	0	0	0	Use of emission factor according to data year.
Public transport in general (traveled kms; type of transport unknown)	Traveler km	0.025	0.025	0.025	0.025	0.011	0.011	0.016	Use of emission factor according to data year.
Public transport in general (traveled kms; Bus, Tram, Metro average)	Traveler km					0.052	0.052	0.059	Use of emission factor according to data year. For year 2018 the emission factor of 2021 and 2022 have been used.
Public transport by train (traveled	Traveler km	0.005	0.005	0.005	0.005	0.002	0.002	0.002	Use of emission factor according to data year.

kms; unknown train type)									
Public transport by bus (traveled kms; type unknown)	Traveler km	0.113	0.113	0.113	0.113	0.081	0.081	0.086	Use of emission factor according to data year. CO2emissiefactoren.nl reports that for the year 2021 and 2022 TTW is not available. TTW for 2021 and 2022 calculated based on that TTW is 78.9% of WTW.
Public transport by tram (traveled kms)	Traveler km	0	0	0	0	0	0	0	Use of emission factor according to data year.
Public transport by metro (traveled kms)	Traveler km	0	0	0	0	0	0	0	Use of emission factor according to data year.
Air travel <700 km	Traveler km	0.278	0.278	0.278	0.278	0.278	0.202	0.202	Use of emission factor according to data year.
Air travel 700-2500 km	Traveler km	0.187	0.187	0.187	0.187	0.187	0.152	0.152	Use of emission factor according to data year.
Air travel >2500 km	Traveler km	0.137	0.137	0.137	0.137	0.137	0.140	0.140	Use of emission factor according to data year.
Air travel, average km	Traveler km						0.160	0.160	Use of emission factor according to data year.
Bulk goods, Truck, unit with semi-trailer heavy	Tonne km	0.064	0.064	0.064	0.064	0.067	0.067	0.067	Use of emission factor according to data year.
Average heating networks	GJ	32.53	32.53	32.53	32.53	32.53	23.4	21.93	The value for 2022 and 2023 is the average emission factor for heat from large heating networks. In current report, the 2022 emission factor has been used for all years before 2022 due to the large differences between the 2022 emission factor and previous years. In 2023, for some social housing associations the emission factor of specific district heating network has been used. These emission factors can be found in appendix B.
Methane	Kg					28 WTW	28 WTW	28 WTW	Since 2021, the value for methane has been published by CO2emissiefactoren.nl. This value is also applicable for earlier years.
Source		LINK[25]	*LINK*[26]	*LINK*[27]	*LINK*[28]	*LINK*[29]	*LINK*[30]	*LINK*[31]	

[25] co2emissiefactoren-2017.pdf
[26] co2emissiefactoren-2018.pdf
[27] CO2emissiefactoren-2019.pdf
[28] CO2emissiefactoren-2020.pdf
[29] CO2emissiefactoren-2023-2015-dd-03-04-2023 (3).xlsx
[30] CO2emissiefactoren-2022-okt2023.pdf
[31] CO2emissiefactoren-2023-okt2023.pdf

2.5 Methodology development is an ongoing process

Comparability and transparency of carbon accounting requires consistent disclosure, following the same guidelines and methods, and ideally using the same metrics.[32] However, the methodology for carbon accounting is not yet set in stone. As data availability improves and/or methodologies evolve, more accurate calculations will be possible in the future. Therefore, the total GHG footprint that is presented throughout this report is not conclusive. Each time the methodology and data used improve, the results for previous years are recalculated where possible, so that comparisons can be made over time.

[32] https://carbonaccountingfinancials.com/standard.
PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.

3 BNG's loan portfolio

BNG's loan portfolio comprises several market segments. These segments cover several sectors or subsectors. Table 3-1 provides an overview of these sectors.

Table 3-1 Overview of BNG's loan portfolio in 2018, 2022 and 2023[33]

Market segment	Sector	Total loan portfolio (million euro)			Percentage of all loans (%)		
		2018	**2022^**	**2023**	**2018**	**2022**	**2023**
Housing	Social housing associations*	38,947	44,118	45,957	47.7	50.9	52.4
	Housing related	496	715	784	0.6	0.8	0.9
Public sector	Municipalities	26,066	25,765	25,104	31.9	29.7	28.6
	Provinces	137	421	449	0.2	0.5	0.5
	Water boards	233	197	220	0.3	0.2	0.3
	Joint arrangements	1,362	1,270	1,303	1.7	1.5	1.5
	Other public institutions	768	560	510	0.9	0.6	0.6
Healthcare	Healthcare	7,031	6,724	6,629	8.6	7.8	7.6
Education	Educational institutions	979	1,057	1,035	1.2	1.2	1.2
Public infrastructure	Public transport	909	986	1,153	1.1	1.1	1.3
	Infrastructure	1,220	1,126	1,028	1.5	1.3	1.2
	Waste collection and processing	754	710	697	0.9	0.8	0.8
	Drinking water companies	811#	548	677	1.0	0.6	0.8
	Spatial planning	754	631	592	0.9	0.7	0.7
	Network operators (energy, telecom)	451	603	486	0.6	0.7	0.6
Others	Others	381	317	281	0.5	0.4	0.3
Energy	Renewable energy	309	867	808	0.4	1.0	0.9
	Sustainability projects	19	48	52	0.0	0.1	0.1
Total		**81,628**	**86,664**	**87,767**	**100.0***	**100.0***	**100.0***

* The totals in these columns do not always add up to 100% due to sectoral rounding

^The current report does not include data for 2019, 2020, and 2021. It is decided to calculate 3 years: the reference year (2018) and the two most recent years, 2022 and 2023.

As can be seen in Table 3-1, the social housing associations and municipalities are the largest sectors in BNG's loan portfolio. The total loan portfolio increased by 1,102 million euro between 2022 and 2023.

The final overview of all the calculations for 2018, 2022, and 2023 can be found in the data files mentioned in the factsheet below.

[33] Reference dates for the years 2018, 2021, and 2022 are 31-12-2018, 31-12-2021, and 31-12-2022, respectively.

Factsheet

List of the calculation sheets	Location
250305 Bankcijfers BNG 2023.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank
250124 Bankcijfers BNG 2022.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank
250512 Bankcijfers BNG 2018.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank
250123 Datakwaliteit BNG Bank Loans 2023.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank
250124_Overzicht projecten BNG Bank_2022.xlsx	Werkmap\Projecten BNG\f4. Berekening BNG

4 Housing: social housing sector

The housing sector consists of two sub-sectors, namely social housing associations and housing related clients. This subsector is called Housing related. In chapters 4 and 5 both subsectors are discussed.

4.1 Results Social housing sector

The social housing sector is the largest sector within the loan portfolio of BNG. The sector accounts for 51.8% of BNG's loan portfolio.

4.1.1 Coverage ratio and attribution

The GHG footprint was calculated for 100% of the social housing loan portfolio in 2023. Between 2022 and 2023, the outstanding loan volume increased by 1,142 million euro. The loan portfolio of clients for which a GHG footprint was calculated increased by 3,269 million euro, partly due to an increase in the coverage ratio. The total balance sheet of clients for which a GHG footprint was calculated increased as well. As a result, the ratio of the loan portfolio to the total balance sheet slightly increased. The attribution to BNG slightly increased compared to last year. For 2018, 2022 and 2023, the loan portfolio, the total balance sheet and the coverage ratio are shown in Table 4-1.

Table 4-1 Loan portfolio, coverage ratio and ratio loan portfolio versus total balance sheet for the social housing sector in 2018, 2022 and 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients for which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)[34]	Total balance sheet of clients for which a GHG footprint was calculated (million euro)	Ratio loan portfolio / total balance sheet of clients for which a GHG footprint was calculated
2018	38,947	47.7	36,617	94.0	308,088	0.12
2022	44,118	50.9	42,688	96.8	421,394	0.10
2023	45,957	52.4	45,957	100.0	429,014*	0.11*

*This is based on 99.5% of outstanding loans to this sector

4.1.2 Energy consumption and financed GHG emissions

Table 4-2 shows the total energy consumption of the social housing sector in 2018, 2022 and 2023. The total consumption of natural gas and electricity decreased between 2022 and 2023. The emission factors for natural gas and electricity from an unknown source also decreased and the attribution to BNG slightly increased. These changes affect GHG emissions.

[34]To make sure that the coverage ratio for all three years is comparable, the loans and total balance sheet of social housing associations that have merged in the past few years have been summed and it is assumed that the energy consumption of the merged social housing associations are the same as the sum of the original ones.

Table 4-2 Total energy consumption of the social housing sector in 2018, 2022 and 2023

Year	Natural gas consumption (m^3)	Electricity consumption (kWh)	Consumption of district heating (GJ)
2018	1,873,720,360	4,527,016,472	4,416,458
2022	1,696,102,879	4,379,024,205	5,079,129
2023*	1,620,152,621	4,359,728,210	3,579,247

*This is based on 99.5% of outstanding loans to this sector

Table 4-3 shows the GHG footprint results for the social housing sector in 2018, 2022 and 2023.

Table 4-3 Absolute and relative financed GHG emissions for the social housing sector in 2018, 2022 and 2023

Source of emissions	Scope	Financed GHG emissions (tonnes/year)			Financed GHG emissions (%)			Relative financed GHG emissions (tCO_2e/million euro)		
		2018	**2022**	**2023**	**2018**	**2022**	**2023**	**2018**	**2022**	**2023**
Natural gas use	Scope 1	401,874	312,985	312,552	63.3	68.1	68.1	11.0	7.3	6.8
Electricity use	Scope 2	221,620	168,085	137,986	34.9	30.1	30.1	6.1	3.9	3.0
District heating	Scope 2	11,748	11,355	8,453	1.8	1.8	1.8	0.3	0.3	0.2
Total		**635,242**	**492,426**	**458,990**	**100.0***	**100.0***	**100.0***	**17.3**	**11.5**	**10.0**

*The sum in these columns is not always exactly 100% due to rounding per sector

Table 4-4 Financed GHG emissions per financed floor area (m^2) for the social housing sector in 2018, 2022 and 2023

	Year		
	2018	**2022**	**2023**
Financed GHG emissions real estate related ($kgCO_2e$)/ financed m^2	29.3	26.2	22.0*

*99.5% of outstanding loans to this sector was used to calculate this value (2023)

Between 2022 and 2023, the financed GHG emissions decreased for all scopes. Total financed GHG emissions decreased by 33,436 tonnes. This decrease is mainly due to the decrease in scope 2 electricity consumption. The 2023 data for scope 2 district heating is not comparable to 2022 due to a change in methodology. The difference between 2023 and 2022 for district heating is smaller than presented in Table 4-3, see section 4.2.1. The financed GHG emissions per financed m^2 decreased by 4.2 $kgCO_2e/m^2$. This is in line with the reduction in total energy consumption (Table 4-2).

Due to an increase in loans of clients for which a GHG footprint was calculated and a decrease in financed GHG emissions, relative financed GHG emissions decreased from 11.5 to 10.0 tonnes per million euro. In conclusion, the absolute and relative financed GHG emissions for the social housing sector decreased between 2022 and 2023.

Housing associations face several challenges. By the end of 2028, no more dwellings are allowed to have E, F or G energy labels. By 2030, 675,000 dwellings must be future proof and insulated. By 2050, all dwellings owned by a housing association must be carbon neutral.[35] To achieve this, social housing associations are working hard to insulate dwellings to save energy. In addition, social housing associations are investing in solar panels for their dwellings. The number of dwellings with solar panels is increasing faster than ever.[36] By 2030, 450,000 existing dwellings cease natural gas use for heating purposes. This will require alternative sources of heat.

4.2 Social housing sector approach

4.2.1 Scopes 1 and 2

Adjustments in methodology

Small changes are made to the calculations for scope 2 district heating. The latest data available is for 2022, instead of 2023. The data is therefore one year behind compared to the energy consumption data of electricity and natural gas. For the large heat networks in the Netherlands, the emission factor is publicly available. These emission factors were used for the large heat networks. For the small and medium-sized heat networks the average emission factor from CO2emissiefactoren.nl was used. For housing associations in municipalities with more than one heat network the average emission factor from CO2emissiefactoren.nl was used as well.

The allocation key used to divide the GJ (gigajoule) of district heating per municipality among the housing associations changed compared to previous years. Last year, an allocation key based on data from the 'Inspectie van de leefomgeving en transport' was used. They have data on the number of dependent and independent dwellings per housing association. Based on these figures, an allocation key was created to distribute the GJ of district heating per municipality among the housing associations. This year a dataset from Republiq was used for the allocation. This dataset contains information on the number of dwellings connected to district heating per housing association per municipality. Based on the availability of district heating networks and energy consumption, an estimate has been made of the presence of district heating per dwelling. With this dataset, the distribution key became more precise.

For 2023, the calculation method for district heating has been slightly changed as mentioned above. GHG emissions for district heating were not recalculated for 2018 and 2022 as this was not possible. The figures for district heating for 2023 are therefore not directly comparable with those for 2018 and 2022. For 2022, the new calculation cannot be exact, but an estimate has been made for 2022. The difference due to the method change is estimated to be 23%. In Table 4-3, the financed GHG emissions for 2022 are 11,355 tCO_2e, but the estimate according to the changed methodology is 8,692 tCO_2e (-23%). Comparing this value with the value for 2023 shows that the reduction in GHG emissions is 2.4% (8,692

[35] Wat omvatten de Nationale Prestatieafspraken op hoofdlijnen? | Aedes
[36] Solar Magazine - De harde cijfers | 1 op 5 sociale huurwoningen heeft zonnepanelen

tCO_2e estimate for 2022 vs. 8,453 tCO_2e for 2023). This difference is smaller than shown in Table 4-3.

General factsheet

Topic	Description
Scopes covered	For the social housing sector, scopes 1 and 2 are covered. Scope 1 covers natural gas consumption and scope 2 covers electricity and district heating consumption.
Portfolio covered	The social housing coverage ratio is 100% for 2023. For 99.5% of the social housing loan portfolio energy consumption data were available. For 0.5% of the social housing portfolio no energy consumption data were available and a less accurate calculation method was used.
Data	**Data used for the housing associations with energy consumption data** Data on electricity and natural gas consumption are based on the connection registers of the three largest network operators (Enexis, Liander, and Stedin) in the Netherlands. For privacy reasons it is not possible to collect these data for individual dwellings. The data is therefore collected for small clusters of similar dwellings. The data is aggregated to the level of a housing association. The housing association's property data come from 'Kadaster'.[37] The source for the floor area data is the Basic Registration of Addresses and Buildings (BAG). Data on the presence of district heating comes from a survey by Republiq. Data on consumption of district heating are based on the connection registers of the energy network operators, collected by the Dutch Central Bureau of Statistics (CBS). It is based on actual energy consumption and is therefore reliable. District heating consumption is available at the level of municipalities. For each municipality, the district heating consumption by dwellings owned by the social housing associations is known. **Data used for the housing associations lacking energy consumption data** For eight social housing associations energy consumption data was not available (0,5% of outstanding loans to this sector). The emissions of these clients have been calculated based on the outstanding loan amount and a PCAF emission factor. For two of the eight clients revenue was used instead of the outstanding loan amount. *Loan-specific information includes:* - NACE codes: Used to classify economic activities and map loans to the corresponding sectors and subsectors. - Outstanding loan amounts: The nominal value of loans provided to clients, which serves as the basis for GHG emissions calculations. - Subsector classifications: Detailed breakdowns of financed activities *Emission Factors:* Emission factors are applied according to the PCAF guidelines, using sector-specific data to estimate scope 1 (direct) and scope 2 (indirect from electricity) emissions. These factors are sourced from reputable databases and methodologies, including DEFRA, FAOSTAT, IPCC EFDB, Joint European Commission, Exiobase, and Probas. These emission factors are expressed in terms of tCO_2e per million euros financed. *Revenue and total balance sheet of the client:* For two housing associations the revenue and the total balance sheet over 2023 have been collected from their annual report. *Indexing of outdated climate data:* Data has been indexed based on the principle that in the adjustment of economic emissions intensities only the monetary value is adjusted, not the emissions in line with PCAF guidance. A CPI index for the Netherlands was used to adjust this.

[37]Kadaster registers of all real estate (land and buildings) in the Netherlands, showing who has what rights.

Grid emission factors	**Grid emission factors for the housing associations with energy consumption data** Section 2.4 provides further information on emission factors. The following emission factors from Table 2-3 have been used: - Natural gas - Electricity (unknown source) - Average heating networks In addition, for some heating networks their own emission factors are used (see Appendix B). **Grid emission factors for the housing associations lacking energy consumption data** Grid emission factors represent the average GHG emissions associated with the generation and delivery of electricity consumed by financed organisations. For scope 2 emissions, these factors reflect the carbon intensity of the power grid in the region where the financed activities take place. The grid emission factors are embedded within the sector-specific averages used for PCAF Classification Level 1. These factors ensure that the scope 2 emissions for the loan portfolio account for the electricity consumption of each sector, adjusted for regional variations in energy mix and grid intensity. For this portfolio, grid emission factors are expressed as tCO_2e per million euros financed, providing a standardised approach to estimate indirect emissions from purchased electricity.
Calculation steps	**Calculation steps for the housing associations with energy consumption data** ***Scope 1 natural gas use & scope 2 electricity use*** The following steps have been taken by Republiq: 1. Inventory of dwellings owned by social housing associations 2. Joining energy consumption data 1. Inventory of dwellings owned by social housing associations Republiq has acquired the housing association's property data from 'Kadaster'. For each housing association Republiq knows the number of dwellings it owns, the floor area of each dwelling, and the energy class to which it belongs. Republiq has calculated the number of dwellings owned by each housing association and the total floor area of these dwellings. From BNG, Republiq obtained an overview of which housing associations are clients according to the loan portfolio as of 31-12-2023. Republiq combined this list from BNG with data from 'Kadaster' to add the number of dwellings and floor area owned by each housing association, where possible. 2. Joining energy consumption data Energy consumption data were requested from the three largest network operators (Enexis, Liander, and Stedin) in the Netherlands. For privacy reasons, the network operators are not allowed to provide energy consumption data for individual buildings. However, data for clusters of buildings (10 to 15 buildings) can be provided: per cluster the standard annual consumption (in Dutch 'standaard jaarafname' (SJA)[38]) has been provided. Republiq has divided the annual energy consumption data by the average floor area of the buildings in a cluster to obtain energy consumption data per m^2. The energy consumption data per m^2 were assigned to the individual dwellings in a cluster. Republiq then performed an outlier check to ensure that only reliable data remained. The average energy consumption data per m^2 per housing association is multiplied by the total floor area owned by the housing association to obtain an estimate of the total consumption of electricity and gas. Republiq provided Het PON & Telos with the following data per social housing association for the calculation of GHG emissions: - Total electricity consumption (in kWh)

[38] 'Standaard jaarverbruik' is the actual energy consumption recalculated to the expected energy consumption in a standard year. The actual energy consumption is corrected for a warmer or colder year, energy in one m^3, and the gaspressure.

- Total gas consumption (in Nm^3)
- Floor area (m^2)

The next step was carried out by Het PON & Telos:

Het PON & Telos used these data to make the final calculations for both scope 1 natural gas consumption and scope 2 electricity consumption. The total electricity and natural gas consumption was multiplied by the emission factor from the same year as the data. For scope 1 natural gas consumption, the emission factor natural gas (Nm^3) was used. For scope 2 electricity consumption the emission factor electricity from unknown sources (kWh) was used.

Floor area

The source for the floor area data is the Basic Registration of Addresses and Buildings (BAG). The reference date for the total floor area per housing association for the 2023 calculations is 1-1-2024. To calculate the financed GHG emissions per financed m^2 the total financed GHG emissions in tCO_2e for the social housing sector are divided by the total financed floor area (m^2) of the social housing sector.

Scope 2: District heating

The consumption of district heating per social housing association is not known. It was therefore necessary to make an estimate. The calculation consists of a number of steps.

The CBS Microdata contains information on the use of district heating by all Dutch houses. Within the CBS Microdata database, this dataset was combined with another dataset containing information on the owners of these houses. Only dwellings owned by social housing associations were included in the calculation. CBS defines a dwelling as: the smallest unit within one or more buildings that is suitable for living in and is accessible through a private entrance from the public street, a yard or a common area. Examples include detached dwellings, single-family dwellings, apartments or terraced dwellings and student accommodations.

A dwelling is considered to be any residential property in the Basic Register of Addresses and Buildings (BAG) with at least one residential function and possibly one or more other functions. Thus, both self-contained and non-self-contained dwellings are included in these data.

For each municipality, district heating consumption was calculated for all dwellings owned by social housing associations. Outside the CBS Microdata database, district heating consumption was calculated per social housing association. To calculate this, data from Republiq has been used. Republiq has obtained the property data of the housing associations from 'Kadaster'. For each housing association, Republiq estimated the number of dwellings it owns that is connected to district heating. These data were used to create the distribution key that allocates the GJ of district heating per municipality to the different housing associations.

The consumption of district heating per municipality for all dwellings owned by social housing associations was multiplied by the ratio of the number of dwellings with district heating of a given social housing association to the total number of dwellings with district heating of all social housing associations in a municipality. For each social housing association, the district heating consumption per municipality was added to give the total district heating consumption for that particular social housing association.

The use of district heating in GJ was multiplied by the emission factor for the specific heat network (large heat networks and only one per municipality) or the average heating networks (source: CO2emissiefactoren.nl) to obtain kg of GHG emissions. These emissions were divided by 1,000 to obtain tonnes of GHG emissions.

After calculating scope 1 and scope 2 GHG emissions, these GHG emissions were multiplied by the ratio of outstanding loan to total balance sheet ratio per client. For example, if the ratio of outstanding loan to total balance sheet is 25%, 25% of the social housing association's scope 1 and 2 GHG emissions are attributed to BNG. The financed GHG emissions per client are added up to result in the total financed GHG emissions per sector.

	Unfortunately, the 2023 total balance sheet data were not available at the time of these calculations. Therefore, the financed GHG emissions for 2023 have been calculated based on the total balance sheet for 2022. To make sure that the coverage ratio for all three years is comparable, the loans and total balance sheet of social housing associations that have merged in the past few years have been summed and it is assumed that the energy consumption of the merged social housing associations are the same as the sum of the original ones. The financed GHG emissions and relative financed emissions are reported per scope. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume in million euro of the clients for which a GHG footprint was calculated in this report. **Calculation steps for the housing associations lacking energy consumption data** The calculation of GHG emissions follows a standardised approach based on the PCAF methodology, utilizing the 3b method for business loans and unlisted equity. For two social housing associations, the 3a method has been used, which links emissions to the borrower's revenue. Both methods apply emission factors based on economic activity, using sector-specific averages provided through recognised databases. These emission factors are aligned with the primary business activities of the financed organisation and reflect emissions per unit of assets. Data quality is assessed in alignment with PCAF standard. 1. *Emission factor assignment:* The NACE code of each social housing association is used to find the sector-specific emission factors. 2. *Loan attribution:* The GHG emissions for each loan are attributed based on the outstanding loan amount relative to the total emissions associated with the financed activity. This ensures that the GHG emissions reflect the financial share of the organisation covered by the loan. For two social housing associations the GHG emissions are based on the client's revenue. An attribution factor is applied: outstanding loan amount (€) / client's total balance sheet (€). 3. *Indexing of outdated climate data:* The emission factor has been adjusted by using a CPI index for the Netherlands. 4. *Financed GHG Emissions:* For each loan, GHG emissions are calculated using the formula: Financed GHG Emissions (tCO_2e) = Outstanding Loan Amount (€) * Emission Factor (tCO_2e/M. Euro) In case of the 3a method (revenue) the emissions are calculated using the formula: Financed GHG Emissions (tCO_2e) = (Outstanding Loan Amount (€) / Balance Total (€)) * Revenue (€) * Emission Factor (tCO_2e/M. Euro) 5. *Data Quality assessment:* Each calculation is assigned a Data Quality (DQ) score based on the PCAF standards. Higher scores indicate reliance on sector averages rather than borrower-specific data.
Avoided emissions	**Avoided emissions for the housing associations with energy consumption data** If the housing associations generate their own electricity, for example through solar panels, and use it directly, this energy consumption is out of scope and is not included in the calculation of the GHG emissions but is also not included in the avoided emissions. Self-generated electricity that is fed back into the grid represents avoided emissions. For the housing associations in the BNG's portfolio, this amounts to 363,132,229 kWh of electricity and 15,141 tonnes financed GHG emissions. These data were provided by Republiq per housing association and the kWh was multiplied by the grey energy emission factor and the ratio of loans to total balance sheet to result in the avoided financed emissions.

Asset class specific considerations	For the calculation based on energy consumption data, the approach for the social housing associations is in line with the approach of asset class 'Mortgages'. Energy consumption of financed buildings (scope 1 and 2) is covered.
Attribution	**Attribution for the housing associations with energy consumption data** To calculate the GHG footprint according to the PCAF principles, a general approach has been developed. First, the GHG emissions of the different entities in the sector are calculated. Then, the BNG's share of the total balance sheet is used to determine the share of GHG emissions for which BNG is responsible. $$\sum \boldsymbol{CO_2eq} \times \frac{\boldsymbol{Outstanding\ loan\ volume}}{\boldsymbol{Total\ balance\ sheet\ (equity + debt)}}$$ Finally, the individual scopes and the sum of the scopes of all individual organisations have been aggregated. **Attribution for the housing associations lacking energy consumption data** Method 3a (revenue): GHG emissions are attributed to BNG based on the following attribution factor: Outstanding Loan Amount (€)/ Client's total balance sheet (€)) This formula ensures emissions are accurately scaled to BNG's financial contribution and the borrower's economic output. Method 3b (outstanding loan amount): GHG emissions are attributed to BNG based on its proportional financial involvement in the borrower's operations. For business loans, this is calculated as the outstanding loan amount relative to the borrower's total financial needs. This ensures that reported GHG emissions correspond to BNG's share of responsibility for the financed activities, in alignment with the PCAF methodology.
Absolute vs. relative emissions	For the social housing sector, the total financed GHG emissions were calculated in tonnes. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume of the clients for which a GHG footprint was calculated in this report.
Limitations	**Limitations for the housing associations with energy consumption data** ***Scope 1 natural gas use & scope 2 electricity use*** Some of the housing associations in BNG's loan portfolio were not included in Republiq's data set because these housing associations are not members of the Aedes trade association. For those housing associations that are not members of the Aedes trade association, property data has not been retrieved from Kadaster. Therefore, no data is available on the number of dwellings and floor area owned. Energy consumption data were only collected from the three largest network operators. No data are available for housing associations operating outside the regions in which these operators are active. For privacy reasons it is not possible to collect energy consumption data for individual dwellings. Data has been collected for small clusters of comparable dwellings within a housing association. These data have been aggregated to the housing association level. For energy consumption, the standard annual consumption (in Dutch 'standaard jaarafname'(SJA) was used. 'Standaard jaarafname' is the actual energy consumption recalculated to the expected energy consumption in a standard year. The actual energy consumption is adjusted for annual temperature variations, energy density per m^3 and gas pressure.

	Scope 2 District heating Unfortunately, Het PON & Telos does not have data on the allocation of dwellings to specific social housing associations. Therefore, the district heating per social housing association had to be estimated based on the ratio of the number of dwellings per social housing association with district heating to the total number of dwellings of all social housing associations with district heating in a municipality. Factors such as the type of dwelling are not considered in the allocation key. The accuracy of the data can be improved by identifying which dwellings are owned by specific social housing associations. However, these data are not available. This will not affect the total GHG emissions of the sector but will affect the sector level GHG emissions attributed to the Bank. The most recent data available from CBS on district heat consumption from a social housing association is for the year 2022. Therefore, the data on heat consumption from a heat network used in this report is from 2022 instead of 2023. The GHG emissions of the social housing associations themselves (scope 1, 2, and 3) are not included in this report. **Limitations for the housing associations lacking energy consumption data** Data availability: For many loans, borrower-specific data is not available. Especially relatively smaller companies do not disclose information on GHG emissions. Therefore, a method with a lower PCAF data quality score has been used. Data quality: PCAF recommends using the Classification Level 2 emission factors for internal analysis only. As a result, Classification level 2 cannot be used for this calculation. Within Classification level 1, it is not possible to distinguish between subsectors. This results in the reliance on the more aggregated Classification Level 1 emission factors, which introduces inherent uncertainties, particularly for sectors with high variability in emissions profiles.
Data quality estimate	**Data quality score for the housing associations with energy consumption data** 2 Primary data on actual building energy consumption is available. According to option 1b in Table 5-14 on page 92 of the report PCAF (2022)[39] the data quality is 2. For privacy reasons it is not possible to collect these data for individual dwellings. The data is therefore collected for small clusters (10 to 15 buildings) of comparable dwellings, which is subsector-specific. These data were aggregated to the level of a housing association. However, due to the specificity of energy consumption data compared to sector-specific data, the data score is 2. **Data quality score for the housing associations lacking energy consumption data** For 0.07% of outstanding loans to this sector, the data quality score is 4. GHG emissions are calculated based on revenue and an emission factor. For 0.4% of outstanding loans to this sector, the data quality score is 5. GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.

[39] https://carbonaccountingfinancials.com/standard.
PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.

Factsheets per data source

Factsheets for the housing associations with energy consumption data

Topic	Description
Data	Houses with energy consumption
Data files	20240606 – Dataset woningcorporaties incl energie.csv
Data Source	Republiq
Year	2024
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Not applicable
Data quality	Score 2 Data per social housing association specific.
Unit of measurement	Not applicable
Selections	Not applicable
Data transformation	Not applicable
Data missing	A few housing associations that are clients at BNG are missing in this dataset.
Print screens	Not applicable

Topic	Description
Data	Supply of energy to social housing corporations
Data file	Original file (datafile received from Republiq): 20240829 - BNG_energieverbruik_woningcorporaties.csv
Data Source	Not applicable
Year	2023
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Original file: Werkmap\Woningcorporaties\b. Ruwe data
Data quality	Score 2 Primary data on actual building energy consumption is available. According to option 1b in Table 5-14 on page 92 of the report PCAF (2022)[40] the data quality is 2. For privacy reasons it is not possible to collect these data for individual dwellings. The data is therefore collected for small clusters (10 to 15 buildings) of comparable dwellings, which is sub-sector specific. These data were aggregated to the level of a housing association. However, due to the specificity of energy consumption data compared to sector-specific data, the data score is 2.
Unit of measurement	Natural gas: Nm^3 Electricity: kWh
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

[40] https://carbonaccountingfinancials.com/standard.
PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.

Topic	Description
Data	Total balance sheet
Data files	Original file: dVi2022 H3.xlsx Edited file: 240820 woco passiva aanpassing 3 woco's 2022.xlsx
Data Source	Inspectie Leefomgeving en Transport (ilent); Autoriteit woningcorporaties
Year	2022. For both the 2022 and 2023 calculations, the total balance sheet for 2022 was used. The total balance sheet for 2023 was not yet available. It is preferable to use the same year for the outstanding loan and the total balance sheet. Unfortunately, this was not possible for 2023, so the total balance sheet of the previous year was used.
Last update	Not applicable
Date of download	2022: 17-7-2024
Link to webpage	https://data.overheid.nl/dataset/verantwoordingsinformatie-woningcorporaties-dvi2022-hfd3
Filters used to obtain the datafile	Sheet: data 3.1 Column B (Soort_instelling) selected on TE Column C (DAEB_Indicatie) selected on O Column D (Jaar) selected on 2018 or 2020 Column E (Balanskant) selected on PASSIVA Column F (Balanstype) selected on PASSIVA
Internal location	Original file: Werkmap\Woningcorporaties\b. Ruwe data Edited file: Werkmap\Woningcorporaties\c. Voorbewerkte data
Data quality	Score 1 Audited data per social housing association specific.
Unit of measurement	Euro
Selections	Not applicable
Data transformation	To make sure that the coverage ratio for all three years is comparable, the loans and total balance sheet of social housing associations that have merged in the past few years have been summed and it is assumed that the energy consumption of the merged social housing associations are the same as the sum of the original ones.
Data missing	For a small number of social housing associations, total balance sheet data were missing in the data file used. For these social housing associations, total balance sheet data were taken from the annual reports. If data were missing for the required year, the previous year's data were used.
Print screens	Werkmap\Woningcorporaties\a. Printscreens 20240717 dvi h3 2022

Topic	Description
Data	District heating of housing associations
Data files	Original file: Stadsw 2022 woco.xlsx Edited file: 240823 stadsverwarming per gemeente 2021 2022.xlsx
Data Source	CBS Microdata (received by e-mail: 16-8-2024_output vrijgegeven_8741_jkrz @output.msg)
Year	2022
Last update	Not applicable
Date of download	16-08-2024
Link to webpage	https://www.cbs.nl/nl-nl/onze-diensten/maatwerk-en-microdata/microdata-zelf-onderzoek-doen/microdatabestanden/energieverbruik-energiegebruiken-van-woningen https://opendata.cbs.nl/statline/#/CBS/nl/dataset/83878NED/table
Filters used to obtain the datafile	Not applicable
Internal location	Original file: Werkmap\Woningcorporaties\b. Ruwe data

	Edited file: \Werkmap\Woningcorporaties\c. Voorbewerkte data
Data quality	Score 2 The GHG emissions are calculated based on primary data on actual building energy consumption. The data quality score 2 applies to the overall sector. See option 1b in Table 5-15 on page 98 of the report PCAF (2022)[41]
Unit of measurement	GJ
Selections	Not applicable
Data transformation	Not applicable
Data missing	In the CBS Microdata environment, all numbers below 10 were removed for privacy reasons.
Print screens	Not applicable

Topic	Description
Data	Number of dwellings per housing association per municipality connected to the district heating network
Data file	Original file: 20240916 - Warmtenetten_woningcorporaties.xlsx Edited file: 20240916 – Warmtenetten_woningcorporaties_emissiefactoren.xlsx
Data Source	Republiq
Year	2024
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Original file: Werkmap\Woningcorporaties\b. Ruwe data Edited file: Werkmap\Woningcorporaties\c. Voorbewerkte data
Data quality	Score 2 Data per social housing association specific.
Unit of measurement	Number of dwellings
Selections	Not applicable
Data transformation	Data for 2024 is used to calculate the district heating for 2022, 2021 and 2017.
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Emission factors for the large heat networks in the Netherlands
Data file	Duurzaamheidsrapportage 2022_v2.pdf
Data Source	Rijksdienst voor Ondernemend Nederland
Year	2022
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	\Werkmap\Woningcorporaties\b. Ruwe data
Data quality	Score 2 Data per large heat network specific.
Unit of measurement	Kg/GJ_{th}
Selections	Not applicable

[41] https://carbonaccountingfinancials.com/standard.
PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.

Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Factsheets per data source

Factsheets for the housing associations lacking energy consumption data

Topic	Description
Data	Loan portfolio data includes key variables such as NACE codes, outstanding nominal amounts, market segments, subsectors.
Data file	BNG kredietportefeuille 31-12-2023.xls
Data Source	Internal loan portfolio data extracted from BNG's credit systems
Year	Data reflects the loan portfolio per 31-12-2023.
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Klimaatplan\PCAF\Data uitvragen\Portefeuillebestand Kredietportefeuille
Data quality	1
Unit of measurement	Euro (€)
Selections	Portfolio filtered to select the social housing associations
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	PCAF Emission Factor Database: Business Loans and Unlisted Equity.
Data file	PCAF_emission_factor_database_Business_loans_and_unlisted_equity
Data Source	Exiobase
Year	2019
Last update	November 2024
Date of download	Data was extracted on November 25, 2024.
Link to webpage	Not applicable
Filters used to obtain the datafile	Selection of emission factors relevant to business loans and unlisted equity.
Internal location	Klimaatplan\PCAF\PCAF EF database
Data quality	The emission factors provided by the PCAF database are sourced from globally recognised and validated datasets, ensuring a high level of reliability for emissions calculations. These factors are specific to various sectors, regions, and activities, and are derived from reputable sources such as DEFRA, Climate Trace, and FAOSTAT.B
Unit of measurement	tCO_2e per mln euro (tCO_2e / M. Euro)
Selections	In the dataset, filters were applied to ensure that only emission factors corresponding to methodology Option 3a and Option 3b, as outlined in the PCAF guidelines, were selected. These emission factors are sourced from the Exiobase assets database (2019), which provides sector-specific data for scope 1 and scope 2 emissions. Additional filters: - Region: EU member states - Comments: Emission factor recommended to use for financed emission calculations

Data transformation	Emission factors are directly applied to calculate emissions.
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Consumer Price Index which can be used to update the outdated emission factors to the recent reporting year.
Data file	PCAF_DB Financed emissions calculation worksheet 0424
Data Source	https://data.imf.org
Year	Conversion factor to convert from 2019 to 2020-2023
Last update	April 2024
Date of download	Not applicable
Link to webpage	https://db.carbonaccountingfinancials.com/
Filters used to obtain the datafile	Not applicable
Internal location	Not applicable
Data quality	Not applicable
Unit of measurement	Numerical
Selections	Country = The Netherlands
Data transformation	The emission factors from the PCAF database were divided by the Consumer Price Index factor. This is consistent with the methodology used in the PCAF emissions calculation tool.
Data missing	Not applicable
Print screens	Not applicable

List of the calculation sheets	Location
BNGDOCS-#3590683-v1-Woco_s_onderwijs- en zorginstellingen zonder emissies van HPT.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank
Leningen woco BNG aangepast.xlsx	Werkmap\Woningcorporaties\c. Voorbewerkte data
Emissiefactoren + woningen stadsw 2021 2022.csv Energieverbruik bng 2021 2022 2023.csv bBNG.tWOCO_Leningportefeuille.csv Woco passiva 2018 2020 2021 2022.csv Woco stadsw 2021 2022.csv	Werkmap\Woningcorporaties\d. Data voor SQL
emissiefactoren - PCAF 2024.csv	Werkmap\Emissiefactoren\d. Data voor SQL
241129_BNG_WOCO_2023_versie2024.ipynb	Werkmap\Woningcorporaties\e. SQL notebooks
241129_pBNG.vWOCO_2023_IndividueleKlanten_versie2024.xslx 241129_pBNG.vWOCO_2023_Ratio_Lening_Passiva_versie2024.xlsx 241129_pBNG.vWOCO_2023_CO2voetafdruk_Absoluut_Totaal_versie2024.xlsx 241129_pBNG.vWOCO_2023_CO2voetafdruk_Relatief_Totaal_versie2024.xlsx	Werkmap\Woningcorporaties\f2. Data uit SQL BNG
BNGDOCS-#3590683-v2-Woco_s_onderwijs- en zorginstellingen zonder emissies van HPT VERSIE3.slxs	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank\Bestanden ontvangen van BNG Bank eigen berekeningen
241209 samenvoeging alle GHG emissies woningcorporaties BNG Bank 2023.xlsx 250116_pBNG.vWOCO_2018_IndividueleKlanten_m2.xslx 250116_pBNG.vWOCO_2022_IndividueleKlanten_m2.xslx	Werkmap\Woningcorporaties\f4. Berekening BNG

5 Housing: housing related

5.1 Results housing related sector

The housing related sector is a small sector within the loan portfolio of BNG. The sector accounts for 0.9% of BNG's loan portfolio.

Tables 5-5 and 5-6 show the results for the housing related sector in 2023. A comparison over time is not yet possible.

The relative financed GHG emissions (Table 5-6) show that this is not a GHG intensive sector.

Table 5-5 Loan portfolio and coverage ratio of the housing related sector in 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients for which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)
2023	784	0.9	784	100.0

Table 5-6 Absolute and relative financed GHG emissions for the housing related sector in 2023

Scope	Financed GHG emission (tonnes/year)	Financed GHG emission (%)	Relative financed GHG emission (tCO_2e/million euro)
	2023	**2023**	**2023**
Scope 1	735	13.6	0.9
Scope 2	295	5.5	0.4
Scope 3	4,364	80.9	5.6
Total	**5,395**	**100.0***	**6.9**

*The sum in these columns is not always exactly 100% due to rounding per sector

5.2 Housing related approach

General factsheet

Topic	Description
Scopes covered	For the housing related sector scope 1, 2 and 3 are covered.
Portfolio covered	The housing related sector coverage ratio is 100% for 2023.
Data	*Loan-specific information includes:* - NACE codes: Used to classify economic activities and map loans to the corresponding sectors and subsectors. - Outstanding loan amounts: The nominal value of loans provided to clients, which serves as the basis for emissions calculations. - Subsector classifications: Detailed breakdowns of financed activities *Emission Factors:* Emission factors are applied according to the PCAF guidelines, using sector-specific data to estimate scope 1 (direct), scope 2 (indirect from electricity), and scope 3 (other indirect) emissions. These factors are sourced from reputable databases and methodologies, including DEFRA, FAOSTAT, IPCC EFDB, Joint European Commission,

	Exiobase, and Probas. These emission factors are expressed in terms of tCO_2e per million euros financed. *Indexing of outdated climate data:* Data has been indexed based on the principle that in the adjustment of economic emissions intensities only the monetary value is adjusted, not the emissions in line with PCAF guidance. A CPI index for the Netherlands was used to adjust this.
Grid emission factors	Grid emission factors represent the average GHG emissions associated with the generation and delivery of electricity consumed by financed organisations. For scope 2 emissions, these factors reflect the carbon intensity of the power grid in the region where the financed activities take place. The grid emission factors are embedded within the sector-specific averages used for PCAF Classification Level 1. These factors ensure that the scope 2 emissions for the loan portfolio account for the electricity consumption of each sector, adjusted for regional variations in energy mix and grid intensity. For this portfolio, grid emission factors are expressed as tCO_2e per million euros financed, providing a standardised approach to estimate indirect emissions from purchased electricity.
Calculation steps	The calculation of GHG emissions follows a standardised approach based on the PCAF methodology, utilizing the 3b method for business loans and unlisted equity to ensure consistency in the assessment of financed emissions. This methodology applies emission factors based on economic activity, using sector-specific averages provided through recognised databases. These emission factors are aligned with the primary business activities of the financed organisation and reflect emissions per unit of assets. The 3b method ensures emissions are attributed proportionally to BNG's share of financing, relative to the borrower's total financial needs. This approach leverages emission factors validated through established methodologies, ensuring they are consistent with the activities financed by the bank. Data quality is assessed in alignment with PCAF standard. 1. Emission factor assignment: The NACE code of each company in the loan portfolio is used to determine the sector-specific emission factors. In addition, expert judgement was used when the mapping based on NACE codes seemed less reliable. In these cases, a better fit was made based on the subsector classification or more detailed information on the activities of the company. This information was largely derived from internal documents prepared by our credit department. 2. Loan attribution: The GHG emissions for each loan are attributed based on the outstanding loan amount relative to the total emissions associated with the financed activity. This ensures that the emissions reflect the financial share of the organisation covered by the loan. 3. Indexing of outdated climate data: The emission factor has been adjusted by using a CPI index for the Netherlands. 4. Financed GHG Emissions: For each loan, emissions are calculated using the formula: Financed GHG Emissions (tCO_2e) = Outstanding Loan Amount (€) * Emission Factor (tCO_2e/M. Euro). 5. Data Quality assessment:

	Each calculation is assigned a Data Quality (DQ) score based on the PCAF standards. Higher scores indicate reliance on sector averages rather than borrower-specific data.
Avoided emissions	Not applicable
Asset class specific considerations	No additional considerations
Attribution	GHG emissions are attributed to BNG based on its proportional financial involvement in the borrower's operations. For business loans, this is calculated as the outstanding loan amount relative to the borrower's total financial needs. This ensures that reported GHG emissions correspond to BNG's share of responsibility for the financed activities, in alignment with the PCAF methodology.
Absolute vs. relative emissions	For the housing related sector, the total financed GHG emissions were calculated in tonnes. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume of the clients for which a GHG footprint was calculated in this report.
Limitations	Data availability: for many loans, borrower-specific data were not available. In particular, relatively small companies do not disclose information on GHG emissions. Therefore, emissions were calculated based on outstanding loan amounts, resulting into a lower PCAF data quality score. Scope 3 complexity: indirect emissions, particularly for scope 3, are estimated using economic activity data, which may not fully capture the variability in emissions across borrowers. Data quality: PCAF recommends using the Classification Level 2 emission factors for internal analysis only. As a result, Classification level 2 cannot be used for this calculation. Within Classification level 1, it is not possible to distinguish between subsectors. This results in the reliance on the more aggregated Classification Level 1 emission factors, which introduces inherent uncertainties, particularly for sectors with high variability in emissions profiles.
Data quality estimate	Data quality score is 5. GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.

Factsheets per data source

Topic	Description
Data	Loan portfolio data includes key variables such as NACE codes, outstanding nominal amounts, market segments, subsectors.
Data file	BNG kredietportefeuille 31-12-2023.xls
Data Source	Internal loan portfolio data extracted from BNG's credit systems
Year	Data reflects the loan portfolio per 31-12-2023.
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Klimaatplan\PCAF\Data uitvragen\Portefeuillebestand Kredietportefeuille
Data quality	1
Unit of measurement	Euro (€)
Selections	Portfolio filtered to select the clients within housing related sector
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	PCAF Emission Factor Database: Business Loans and Unlisted Equity.
Data file	PCAF_emission_factor_database_Business_loans_and_unlisted_equity
Data Source	Exiobase
Year	2019
Last update	November 2024
Date of download	Data was extracted on November 25, 2024.
Link to webpage	Not applicable
Filters used to obtain the datafile	Selection of emission factors relevant to business loans and unlisted equity.
Internal location	Klimaatplan\PCAF\PCAF EF database
Data quality	The emission factors provided by the PCAF database are sourced from globally recognised and validated datasets, ensuring a high level of reliability for emissions calculations. These factors are specific to various sectors, regions, and activities, and are derived from reputable sources such as DEFRA, Climate Trace, and FAOSTAT.B
Unit of measurement	tCO_2e per mln Euros (tCO_2e / M. Euro)
Selections	In the dataset, filters were applied to ensure that only emission factors corresponding to methodology Option 3a and Option 3b, as outlined in the PCAF guidelines, were selected. These emission factors are sourced from the Exiobase assets database (2019), which provides sector-specific data for scope 1 and scope 2 emissions. Additional filters: - Region: EU member states - Comments: Emission factor recommended to use for financed emission calculations
Data transformation	Emission factors are directly applied to calculate emissions.
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Consumer Price Index which can be used to update the outdated emission factors to the recent reporting year.
Data file	PCAF_DB Financed emissions calculation worksheet 0424
Data Source	https://data.imf.org
Year	Conversion factor to convert from 2019 to 2020-2023
Last update	April 2024
Date of download	Not applicable
Link to webpage	https://db.carbonaccountingfinancials.com/
Filters used to obtain the datafile	Not applicable
Internal location	Not applicable
Data quality	Not applicable
Unit of measurement	Numerical
Selections	Country = The Netherlands
Data transformation	The emission factors from the PCAF database were divided by the Consumer Price Index factor. This is consistent with the methodology used in the PCAF emissions calculation tool.
Data missing	Not applicable
Print screens	Not applicable

List of the calculation sheets	Location
BNGDOCS-#3592573-v2-Emissies overige klanten kredietportefeuille.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank\Bestanden ontvangen van BNG Bank eigen berekeningen

6 Public sector: municipalities

6.1 Results public sector: Municipalities

Municipalities represent 28.6% of BNG's total loan portfolio, making them the second-largest sector within BNG's loan portfolio.

6.1.1 Coverage ratio and attribution

As last year, the coverage ratio for municipalities is 100%. Between 2022 and 2023, the outstanding loan volume decreased by 661 million euro. The total balance sheet of clients for which a GHG footprint was calculated increased. As a result, the ratio of the loan portfolio to the total balance sheet decreased. The attribution to BNG decreased compared to last year. For 2018, 2022 and 2023, the loan portfolio, the total balance sheet and the coverage ratio are shown in Table 6-1.

Table 6-1 Loan portfolio, coverage ratio and ratio loan portfolio versus total balance sheet for the municipalities in 2018, 2022 and 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients of which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)	Total balance sheet of clients for which a GHG footprint was calculated (million euro)	Ratio loan portfolio / total balance sheet of clients for which a GHG footprint was calculated
2018	26,066	31.9	25,973	99.6	87,194	0.30
2022	25,765	29.7	25,765	100.0	98,886	0.26
2023	25,104	28.6	25,104	100.0	103,361	0.24

6.1.2 Energy consumption and financed GHG emissions

Natural gas and electricity consumption increased between 2022 and 2023 because the amount of real estate expressed in floor area (m^2) owned by municipalities has increased. The emission factors for natural gas and unknown electricity also decreased and the attribution to BNG decreased. These changes affect GHG emissions.

Table 6-2 Total energy consumption of the municipalities in 2018, 2022 and 2023

Year	Natural gas consumption (m^3)	Electricity consumption (kWh)
2018	295,152,316	994,918,014
2022	274,453,300	897,588,964
2023	350,224,572	1,233,851,609

Table 6-3 shows the GHG footprint results for the Dutch municipalities in 2018, 2022 and 2023.

Table 6-3 Absolute and relative financed GHG emissions for municipalities in 2018, 2022 and 2023

Source of emissions	Scope	Financed GHG emissions (tonnes/year)			Financed GHG emissions (%)			Relative financed GHG emissions (tCO_2e/million euro)		
		2018	**2022**	**2023**	**2018**	**2022**	**2023**	**2018**	**2022**	**2023**
Natural gas use	Scope 1	161,209	130,506	149,619	14.9	14.8	16.4	6.2	5.1	6.0
Fossil fuel use (cars)	Scope 1	3,628	2,562	2,332	0.3	0.3	0.3	0.1	0.1	0.1
Electricity use	Scope 2	122,617	87,885	85,357	11.4	10.0	9.3	4.7	3.4	3.4
Purchased goods and services	Scope 3	791,066	660,386	675,974	73.3	74.9	74.0	30.5	25.6	26.9
Total		**1,078,520**	**881,339**	**913,282**	**100.0***	**100.0***	**100.0***	**41.5**	**34.2**	**36.4**
Total scope 1 and 2		**287,454**	**220,953**	**237,308**	**26.6**	**25.1**	**26.0**	**11.0**	**8.6**	**9.5**

*The sum in these columns is not always exactly 100% due to rounding per sector

Table 6-4 Financed GHG emissions per financed floor area (m^2) for the municipalities in 2018, 2022 and 2023

	Year		
	2018	**2022**	**2023**
Financed GHG emissions real estate related ($kgCO_2e$)/ financed m^2	45.2	39.8	35.1

Between 2022 and 2023 the financed GHG emissions decreased for scope 1 fossil fuel use (cars) and scope 2 electricity consumption but increased for scope 1 natural gas consumption and scope 3. As mentioned above, the total consumption of natural gas and electricity increased between 2022 and 2023 (Table 6-2). In 2024, a new inventory of property data was carried out by the 'Kadaster'.[42] This led to an increase in the total floor area owned by municipalities according to Kadaster. Natural gas consumption increased more than electricity consumption and the emission factor for natural gas is higher than for electricity. Overall, the ratio loan portfolio to total balance sheet decreased between 2022 and 2023. These changes resulted in an increase in financed GHG emissions for natural gas consumption, but a decrease in financed GHG emissions for electricity consumption. Financed GHG emissions per m^2 decreased by 4.7 $kgCO_2e/m^2$. This shows that the increase in financed GHG emissions for scope 1 is mainly due to an increase in total floor area.

Total financed GHG emissions increased by 31,943 tCO_2e. This increase is mainly due to an increase in scope 1 GHG emissions for natural gas consumption, which increased by 19,113 tonnes. The scope 3 change is due to a decrease in the emission factor per sector and due to an increase in the expenditure on procurement of goods and services between 2022 and 2023, but the financed GHG emissions are also affected by the ratio of the loan portfolio to total balance sheet on client level. Municipal expenditure on goods and services increased

[42] Kadaster registers of all real estate (land and buildings) in the Netherlands, showing who has what rights.

between 2022 and 2023. Using the spend-based calculation method for scope 3, these increased expenditures result in higher GHG emissions, but it is not possible to say with certainty whether these increased expenditures are actually associated with higher GHG emissions in practice.

The relative GHG emissions increased by 2.2 tonnes per million euro. This is due to an increase in relative financed GHG emissions for scope 1 natural gas consumption and scope 3. The GHG emissions for scope 3 increased and influenced both the absolute (>70%) and relative financed GHG emissions. Because the data quality of scope 3 is poor (score 4), no hard conclusions can be drawn from these figures.
The financed GHG emissions per m^2 of scope 1 natural gas consumption and scope 2 electricity consumption decreased between 2022 and 2023 and between 2018 and 2023 (Table 6-4).

6.2 Public sector: municipalities approach

6.2.1 Scope 1 and 2

Adjustments in methodology

The methodology for calculating scopes 1 and 2 has not changed. This year, a few changes have been made to the scope 3 calculations. These changes are explained in more detail in section 5.2.2.

General factsheet

Topic	Description
Scopes covered	For municipalities, scope 1 natural gas consumption, scope 1 fossil fuel use by company cars, scope 2 electricity consumption, and scope 3 purchased goods and services are covered.
Portfolio covered	Data are collected for all municipalities in the Netherlands. This means that the coverage ratio for this sector is 100%. Loans are issued by the bank to municipalities. BNG also holds debt securities for municipality bonds and medium term notes. Bonds and medium term notes are not included in 2018 but are included in 2022 and 2023. Therefore, a distinction has been made between loans and bonds and medium term notes within the municipal loan portfolio. The carbon footprint has been calculated separately for bonds and medium term notes and loans so that the GHG footprint of the loan portfolio in 2018 can be compared to the loan portfolio in 2022 and 2023.
Data	For scope 1 natural gas consumption and scope 2 electricity consumption, 2023 data were used. For scope 1 fossil fuel consumption of company cars, the calculation was made with partial use of 2022 data. The data used in this approach comes from several sources. For scope 1 natural gas consumption and scope 2 electricity consumption, energy consumption data for buildings owned by municipalities were used. Republiq provided the energy consumption data to Het PON & Telos. Republiq used estimates for different functions and construction periods. Het PON & Telos calculated the GHG emissions for scope 1 fossil fuel consumption of company cars, using several data sources. Ideally, the litres of fuel consumed or kilometres driven by the company cars would be multiplied by the corresponding emission factor to obtain the GHG emissions of company cars. However, data on fuel consumption or driven kilometres are not available for each municipality. Therefore, a calculation was made to estimate the GHG emissions of company cars

	by using several data sources. The data used for this calculation are summarised in this section. More information on the calculation can be found in the calculation steps section. The data on the number of employees working for SBI-code 8411 (general government administration, which includes municipalities, as well as provinces and ministries) and the data on the number of employees working for the entire public administration and government services sector come from Lisa. Lisa serves as the national information system on jobs in the Netherlands and maintains a comprehensive database with information on all places where paid work is performed. The data are provided based on the 2023 municipality classification. Consequently, all other data used were reclassified to match the 2023 municipality classification to ensure coverage of all municipalities present in the Lisa dataset. Data on the number of employees working for the provincial government organisation come from 'A&O fonds provincies'. 'A&O fonds provincies' is an organisation that provides governments with practical tools, knowledge and subsidies. These data are available at the aggregated level of the provinces. Data on the number of passenger cars owned by enterprises per sector come from the Dutch Central Bureau of Statistics (CBS). The data originate from the vehicle register (RDW), which ensures their reliability and accuracy. Data on the number of kilometres travelled by car per year comes from the Dutch Central Bureau of Statistics (CBS) and covers the average number of kilometres travelled per year by a passenger car registered in the Netherlands. The original data come from the RDW's Online Kilometre Registration (OKR), which ensures its reliability.
Grid emission factors	Section 2.4 contains more information on emission factors. The following emission factors from Table 2-3 have been used: - Natural gas - Electricity (unknown source) - Passenger transport, Car, Fuel type unknown, weight class unknown.
Calculation steps	**Scope 1 natural gas and scope 2 electricity** The following steps have been performed by Republiq: 1. Inventory of buildings owned by municipalities 2. Joining energy consumption data 1. Inventory of buildings owned by municipalities Republiq has a dataset called 'dataset maatschappelijk vastgoed'. This dataset contains all buildings owned by municipalities and/or used for public purposes such as education, sports, welfare and culture. Republiq filtered out all buildings owned by municipalities and deleted buildings with one of the following functions: residential, industrial, retail and accommodation. Republiq has acquired the property data from 'Kadaster'.[43] 2. Joining energy consumption data For different years, Republiq has estimated values for energy consumption for different types of functions and construction periods. For example, Republiq can estimate the energy consumption of a sports centre built in 1960. The energy consumption estimates are based on actual energy consumption data in the years 2018 and 2020. For the year 2023, the energy consumption per building type and construction period is estimated according to the actual energy consumption data from 2018 and 2020 and the development of energy consumption based on the trend within the municipality sector published by CBS. Republiq combines these estimates with the dataset from step 1 on the function and construction period of the buildings. The result of this step is a dataset containing all buildings owned by municipalities with an estimated value for energy consumption in 2023.

[43] Kadaster registers of all real estate (land and buildings) in the Netherlands, showing who has what rights.

	Republiq provided Het PON & Telos with the following data: - Total electricity consumption (in kWh) - Total gas consumption (in Nm^3) - Floor area (m^2) The next step was carried out by Het PON & Telos: To make the final calculations for both scope 1 natural gas consumption and scope 2 electricity consumption, the total electricity and natural gas consumption was multiplied by the corresponding emission factor from the same year as the data. For scope 1 natural gas consumption, the emission factor natural gas (Nm^3) was used. For scope 2 electricity consumption, the emission factor electricity from unknown sources (kWh) was used. Floor area The source of the floor area data is the Basic Registration of Addresses and Buildings (BAG). The reference date for the total floor area of buildings owned by municipalities is 1-1-2024. To calculate the financed GHG emissions per financed m^2, the total attributed GHG emissions in tCO_2e for the municipalities were divided by the total financed floor area (m^2) of the municipalities. **Scope 1 fossil fuel for company cars** Scope 1 emissions also include fossil fuel emissions from company cars. For this calculation, the number of employees working for the total public administration and government services sector and the number of employees working for a general government administration (SBI code 8411: general government administration, which includes municipalities as well as provinces and ministries), both per municipality, were used. The number of company cars used in the entire public administration and government services sector is known (CBS Statline). To calculate the total number of company cars for the municipalities, the number of company cars used by the total public administration and government services sector was multiplied by the percentage of employees working for the municipalities in relation to all employees working for the Dutch public administration and government services sector. The total number of company cars for Dutch municipalities was multiplied by the percentage of employees working for that municipality in relation to all employees working for Dutch municipalities to obtain the number of company cars per municipality. This was multiplied by the number of kilometres travelled per company car (all fuel types) and multiplied by the emission factor for passenger transport, car, fuel type unknown, weight class unknown (Table 2-4). The GHG emissions were divided by a factor of 1,000 to obtain the GHG emissions in tonnes for company cars. After calculating scope 1 and scope 2 GHG emissions, these GHG emissions were multiplied by the ratio of outstanding loan to total balance sheet ratio per client. For example, if the ratio of outstanding loan to total balance sheet is 25%, 25% of the municipality's scope 1 and 2 GHG emissions are attributed to BNG. The financed GHG emissions per client are added up to result in the total financed GHG emissions per sector. The financed GHG emissions and relative financed GHG emissions are reported per scope. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume in million euro of the clients for which a GHG footprint was calculated in this report. The final calculated values for scopes 1 and 2 and the total balance sheet have been reallocated to the 2023 municipal division for all calculated years.
Avoided emissions	For municipalities, avoided emissions are unknown. It is unknown whether municipalities generate their own renewable energy and feed it back into the grid.
Asset class specific considerations	The approach for municipalities is in line with the public loan approach in the PCAF methodology.

Attribution	To calculate the GHG footprint according to the PCAF principles, a general approach has been developed. First, the GHG emissions of the different entities in the sector are calculated. Then, the BNG's share of the total balance sheet is used to determine the share of GHG emissions for which BNG is responsible. $$\sum \boldsymbol{CO_2eq} \times \frac{\boldsymbol{Outstanding\ loan\ volume}}{\boldsymbol{Total\ balance\ sheet\ (equity + debt)}}$$ Finally, the individual scopes and the sum of the scopes of all individual organisations have been aggregated.
Absolute vs. relative emissions	For the municipalities, the total financed GHG emissions were calculated in tonnes. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume of the clients for which a GHG footprint was calculated in this report.
Limitations	**Scope 1 natural gas and scope 2 electricity** Energy consumption data were estimated based on actual energy consumption data in the years 2018 and 2020. It is preferable to have actual energy consumption data for all buildings owned by municipalities. Some municipal buildings have multiple functions, including a school. It is therefore possible that a small number of schools are included in the municipality buildings. **Scope 1 fossil fuels from company cars** There is no recorded data per municipality on company cars, including details such as number of cars, car types and fuel types. The best possible result is achieved by using the current model(s). Many municipalities are actively working to improve the sustainability of their operations. As part of this effort, they are focusing on making their vehicle fleets more sustainable. The calculation method used in this project does not reflect this development. As a result, the GHG emissions from company cars are a relatively rough estimate and may differ from the actual situation due to developments in the area of making the local authority fleet more sustainable. In addition to cars, municipalities also have other means of transport such as scooters and (electric) bicycles. The use of these means of transport is not included in the calculated GHG emissions for company cars.
Data quality estimate	**Scope 1 natural gas and scope 2 electricity:** data quality score 3. The indicators for energy consumption are based on actual consumption from 2018 and 2020. For the 2023 data, estimates were made based on the developments in energy consumption based on the trend within the municipality sector published by CBS. **Scope 1 company cars:** data quality score 5. The GHG emissions calculations are based on average car information. Brand, model, and type are not known, and distance travelled is based on local or regional statistical data. Therefore, the data quality score is 5. See option 3b in Table 5-16 on page 106 of the report PCAF (2022)[44]

[44] https://carbonaccountingfinancials.com/standard.
PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.

Factsheets per data source for scope 1 and 2

Topic	Description
Data	Dataset public real estate
Data files	Dataset Maatschappelijk Vastgoed.csv
Data Source	Republiq
Year	2024
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Data can be requested from Republiq
Data quality	Score 2 Data is obtained from Kadaster. However, these data are reliable it is not 100% accurate regarding the actual list of buildings owned by municipalities.
Unit of measurement	Not applicable
Selections	Exclude the following buildings: - Buildings not owned by municipalities - Buildings with one of the following functions: living, industrial, retail, lodging
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Energy consumption public real estate
Data files	20240827 - Energieverbruik Maatschappelijk Vastgoed 2018-2023.xlsx
Data Source	Republiq
Year	2018, 2020, 2021, 2022, 2023
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Data can be requested from Republiq
Data quality	Score 2. Data is based on actual energy consumption data from a sample set of buildings.
Unit of measurement	kWh for electricity and Nm^3 for gas
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Supply of energy to municipalities
Data file	Original files (datafiles received from Republiq): 20240918 - BNG_energieverbruik_gemeenten.xlsx 20240918 - NWB_energieverbruik_gemeenten.xlsx Edited file: 240923 samenvoegen energiedata.xlsx

Data Source	Republiq
Year	2021, 2022, 2023
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Original files: Werkmap\Gemeenten\b. Ruwe data Edited file: Werkmap\Gemeenten\c. Voorbewerkte data
Data quality	Score 3
Unit of measurement	Natural gas: Nm^3 Electricity: kWh
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Number of employees working for the public administrations and government services sector (sector O)
Data file	LISA-statistiek_(ordernr_202400020).xlsx
Data Source	Lisa; het werkgelegenheidsregister van Nederland
Year	2023
Last update	July 2024
Date of download	Data purchased on 09-07-2024
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Werkmap\Gemeenten\b. Ruwe data
Data quality	Score 2 Data from LISA are based on observations/measurements of all locations of companies. Self-employed people are taken into account as well. This makes it possible to present an overview of employment on both geographic and sectoral level.
Unit of measurement	Number of employees
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Gemeenten\a. Printscreens FW Bestelling LISA-data (ordernummer 202400020).msg

Topic	Description
Data	Number of employees working for a general government administration (SBI 8411)
Data file	LISA-statistiek_(ordernr_202400021).xlsx
Data Source	Lisa; het werkgelegenheidsregister van Nederland
Year	2023
Last update	July 2024
Date of download	Data purchased on 10-07-2024
Link to webpage	Not applicable
Filters used to obtain the datafile	SBI08-omschrijving: O-8411-Algemeen overheidsbestuur

Internal location	Werkmap\Gemeenten\b. Ruwe data
Data quality	Score 2 Data from LISA are based on observations/measurements of all locations of companies. Self-employed people are taken into account as well. This makes it possible to present an overview of employment on both geographic and sectoral level.
Unit of measurement	Number of employees
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Gemeenten\a. Printscreens FW Bestelling LISA-data (ordernummer 202400021).msg

Topic	Description
Data	Number of employees working at provinces
Data file	241217 aantal banen bij provincies.xlsx Edited file: 240923 berekening sbi 8411 zonder provincie 2023.xlsx – sheet: Banen provinciehoofdsteden
Data Source	A & O Fonds Provincies
Year	2023
Last update	July 2023
Date of download	17-07-2024
Link to webpage	https://personeelsmonitorprovincies.onderzoek.nl/index.cfm?action=main.report
Filters used to obtain the datafile	No filters used
Internal location	\Werkmap\Gemeenten\b. Ruwe data
Data quality	Score 2 Data is directly acquired from provinces, using a questionnaire. Data quality is therefore indicated as high.
Unit of measurement	Number of employees
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Gemeenten\a. Printscreens\Banen provincies

Topic	Description
Data	Number of company cars owned by companies in the public administration and government services sector.
Data file	240717 aantal bedrijfsautos tm 2022.xlsx
Data Source	CBS Statline
Year	2022 2022 data is used for 2023 calculations.
Last update	09-02-2024
Date of download	17-07-2024
Link to webpage	https://opendata.cbs.nl/#/CBS/nl/dataset/85620NED/table?dl=975E8
Filters used to obtain th datafile	Onderwerp: Bedrijfsbestelauto's Bedrijfstakken/branches: O Openbaar bestuur en overheidsdiensten Bedrijfsgrootte/leeftijd bestelauto: Totaal Perioden: 2022
Internal location	Werkmap\Gemeenten\b. Ruwe data

Data quality	Score 2 The research method of these data can be found here: https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/korte-onderzoeksbeschrijvingen/bezit-en-gebruik-bestelauto-s The additional research report can be found here: https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/aanvullende%20onderzoeksbeschrijvingen/bezit-en-gebruik-bestelauto-s Data comes from motor vehicle registration (RDW) and data is checked on content, quality and usability by Statistics Netherlands
Unit of measurement	Number of company cars
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Gemeenten\a. Printscreens 240717 aantal bedrijfsautos.png

Topic	Description
Data	Average kilometres driven with a passenger car with a Dutch registration per year
Data file	240717 aantal km autos tm 2022.xlsx
Data Source	CBS Statline
Year	2022 2022 data is used for 2023 calculations.
Last update	26-10-2023
Date of download	17-07-2024
Link to webpage	https://opendata.cbs.nl/#/CBS/nl/dataset/85396NED/table
Filters used to obtain the datafile	Gewichtsklasse leeggewicht: Totaal Leeftijd voertuig: Totaal Tenaamstelling: Totaal Brandstofsoort: Alle brandstofsoorten Onderwerp: Gemiddelde jaarkilometrage Perioden: 2022
Internal location	Werkmap\Gemeenten\b. Ruwe data
Data quality	Score 2 The research method of these data can be found here: https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/korte-onderzoeksbeschrijvingen/verkeersprestaties-personenauto-s The original data comes from the online kilometer registration (OKR) of the RDW. These data are reliable.
Unit of measurement	Kilometres
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Gemeenten\a. Printscreens \240717 aantal km autos.png

Topic	Description
Data	Total balance sheet municipalities
Data file	240923 passiva gemeente 2023.xlsx
Data Source	CBS Statline
Year	2023
Last update	23-09-2024
Date of download	23-09-2024
Link to webpage	https://iv3statline.cbs.nl/#/IV3/nl/dataset/45063NED/table?ts=1726647065914

Filters used to obtain the datafile	Gemeenten: allemaal Verslagsoort: Jaarrekening Categorie: Ultimo Onderwerp: 2e plaatsing Taakveld/balanspost: Passiva
Internal location	Werkmap\Gemeenten\b. Ruwe data
Data quality	Score 2 High quality data. The data is directly delivered to CBS by municipalities from internal accounting systems. The data has not been edited by CBS.
Unit of measurement	Euro
Selections	Not applicable
Data transformation	Not applicable
Data missing	Data for the municipality Vijfheerenlanden is missing for 2023. Therefore, data from 2022 is used for the calculations.
Print screens	Werkmap\Gemeenten\a. Printscreens

List of the calculation sheets	Location
Kredietportefeuille 31-12-2022 ZONDER OBLIGATIES.xlsx Kredietportefeuille 31-12-2023 ZONDER OBLIGATIES.xlsx	Werkmap\Gemeenten\b. Ruwe data
241203 loans gemeenten BNG 2022 met kvknummer.xlsx 241203 loans gemeenten BNG 2023 met kvknummer.xlsx	Werkmap\Gemeenten\c. Voorbewerkte data
Aardgas_elektra_gemeente_v2024.csv Banen_gemeente_2018_2020_2022_2023.csv Banen_sectorO_gemeente_2018_2020_2021_2022_2023.csv Loans_BNG_gemeente_2018_2020_2021_2022_2023.csv Passiva_gemeente_2018_2020_2021_2022_2023.csv bGemeenteBerekeningen.tgemeente_Scope3_versie2024.csv	Werkmap\Gemeenten\d. Data voor SQL
Emissiefactoren – PCAF 2024.csv	Werkmap\Emissiefactoren\d. Data voor SQL
240923_BNG_Gemeente_2018_versie2024 2411204_BNG_Gemeente_loans_2022_versie2024 241204_BNG_Gemeente_loans_2023_versie2024	Werkmap\Gemeenten\e. SQL notebooks\BNG Bank
250114_pBNG.vGemeente_2018_CO2voetafdruk_Absoluut_Totaal_versie2024.xlsx 250114_pBNG.vGemeente_2018_CO2voetafdruk_Relatief_Totaal_versie2024.xlsx 250114_pBNG.vGemeente_2018_IndividueleKlanten_versie2024.xlsx 250114_pBNG.vGemeente_2018_Ratio_Lening_Passiva_versie2024.xlsx 250114_pBNG.vGemeente_2022_CO2voetafdruk_Absoluut_Totaal_Loans_versie2024.xlsx	Werkmap\Gemeenten\f2. Data uit SQL BNG

250114_pBNG.vGemeente_2022_CO2voetafdruk_Relatief_Totaal_Loans_versie2024.xlsx 250114_pBNG.vGemeente_2022_Individuele Klanten_Loans_versie2024.xlsx 250114_pBNG.vGemeente_2022_Ratio_Leninig_Passiva_Loans_versie2024.xlsx 250123_pBNG.vGemeente_2023_CO2voetafdruk_Absoluut_Totaal_Loans_versie2024.xlsx 250123_pBNG.vGemeente_2023_CO2voetafdruk_Relatief_Totaal_Loans_versie2024.xlsx 250123_pBNG.vGemeente_2023_Individuele Klanten_Loans_versie2024.xlsx 250123_pBNG.vGemeente_2023_Ratio_Leninig_Passiva_Loans_versie2024.xlsx	
250115 Berekening m2 BNG Bank loans gemeenten.xlsx 250115_pBNG.vGemeente_2018_Individuele Klanten_versie2024_m2.xlsx 250115_pBNG.vGemeente_2022_Individuele Klanten_Loans_versie2024_m2.xlsx	Werkmap\Gemeenten\f4. Berekening BNG

6.2.2 Scope 3

Adjustments in methodology

As mentioned in section 6.2.1 the calculation method for scope 3 has changed. As in previous years, the spend-based method was used to calculate scope 3 for municipalities. The spend-based method calculates GHG emissions based on an organisation's expenditures. The expenditure included in the spend-based method changed in comparison to previous years. Previously, expenditure was included for all task fields in the economic subcategories: sale of areal land, purchase of sustainable goods and services, insourcing of employees and purchase of other goods and services. Tangible assets were not included in the calculation. Tangible assets are assets of the organisation that can be used by the organisation over a long period of time (more than one year). The cost of acquisition is not included in costs in the task fields but is included in assets on the balance sheet. The items belong to the assets of an organisation and are depreciated every year. Tangible assets are included because these items include investments that are capitalised over several years. Examples of tangible assets are the construction of a new building, the purchase of a car or specific machinery.

In this year's report, the inclusion of task fields, economic subcategories and tangible assets in the calculation has been reassessed based on expert judgement. As a result of the reassessment, some new items have been included compared to last year, as the procurement of certain relevant goods and services by the municipalities is recorded on items that were not previously included in the analysis, such as tangible assets. Tangible assets are included because these items include investments that are capitalised over several years. Also, two categories were removed from the analysis, such as land and hired personnel, because these categories did not include any tillage or travel movements and were therefore not relevant for the measurement of GHG emissions. Tangible assets are included because these items include investments that are capitalised over several years. In addition, based partly on the research of De Bruyn et al. (2020)[45], only expenditures in the task field and economic subcategories with the highest GHG emissions have been included in the scope 3 calculation. Compared to previous years, the emission factors used in the

[45] De Bruyn, S., Rozema, J., Bachaus, A., Ten Bosch, W. (2020). CO2-emissies decentrale overheden. CE Delft, Delft.

scope 3 calculations have changed as well. Previously, an emission factor was calculated by dividing the GHG emissions of the Dutch economy ($kgCO_2e$) by the monetary value of all goods and services produced in the Netherlands (euro). The new method uses emission factors in tCO_2e/million euro revenue from the PCAF database. More details on the calculation can be found in the general factsheet in the calculation steps section. The differences between the results of the new and previous methodology are shown in Table 6-5.

Table 6-5 Effect of the change in methodology on the GHG emissions^

Scopes	New 2022	Previous 2022	Difference* (%)	New 2018	Previous 2018	Difference* (%)
Scope 3	723,825	1,655,593	-56.3%	791,066	1,719,668	-54.0%

^ The values under "new" for 2022 in this table do not correspond to the values in table 6-3. This is because the content of the loan portfolio has been adjusted for municipalities. However, this table accurately reflects the impact of the change in methodology.

*The difference is calculated with the following formula: (New - Previous)/Previous*100

General factsheet

Topic	Description
Scopes covered	Scope 3 covers all indirect GHG emissions except for the indirect GHG emissions that are already covered in scope 2. Scope 3 emissions per municipality are not known but can be estimated by using a spend-based method based on the annual spending of municipalities (IV3/COFOG; classification of the function of government).
Portfolio covered	Data are collected for all municipalities in the Netherlands. This means that the coverage ratio for this sector is 100%.
Data	The data on municipal expenditure (IV3 data) come from the Dutch Central Bureau of Statistics (CBS). The data come directly from the municipalities themselves. Municipalities deliver the data directly to CBS in a uniform, prescribed format. CBS does not check or edit the data. The OECD has developed the Classification of the Function of Government (COFOG), a system that categorises government expenditure data from the System of National Accounts according to the specific purposes for which funds are allocated. Municipal budgets are divided into 9 main task fields (first level) and 48 tasks (second level). The tasks indicate the purpose of the expenditure. The following main task fields are included: management and support; safety; traffic, transport and water management; economy; education; sport, culture and recreation; social domain; public health and environment; public housing, spatial planning and urban renewal. The expenditures are also classified by economic categories. These categories indicate the type of expenditure. The following categories are included: salaries and social charges; taxes; goods and services; transfers; interest and dividends; financial transactions; settlements. Data about the International Standard Industrial Classification of All Economic Activities (ISIC Rev. 3) were used to link the 17 sectors from the PCAF database to the different task fields and tangible assets of municipalities (see Calculation steps in this factsheet for more information). The emission factors from the PCAF database need to be corrected for inflation. The emission factor has been adjusted using the inflation index for the Netherlands from the PCAF database.
Grid emission factors	No emission factors have been used from section 2.4. A database of emission factors that is often used for a spend-based method is the EXIOBASE database. These emission factors are also available in the PCAF database (March 2024) which were derived from EXIOBASE v3.9. For 17 sectors, the PCAF database provides an emission factor based on tCO_2e per million euro revenue. Emission factors are available per country and region (EU member states). PCAF

	recommends using the regional emission factors as it is more accurate than country emission factors. In the PCAF database, the emission factors are only available for the year 2019. Emission factors are corrected for inflation from 2019 to 2018, 2022 and 2023 using an inflation factor for the Netherlands.
Calculation steps	For the scope 3 calculation, a selection of relevant task fields per economic subcategory and relevant tangible assets was made. Only those task fields, subeconomic categories and tangible assets relevant for GHG emissions were selected. The following subeconomic categories were selected: - Durable goods - Other goods and services In previous years, four economic subcategories were included in the scope 3 calculations: 3.1 purchase of land, 3.2 purchase of sustainable goods and services, 3.5 insourced labour and 3.8 purchase of other goods and services. This year only 3.2 purchases of sustainable goods and services and 3.8 purchases of other goods and services were included in scope 3 calculations. The purchase of land category was excluded because it only includes (bare) land. The category of insourced labour was excluded because it only includes personnel costs for personnel working within the municipal organisation (e.g. personnel costs for replacements during sick- or maternity leave). Within the economic subcategories the following task fields are relevant for the calculation of GHG emissions: *The letter between brackets corresponds to a sector in the International Standard Industrial Classification of All Economic Activities (ISIC Rev. 3). According to the detailed description of the task fields and tangible assets, the most appropriate production sector(s) has/have been linked.* - 2.1 Traffic and transport: this includes the maintenance of roads, squares, cycle paths, bridges and tunnels. Also includes street cleaning. This is related to Construction *(F)*. - 2.4 Commercial harbors and waterways: this includes work such as dredging, but also maintenance of shorelines and ice control on the water. This is related to Construction *(F)*. - 2.5 Public transport: this includes mainly a financial contribution to the province for public transport, but also major infrastructure facilities. In the case of large municipalities, this includes own public transport such as trams or metro. This is related to a combination of Construction *(F)*, Transport equipment *(D34-35)*, Transport *(I)*. - 3.2 Physical business infrastructure: this includes the maintenance of roads in business parks. This includes contributions to activities aimed at creating physical conditions for all forms of business activity, including maintenance of facilities. This is related to Construction *(F)*. - 5.7 Public green areas and (outdoor) recreation: this item includes the maintenance of natural areas and waterways. It includes the cost of maintaining green areas and playgrounds. This is related to Other services *(O)*. - 7.2 Sewerage: this item includes the maintenance of sewers, but also the prevention of groundwater problems and the treatment of wastewater. This is related to Other services *(O)*. - 7.3 Waste: this includes the collection and processing of commercial and household waste. It also includes activities such as waste separation. This is related to Other services *(O)*. - 7.4 Environmental management: this includes pest control, but also the protection and remediation of soil quality. It also includes activities such as noise control and radiation protection. This is related to Other services *(O)*. - 8.2 Land development (non-industrial sites): this relates to land for non-industrial sites. It includes the cost of responsibly preparing land for eventual residential development. This is related to Construction *(F)*. The iv3 data include seven items of tangible assets. Six of these were included in the scope 3 calculation: only the item Land (A121) was not included. This item only

	covers purchase of (bare) land, without buildings. Therefore, this item was not relevant for this calculation. The other items concern the purchase of buildings (both residential and non-residential), the construction of new buildings, the purchase of machinery, means of transport and public roads. These items are relevant for the calculation of GHG emissions and are therefore included. The following tangible assets are relevant for the calculation of GHG emissions: - Housing (A122), Commercial Buildings (A123) and Land, civil engineering works (A124) all relate to Construction *(F)*. They include the purchase of residential properties as well as commercial buildings such as offices and construction work such as the construction of a bridge. - Transportation equipment (A125) is related to Transport equipment *(D34/35)*. This includes the purchase of, for example, bicycles and (company) cars. - Machinery, equipment and installations (A126) covers purchases of items such as computers and printers, among other things. This item is related to Electrical & machinery *(D29/33)*. - The item Others (A129) is related to Other services *(O)*. After the task fields and tangible assets were linked to an ISIC code, the corresponding emission factor from the PCAF database was selected. The expenditures in the IV3 data for the mentioned task fields per economic subcategory and for the mentioned tangible assets were multiplied by 1,000 to have the expenditures in euro. Then, these expenditures were multiplied with the emission factor corrected for the inflation index for a particular year (2018, 2022 or 2023). For those task fields where multiple sectors are involved, one composite emission factor is created based on an equal distribution of the different sectors. For example, when three sectors are involved, the emission factor used for the calculation consists of one third of the individual emission factor per sector. For each municipality, the calculated tCO_2e emissions per item were added up to result in tCO_2e per municipality. After calculating scope 3 GHG emissions, the GHG emissions were multiplied by the ratio of outstanding loan to total balance sheet ratio per client. For example, if the ratio of outstanding loans to total balance sheet is 25%, 25% of the social housing association's scope 1 and 2 GHG emissions are attributed to BNG. The financed GHG emissions per client are added up to result in the total financed GHG emissions per sector. The financed GHG emissions and relative financed emissions are reported per scope. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume in million euro of the clients for which a GHG footprint was calculated in this report.
Avoided emissions	Not applicable
Asset class specific considerations	The approach for municipalities is in line with the public loan approach in the PCAF methodology.
Attribution	To calculate the GHG footprint according to the PCAF principles, a general approach has been developed. First, the GHG emissions of the different entities in the sector are calculated. Then, the BNG's share of the total balance sheet is used to determine the share of GHG emissions for which BNG is responsible. $$\sum \boldsymbol{CO_2eq} \times \frac{\boldsymbol{Outstanding\ loan\ volume}}{\boldsymbol{Total\ balance\ sheet\ (equity + debt)}}$$ Finally, the individual scopes and the sum of the scopes of all individual organisations have been aggregated.
Limitations	The spend-based method was used to calculate Scope 3 for municipalities. The spend-based method calculates GHG emissions based on an organisation's expenditure. A database with emission factors that are often used for a spend-based method is the EXIOBASE database. These emission factors are also available in the PCAF database. The unit of the emission factor is tCO_2e/million euro. The emission factors are available per country, but PCAF recommends using the region emission factors as it is more accurate than country emission factors. In the PCAF database, the emission factors are only available for the year 2019. Emission factors are

	corrected for inflation from 2019 to 2018, 2022 and 2023 using an inflation factor for the Netherlands. The spend-based method and the use of Dutch-level emission factors from 2019 are far from ideal. Apart from inflation, sustainable choices are often more expensive. As a result, expenditure is higher, and because expenditure is higher, the calculated GHG emissions are also higher under the spend-based method, while emissions are lower.
Data quality estimate	Scope 3: data quality score 4. The PCAF database gives a quality score of 4 when emissions are calculated using an emission factor based on tCO_2e/million euro revenue.

Factsheet per data source scope 3

Topic	Description
Data	International Standard Industrial Classification of All Economic Activities (ISIC)
Data file	Uitgebreide beschrijving ISIC 3 nomenclature.pdf
Data Source	United Nations
Year	2002
Last update	Not applicable
Date of download	04-09-2024
Link to webpage	International Standard Industrial Classification of All Economic Activities (ISIC) (un.org)
Filters used to obtain the datafile	Not applicable
Internal location	Werkmap\Gemeenten\b. Ruwe data
Data quality	Not applicable
Unit of measurement	Not applicable
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Expenses of all Dutch municipalities per IV3/COFOG code
Data file	240911 iv3 scope 3 gemeente 2017.xlsx 240916 iv3 scope 3 gemeente 2018.xlsx 240916 iv3 scope 3 gemeente 2021.xslx 240911 iv3 scope 3 gemeente 2022.xslx 240923 iv3 scope 3 gemeente 2023.xslx
Data Source	CBS Statline
Year	2018, 2022, 2023
Last update	2018: 23-09-2019 2022: 22-09-2023 2023: 23-09-204
Date of download	11-09-2024; 16-09-2024
Link to webpage	2018: https://iv3statline.cbs.nl/#/IV3/nl/dataset/45042NED/table?ts=1632405676148 2022: https://iv3statline.cbs.nl/#/IV3/nl/dataset/45059NED/table?ts=1691070420108 2023: https://iv3statline.cbs.nl/#/IV3/nl/dataset/45063NED/table?ts=1726647065914
Filters used to obtain the datafile	Onderwerp: 2e plaatsing Categorie: Lasten: L3.2 Duurzame goederen, L3.8 Overige goederen en diensten Taakveld/balanspost: 2.1 Verkeer en vervoer, 2.4 Economische havens en waterwegen, 2.5 Openbaar vervoer, 3.2 Fysieke bedrijfsinfrastructuur, 5.7 Openbaar groen, 7.2 Riolering, 7.3 Afval, 7.4 Milieubeheer, A122 Woonruimten, A123

	Bedrijfsgebouwen, A124 Grond-, weg- en waterbouwkundige werken, A125 Vervoermiddelen, A126 Machines, apparaten en installaties, A129 Overig Verslagsoort: Jaarrekening
Internal location	Werkmap\Gemeenten\b. Ruwe data
Data quality	Score 2 High data quality. Data is directly supplied by municipalities from internal accounting systems. Provinces deliver the data to CBS, the data has not been edited by CBS.
Unit of measurement	Euro
Selections	Not applicable
Data transformation	Not applicable
Data missing	2018: Data of municipalities 'Zederik', 'Vianen' and 'Leerdam' are missing and 2017 data is used for those municipalities. 2022: Data of municipalities 'Almelo', 'Dordrecht' and 'Twenterand' are missing, therefore 2021 data has been used for those municipalities. 2023: Data of the municipality 'Vijfheerenlanden' are missing, therefore 2022 data has been used for this municipality.
Print screens	Werkmap\Gemeenten\a. Printscreens

Topic	Description
Data	Emission factors per sector in tCO_2e / million Euro revenue
Data file	Original file: PCAF_DB_BL_LE_PF_03_2024.xlsx Edited file: 250108 emissiefactoren voor gemeente en provincie scope 3 uit PCAF database.xlsx
Data Source	PCAF database
Year	2019
Last update	March 2024
Date of download	10-09-2024
Link to webpage	Not applicable
Filters used to obtain the datafile	Activity variable: Revenue Region: EU member states Classification_level_2: Sector Average
Internal location	Original file: Werkmap\Gemeenten\b. Ruwe data Edited file: Werkmap\Gemeenten\b. Voorbewerkte data
Data quality	Score 4 Proxy data based on region or country
Unit of measurement	tCO_2e/M. Euro
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable
List of the calculation sheets	Location

Topic	Description
Data	Consumer Price Index (CPI)
Data file	Original file: Conversion guidance 1224.xlsx Edited file: Conversion guidance 1224_factor inflatie index berekend.xlsx
Data Source	PCAF Database
Year	2024
Last update	April 2024
Date of download	31-10-2024 Received per e-mail: Inflatiefactoren PCAF.msg

Link to webpage	https://db.carbonaccountingfinancials.com/?info-pages=4
Filters used to obtain the datafile	Not applicable
Internal location	Original file and e-mail: Werkmap\Gemeenten\b. Ruwe data Edited file: Werkmap\Gemeenten\c. Voorbewerkte data
Data quality	2
Unit of measurement	Not applicable
Selections	Tabs: Consumer Price Index (CPI)
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

List of the calculation sheets	Location
250108 scope 3 gemeente 2018.xlsx	Werkmap\Gemeenten\f4. Berekening BNG
250108 scope 3 gemeente 2022.xlsx	Werkmap\Gemeenten\f4. Berekening BNG
250123 scope 3 gemeente 2023.xlsx	Werkmap\Gemeenten\f4. Berekening BNG

7 Public sector: provinces

7.1 Results public sector: provinces

The provinces represent a small share of BNG's loan portfolio with 0.5% of the total loan portfolio of BNG in 2023.

7.1.1 Coverage ratio and attribution

As for previous years, the coverage ratio for provinces is 100%. Between 2022 and 2023, the outstanding loan volume has increased by 28 million euro. The total balance sheet of clients for which a GHG footprint was calculated also increased. As a result, the ratio of the loan portfolio to the total balance sheet has not changed compared to last year. The attribution to BNG also did not change compared to last year. For 2018, 2022 and 2023, the loan portfolio, the total balance sheet and the coverage ratio are shown in Table 7-1.

Table 7-1 Loan portfolio, coverage ratio and ratio loan portfolio versus total balance sheet for the provinces in 2018, 2022 and 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients for which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)	Total balance sheet of clients of which a GHG footprint was calculated (million euro)	Ratio loan portfolio / total balance sheet of clients of which a GHG footprint was calculated
2018	137	0.2	137	100	8,390	0.02
2022	421	0.5	421	100	4,251	0.10
2023	449	0.5	449	100	4,392	0.10

7.1.2 Energy consumption and financed GHG emissions

Table 7-2 shows the estimated total energy consumption of the provinces that are clients of BNG. Natural gas consumption decreased, and electricity consumption increased between 2022 and 2023. The emission factors for natural gas and unknown electricity also decreased. These changes affect GHG emissions.

Table 7-2 Total energy consumption of provinces in 2018, 2022 and 2023

Year	Natural gas consumption (m^3)	Electricity consumption (kWh)
2018	2,288,722	27,864,912
2022	822,452	13,636,875
2023	797,107	14,938,557

Table 7-3 shows the GHG footprint results for the provinces in 2018, 2022, and 2023.

Table 7-3 Absolute and relative financed GHG emissions for the provinces in 2018, 2022 and 2023

Source of emissions	Scope	Financed GHG emissions (tonnes/year)			Financed GHG emissions (%)			Relative financed GHG emissions (tCO_2e/million euro)		
		2018	**2022**	**2023**	**2018**	**2022**	**2023**	**2018**	**2022**	**2023**
Natural gas use	Scope 1	93	159	159	1.1	1.0	1.3	0.7	0.4	0.4
Fossil fuel use (cars)	Scope 1	7	15	15	0.1	0.1	0.1	0.1	0.04	0.03
Electricity use	Scope 2	345	608	547	4.0	3.7	4.4	2.5	1.4	1.2
Purchased goods and services	Scope 3	8,258	15,754	11,825	94.9	95.3	94.2	60.4	37.4	26.3
Total		**8,703**	**16,537**	**12,546**	**100.0***	**100.0***	**100.0***	**63.6**	**39.2**	**27.9**
Total scope 1 and 2		**445**	**782**	**721**	**5.2**	**4.8**	**5.8**	**3.3**	**1.9**	**1.6**

*The sum in these columns is not always exactly 100% due to rounding per sector

Although energy consumption for the provinces is much higher in 2018 than in 2022 and 2023 (Table 7-2), financed GHG emissions are lower in 2018 than in 2022 and 2023 (Table 6-3). This is because the ratio of the loan portfolio to total balance sheet is much lower in 2018 than in 2022 and 2023 (Table 7-1).
Between 2022 and 2023 the financed GHG emissions decreased for scope 2 electricity consumption and scope 3. In total, the financed GHG emissions decreased by 3,991 tonnes. This decrease in financed GHG emissions is mainly due to a decrease in scope 3 (3,929 tonnes). The decrease in scope 3 is due to the decrease in the emission factors per sector and due to the decrease of total expenditure on procurement of goods and services between 2022 and 2023.
The relative financed GHG emissions decreased by 11.3 tonnes per million euro. Both the absolute financed GHG emissions and the relative financed GHG emissions decreased. The financed GHG emissions for scope 3 decreased and influenced both the absolute (>90%) and relative GHG emissions. Because the data quality of scope 3 is poor (score 4), no hard conclusions can be drawn from these figures.

7.2 Public sector: provinces approach

The method to calculate scope 3 for provinces is almost the same as the method to calculate scope 3 for municipalities. For details about this approach see section 5.2.2. For the differences in calculation methodology between province and municipality, see the calculation steps in the general factsheet below.
One difference from last year for the provincial sector is that in the old method scopes 1 and 2 were still subtracted from scope 3 to avoid double counting. This is no longer necessary with the new method and is therefore not done. For both municipalities and provinces, the total expenditure included in the adjusted spend-based analysis is lower than in last year's method. Between provinces and municipalities, different task fields are included and per task fields the emission factors differ. Therefore, the financed GHG

emissions depend on a province's or municipality's expenditure within a specific task field and the corresponding emission factor. This ensures that, despite the decrease in total expenditure included in the analysis for both municipalities and provinces, for example for the year 2022, financed GHG emissions by municipalities calculated with the new method decreased, while for provinces financed GHG emissions slightly increased.

Table 7-4 Effect of the change in methodology on the GHG emissions

Scopes	New 2022	Previous 2022	Difference* (%)	New 2018	Previous 2018	Difference* (%)
Scope 3	15,754	12,185	29.3%	8,258	4,998	65.2%

*The difference is calculated with the following formula: (New - Previous)/Previous*100

General factsheet

Topic	Description
Scopes covered	For provinces, scope 1 natural gas consumption, scope 1 fossil fuel use by company cars, scope 2 electricity consumption and scope 3 purchased goods and services are covered. Scope 1 emissions include the direct GHG emissions of the organisation. For provinces, these emissions result from the use of natural gas for heating buildings and the use of fossil fuels for cars. The exact figures for these sources are not known for each province, so estimates were made using several calculation steps to obtain the best possible result. Scope 2 emissions include the indirect GHG emissions from the consumption of purchased electricity, heat or steam. The use of heat and steam per province is not known, so scope 2 only includes the use of purchased electricity. As the exact figures per province are not known, estimates were made using several calculation steps. Scope 3 covers all indirect GHG emissions except for the indirect GHG emissions that are already covered in scope 2. Scope 3 emissions per municipality are not known but can be estimated by using a spend-based method based on the annual spending of municipalities (IV3/COFOG; classification of the function of government).
Portfolio covered	Data are collected for all provinces in the Netherlands. This means that the coverage for this sector is 100%.
Data	For scope 1 natural gas consumption and scope 2 electricity consumption, 2023 data were used. For scope 1 fossil fuel consumption of company cars, the calculation was made with partial use of 2022 data. The data used in this approach comes from several sources. Het PON & Telos calculated the GHG emissions for scope 1 fossil fuel consumption of company cars, using several data sources. Ideally, the litres of fuel consumed or driven kilometres by the company cars would be multiplied by the corresponding emission factor to obtain the GHG emissions of company cars. However, data on fuel consumption or kilometres driven are not available for each province. Therefore, a calculation was made to estimate the GHG emissions of company cars by using several data sources. The data used for this calculation is summarised in this section. More information on the calculation can be found in the calculation steps section. For provinces energy data and the liters of fuel consumed or driven kilometres by company cars are not available per province. Therefore, calculations are performed based on several data sources to estimate the GHG emissions due to natural gas use, electricity use, and the use of company cars. Data used for these calculations are summarized here and the used calculations are explained below at the section calculation steps.

	The data on the number of employees working for SBI-code 8411 (general government administration, which includes municipalities, as well as provinces and ministries) and the data on the number of employees working for the entire public administration and government services sector come from Lisa. Lisa serves as the national information system on jobs in the Netherlands and contains a comprehensive database with information on all places where paid work is performed. Data on the number of employees working for the provincial government organisation come from 'A&O fonds provincies'. 'A&O fonds provincies' is an organisation that provides governments with practical tools, knowledge and subsidies. These data are available at the aggregated level of the provinces. Data on the supply of energy to the public administration and government services sector come from the Dutch Central Bureau of Statistics (CBS). The data cover the supply of electricity and natural gas to enterprises and other public buildings. The data are based on the energy network connection register and are therefore reliable. Data is divided by sector and region. Data on the number of passenger cars owned by enterprises per sector come from the Dutch Central Bureau of Statistics (CBS). The data originate from the vehicle register (RDW), which ensures their reliability and accuracy. Data on the number of kilometres travelled by car per year comes from the Dutch Central Bureau of Statistics (CBS) and covers the average number of kilometres travelled per year by a passenger car registered in the Netherlands. The original data comes from the RDW's Online Kilometre Registration (OKR), which ensures its reliability. Data on provincial expenditure (IV3 data) come from the Dutch Central Bureau of Statistics (CBS). The data come directly from the provinces themselves. Provinces deliver the data directly to CBS in a uniform, prescribed format. CBS does not check or edit the data. The OECD has developed the Classification of the Function of Government (COFOG), a system that categorises government expenditure data from the System of National Accounts according to the specific purposes for which funds are allocated. Provincial budgets are divided into task fields. The tasks indicate the purpose of the expenditure. The following main task fields are included: general resources, governance, traffic and transport, water, environment, nature, regional economics, culture and society, space. The expenditures are also classified by economic categories. These categories indicate the type of expenditure. The following categories are included: salaries and social charges; taxes; goods and services; transfers; interest and dividends; financial transactions; settlements. Data about the International Standard Industrial Classification of All Economic Activities (ISIC Rev. 3) were used to link the 17 sectors from the PCAF database to the different task fields and tangible assets of provinces. The emission factors from the PCAF database need to be corrected for inflation. The emission factor has been adjusted using the inflation index for the Netherlands from the PCAF database.
Grid emission factors	Section 2.4 contains more information on emission factors. The following emission factors from Table 2-4 have been used: - Natural gas - Electricity (unknown source) - Passenger transport, Car, Fuel type unknown, weight class unknown. For scope 3 no emission factors have been used from section 2.4.

	A database of emission factors that is often used for a spend-based method is the EXIOBASE database. These emission factors are also available in the PCAF database (March 2024) which were derived from EXIOBASE v3.9. For 17 sectors, the PCAF database provides an emission factor based on tCO_2e per million euro revenue. Emission factors are available per country and region (EU member states). PCAF recommends using the regional emission factors as it is more accurate than country emission factors. In the PCAF database, the emission factors are only available for the year 2019. Emission factors are corrected for inflation from 2019 to 2018, 2022 and 2023 using an inflation factor for the Netherlands.
Calculation steps	**Scope 1 natural gas and scope 2 electricity** For the public administration and government services sector, the supply of natural gas and electricity is known (CBS) at the aggregated level of provinces and includes both provinces and other governmental authorities, such as municipalities. To calculate scopes 1 and 2 for the provinces, several calculation steps were taken. The number of employees working for the total public administration and government services sector is known at the level of the province (Lisa), as well as the number of employees working for the province as an organisation (A&O fonds Provincies). The supply of natural gas and electricity to the public administration and government services sector is known for each province (CBS). The percentage of the number of employees working for each provincial organisation (A&O fonds Provincies) relative to the number of employees working for the total public administration and government services sector in each province (Lisa) was multiplied by the supply of natural gas and electricity to the public administration and government services sector (CBS). This results in the supply of natural gas and electricity to the province as an organisation. The amount of natural gas was multiplied by the emission factor for natural gas (Table 2-4) and the amount of electricity was multiplied by the emission factor for electricity (unknown source; Table 2-4). The amount of GHG emissions was divided by a factor of 1,000 to obtain tonnes of GHG emissions for scope 1 (natural gas) and scope 2 (electricity). **Scope 1 fossil fuel for company cars** Scope 1 emissions also include fossil fuel emissions from company cars. For this calculation, the number of employees working for the total public administration and government services sector at the province level (Lisa) and the number of employees working for the provincial organisation (A&O Fonds Provincies) were used. The number of company cars used in the total public administration and government services sector is known (CBS Statline). To calculate the total number of company cars for the provinces, the number of company cars used by the total public administration and government services sector was multiplied by the percentage of employees working at provinces relative to all employees working for the Dutch public administration and government services. The total number of company cars for Dutch provinces was multiplied by the percentage of employees working for that province in relation to all employees working for Dutch provinces to obtain the number of company cars per province. This was multiplied by the number of kilometres travelled per company car (all fuel types) and multiplied by the emission factor for passenger transport, car, fuel type unknown, weight class unknown (Table 2-4). The GHG emissions were divided by a factor of 1,000 to obtain the GHG emissions in tonnes for company cars. After calculating scope 1 and scope 2 GHG emissions, these GHG emissions were multiplied by the ratio of outstanding loan to total balance sheet ratio per client. For example, if the ratio of outstanding loan to total balance sheet is 25%, 25% of the provinces' scope 1 and 2 GHG emissions are attributed to BNG. The financed GHG

	emissions per client are added up to result in the total financed GHG emissions per sector. The financed GHG emissions and relative financed GHG emissions are reported per scope. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume in million euro of the clients for which a GHG footprint was calculated in this report. **Scope 3 all indirect GHG emissions except for the indirect GHG emissions that are already covered in scope 2** With a few exceptions, the calculation method for scope 3 provinces is the same as for scope 3 municipalities. For the scope 3 calculation, a selection of relevant task fields per economic subcategory and relevant tangible assets was made. Only those task fields, subeconomic categories and tangible assets relevant for GHG emissions were selected. For provinces the same economic subcategories and tangible assets were included in the calculation as for municipalities. However, the task fields are different than those of the municipalities. Within the economic subcategories the following task fields are relevant for the calculation of GHG emissions: *The letter between brackets corresponds to a sector in the International Standard Industrial Classification of All Economic Activities (ISIC Rev. 3). According to the detailed description of the task fields and tangible assets, the most appropriate production sector(s) has/have been linked.* - 2.1 Land roads: this includes the management and maintenance of land roads. Other activities under this heading include: traffic surveys, ice control, road marking, and installation of traffic control devices. This is related to Construction (F). - 2.2 Waterways: this covers the construction, management and maintenance of waterways. It includes items such as dredging, shoreline maintenance, construction and replacement of waterway structures. This is related to Construction (F). - 2.3 Public Transportation: this includes all activities related to public transport, such as trains, trams, metros, buses, boats, and ferries. This is related to a combination of Construction *(F)*, Transport equipment *(D34-35)*, and Transport *(I)*. - 4.1 Soil Protection: Includes costs related to soil protection measures and soil decontamination. This is related to Other community, social and personal service activities (O). - 5.2 Management of natural areas: this item includes activities related to nature management and the protection of nature and landscapes. This is related to Other community, social and personal service activities (O). - 5.3 Management of flora and fauna: this item includes control of invasive exotic species and management of goose damage. This is related to Other community, social and personal service activities (O). For further details see the general factsheet of scope 3 municipalities
Avoided emissions	The CBS table on supply of natural gas and electricity through public grit states the following: This table gives figures for electricity and gas supplied to enterprises and other commercial buildings. This includes supply via the public grid, including supply from the public grid to the company's own grid. Electricity produced by enterprises for their own consumption is therefore not included in these figures. If a province invests in renewable electricity, it will reduce the amount of electricity it consumes from the grid. Indirectly, therefore, investments in renewable electricity should be reflected in a reduction of scope 2 electricity in this report.
Asset class specific considerations	The approach for provinces is in line with the public loan approach in the PCAF methodology.

Attribution	To calculate the GHG footprint according to the PCAF principles, a general approach has been developed. First, the GHG emissions of the different entities in the sector are calculated. Then, the BNG's share of the total balance sheet is used to determine the share of GHG emissions for which BNG is responsible. $$\sum \boldsymbol{CO_2eq} \times \frac{\boldsymbol{Outstanding\ loan\ volume}}{\boldsymbol{Total\ balance\ sheet\ (equity + debt)}}$$ Finally, the individual scopes and the sum of the scopes of all individual organisations have been aggregated.
Absolute vs. relative emissions	For the provinces, the total financed GHG emissions were calculated in tonnes. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume of the clients for which a GHG footprint was calculated in this report.
Limitations	**Scope 1 natural gas use and scope 2 electricity use** A limitation of the current method is that the actual natural gas - and electricity consumption by provinces as an organisation is not known. It is therefore calculated according to the estimated number of employees working for the province and the total number of employees working for the whole public administration and government services sector per province. **Scope 1 fossil fuel by company cars** There is no recorded data per province on company cars, including details such as number of cars, car types and fuel types. The best possible result is achieved by using the current model(s). Many provinces are actively working to improve the sustainability of their operations. As part of this effort, they are focusing on making their vehicle fleets more sustainable. The calculation method used in this project does not reflect this development. As a result, the GHG emissions from company cars are a relatively rough estimate and may differ from the actual situation due to developments in the area of making the local authority fleet more sustainable. In addition to cars, provinces also have other means of transport such as scooters and (electric) bicycles. The use of these means of transport is not included in the calculated GHG emissions for company cars. **Scope 3** For scope 3 limitations see limitations scope 3 municipalities.
Data quality estimate	Scope 1 natural gas and scope 2 electricity: data quality score 4. The GHG emissions are calculated based on the energy supply to the public administration and government services sector at the aggregated level of provinces. This includes not only the energy supply to the provinces, but also to other government authorities such as municipalities. Therefore, the data is used based on region and the data quality score is 4. Scope 1 company cars: data quality score 5. The GHG emissions are calculated based on average car information. Brand, model, and type are not known and distance travelled is based on local or regional data. Therefore, the data quality score is 5. See option 3b in Table 5-16 on page 106 of the PCAF report (2022)[46] Scope 3: data quality score 4. The PCAF database gives a quality score of 4 when emissions are calculated using an emission factor based on tCO_2e/million euro revenue.

[46] https://carbonaccountingfinancials.com/standard.
PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.

Factsheets per data source

Topic	Description
Data	Number of employees working in the public administration and government services sector per province (the sector is called O according to sbi-code)
Data file	240717 ruwe data lisa banen overheid 2022 2023.xslx
Data Source	Lisa; het werkgelegenheidsregister van Nederland
Year	2023
Last update	2023: July 2024
Date of download	17-07-2024
Link to webpage	https://www.lisa.nl/data/gratis-data/overzicht-lisa-data-per-provincie
Filters used to obtain the datafile	Welke provincies: allemaal Welke jaren: 2023 Welke sectoren: Overheid Welke gegevens: Banen totaal
Internal location	Werkmap\Provincies\b. Ruwe data
Data quality	Score 2 Data from LISA are based on observations/measurements of all locations of companies, and not only one company as a whole. Self-employed persons are taken into account as well. This makes it possible to present an overview of employment at every geographic and sectoral level.
Unit of measurement	Number of people
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Provincies\a. Printscreens 240717 aantal banen totaal overheid per provincie 2022 2023.png

Topic	Description
Data	Number of employees working at the province
Data file	Not applicable The data are presented in separate print screens per province.
Data Source	A & O Fonds Provincies
Year	2023
Last update	June 2024
Date of download	17-07-2024
Link to webpage	https://personeelsmonitorprovincies.onderzoek.nl/index.cfm?action=main.report
Filters used to obtain the datafile	No filters used
Internal location	Werkmap\Provincies\a. Printscreens\Banen provincie
Data quality	Score 2 Data is directly acquired from provinces, using a questionnaire.
Unit of measurement	Number of people
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Provincies\a. Printscreens\Banen provincie

Topic	Description
Data	Supply of energy to the public administration and government services sector at the aggregated level of province
Data file	241022 aardgas en elektra provincie 2023.xslx
Data Source	CBS Statline
Year	2023
Last update	16-10-2024
Date of download	22-10-2024
Link to webpage	https://opendata.cbs.nl/statline/#/CBS/nl/dataset/82538NED/table?ts=1597657120347
Filters used to obtain the datafile	Onderwerp: Geleverd aardgas, geleverde elektriciteit Perioden: 2023 Regio's: Provincies Bedrijfstakken/branches: Bedrijfstakken 1e digit (SBI 2008), O Openbaar bestuur en overheidsdiensten
Internal location	Werkmap\Provincies\b. Ruwe data
Data quality	Score 4. The supply of energy is not only to the province as organisation, but to the entire public administration and government services sector at the aggregated level of provinces. Therefore, the data quality score is 4 because it is data based on region. Details about the data can be found here: https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/korte-onderzoeksbeschrijvingen/leveringen-van-elektriciteit-en-aardgas-via-het-openbare-net.
Unit of measurement	Natural gas: 1000 Nm^3 Electricity: 1000 kWh
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Provincies\a. Printscreens241022 aardgas en elektra provincies 2023.png

Topic	Description
Data	Number of company cars owned by companies in the public administration and government services sector.
Data file	240717 aantal bedrijfsautos tm 2022.xlsx
Data Source	CBS Statline
Year	2022 2022 data is used for 2023 calculations.
Last update	09-02-2024
Date of download	17-07-2024
Link to webpage	https://opendata.cbs.nl/#/CBS/nl/dataset/85620NED/table?dl=975E8
Filters used to obtain the datafile	Onderwerp: Bedrijfsbestelauto's Bedrijfstakken/branches: O Openbaar bestuur en overheidsdiensten Bedrijfsgrootte/leeftijd bestelauto: Totaal Perioden: 2022
Internal location	Werkmap\Provincies\b. Ruwe data
Data quality	Score 2 The research method of these data can be found here: https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/korte-onderzoeksbeschrijvingen/bezit-en-gebruik-bestelauto-s The additional research report can be found here: https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/aanvullende%20onderzoeksbeschrijvingen/bezit-en-gebruik-bestelauto-s

	Data comes from motor vehicle registration (RDW) and data is checked on content, quality and usability by Statistics Netherlands
Unit of measurement	Number of company cars
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Provincies\a. Printscreens 240717 aantal bedrijfsautos.png

Topic	Description
Data	Average kilometres driven with a passenger car with a Dutch registration per year
Data file	240717 aantal km autos tm 2022.xlsx
Data Source	CBS Statline
Year	2022 2022 data is used for 2023 calculations.
Last update	26-10-2023
Date of download	17-07-2024
Link to webpage	https://opendata.cbs.nl/#/CBS/nl/dataset/85396NED/table
Filters used to obtain the datafile	Gewichtsklasse leeggewicht: Totaal Leeftijd voertuig: Totaal Tenaamstelling: Totaal Brandstofsoort: Alle brandstofsoorten Onderwerp: Gemiddelde jaarkilometrage Perioden: 2022
Internal location	\Werkmap\Gemeenten\b. Ruwe data
Data quality	Score 2 The research method of these data can be found here: https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/korte-onderzoeksbeschrijvingen/verkeersprestaties-personenauto-s The original data comes from the online kilometer registration (OKR) of the RDW. These data are reliable.
Unit of measurement	Kilometres
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Provincies\a.Printscreens\ 240717 aantal km autos.png

Topic	Description
Data	Total balance sheet of provinces
Data file	240923 passiva provincies 2023.xslx
Data Source	CBS Statline
Year	2023
Last update	23-09-2024
Date of download	23-09-2024
Link to webpage	https://iv3statline.cbs.nl/#/IV3/nl/dataset/45064NED/table?ts=1726648559817
Filters used to obtain the datafile	Provincies: allemaal Verslagsoort: Jaarrekening Categorie: Ultimo Onderwerp: 2e plaatsing Taakveld/balanspost: passiva
Internal location	Werkmap\Provincies\b. Ruwe data

Data quality	Score 2 High quality data. The data is directly delivered to CBS by provinces from internal accounting systems. The data had not been edited by CBS.
Unit of measurement	Euro
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Provincies\a. Printscreens 240923 passiva provincie 2023_1.png 240923 passiva provincie 2023_2.png

Topic	Description
Data	Expenses of all Dutch provinces
Data file	240911 iv3 provincies scope 3 2018.xlsx 240911 iv3 provincies scope 3 2022.xlsx 240923 iv3 provincies scope 3 2022.xlsx
Data Source	CBS Statline
Year	2018, 2022 and 2023
Last update	22-09-2019, 22-09-2023, 23-09-2024
Date of download	11-09-2024; 23-09-2024
Link to webpage	2018: https://iv3statline.cbs.nl/#/IV3/nl/dataset/45043NED/table?ts=1602676730545 2022: https://iv3statline.cbs.nl/#/IV3/nl/dataset/45060NED/table?ts=1693216125130 2023: https://iv3statline.cbs.nl/#/IV3/nl/dataset/45064NED/table?ts=1726648559817
Filters used to obtain the datafile	Onderwerp: 2e plaatsing Taakveld/balanspost: 2.1 Landwegen, 2.2 Waterwegen, 2.3 Openbaar vervoer, 4.1 Bodembescherming, 5.2 Beheer natuurgebieden, 5.3 Beheer flora en fauna, A122 Woonruimten, A123 Bedrijfsgebouwen, A124 Grond-, weg- en waterbouwkundige werken, A125 Vervoermiddelen, A126 Machines, apparaten en installaties, A129 Overig Categorie: Lasten: L3.2 Duurzame goederen; L3.8 Overige goederen en diensten Verslagsoort: Jaarrekening
Internal location	Werkmap\Provincies\b. Ruwe data
Data quality	Score 2 High data quality. Data is directly supplied by provinces from internal accounting systems. Provinces deliver the data to CBS, the data has not been edited by CBS.
Unit of measurement	Euro
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Provincies\a. Printscreens 240911 iv3 scope 3 provincie 2018_1.png 240911 iv3 scope 3 provincie 2018_2.png 240911 iv3 scope 3 provincie 2022_1.png 240911 iv3 scope 3 provincie 2022_2.png 240923 iv3 scope 3 provincie 2023_1.png 240923 iv3 scope 3 provincie 2023_2.png

Topic	Description
Data	International Standard Industrial Classification of All Economic Activities (ISIC)
Data file	Uitgebreide beschrijving ISIC 3 nomenclature.pdf
Data Source	United Nations
Year	2002

Last update	Not applicable
Date of download	04-09-2024
Link to webpage	International Standard Industrial Classification of All Economic Activities (ISIC) (un.org)
Filters used to obtain the datafile	Not applicable
Internal location	Werkmap\Gemeenten\b. Ruwe data
Data quality	Not applicable
Unit of measurement	Not applicable
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Emission factors per sector in tCO_2e / million Euro revenue
Data file	Original file: PCAF_DB_BL_LE_PF_03_2024.xlsx Edited file: 240910 emissiefactoren voor gemeente en provincie scope 3 uit PCAF database.xlsx
Data Source	PCAF database
Year	2019
Last update	March 2024
Date of download	10-09-2024
Link to webpage	Not applicable
Filters used to obtain the datafile	Activity variable: Revenue Region: EU member states Classification_level_2: Sector Average
Internal location	Original file: Werkmap\Gemeenten\b. Ruwe data Edited file: Werkmap\Gemeenten\b. Voorbewerkte data
Data quality	Score 4 Proxy data based on region or country
Unit of measurement	tCO_2e/M. Euro
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Consumer Price Index (CPI)
Data file	Original file: Conversion guidance 1224.xlsx Edited file: Conversion guidance 1224_factor inflatie index berekend.xlsx
Data Source	PCAF Database
Year	2024
Last update	April 2024
Date of download	31-10-2024 Received per e-mail: Inflatiefactoren PCAF.msg
Link to webpage	https://db.carbonaccountingfinancials.com/?info-pages=4
Filters used to obtain the datafile	Not applicable
Internal location	Original file and e-mail: Werkmap\Gemeenten\b. Ruwe data Edited file: Werkmap\Gemeenten\c. Voorbewerkte data

Data quality	2
Unit of measurement	Not applicable
Selections	Tabs: Consumer Price Index (CPI)
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

List of the calculation sheets	Location
Banen_provincie_bijprovincie_2018_2021_2022_2023.csv Banen_provincie_overheid_2018_2021_2022_2023.csv LeningportefeuilleBNG_provincie_2018_2021_2022_2023.csv Passiva_provincie_2018_2021_2022_2023.csv bProvincieBerekeningen.tProvincie_Scope3_versie2024.csv	Werkmap\Provincies\d. Data voor SQL
emissiefactoren - PCAF 2024.csv	Werkmap\Emissiefactoren\d. Data voor SQL
250116_BNG_Provincie_2018_versie2024.ipynb 240927_BNG_Provincie_2022_versie2024.ipynb 240927_BNG_Provincie_2023_versie2024.ipynb	Werkmap\Provincies\e. SQL notebooks
250114_pBNG.vProvincie_2018_IndividueleKlanten_versie2024.xlsx 250114_pBNG.vProvincie_2018_Ratio_Lening_Passiva_versie2024.xlsx 250114_pBNG.vProvincie_2018_CO2voetafdruk_Absoluut_Totaal_versie2024.xlsx 250114_pBNG.vProvincie_2018_CO2voetafdruk_Relatief_Totaal_versie2024.xlsx 250114_pBNG.vProvincie_2022_IndividueleKlanten_versie2024.xlsx 250114_pBNG.vProvincie_2022_Ratio_Lening_Passiva_versie2024.xlsx 250114_pBNG.vProvincie_2022_CO2voetafdruk_Absoluut_Totaal_versie2024.xlsx 250114_pBNG.vProvincie_2022_CO2voetafdruk_Relatief_Totaal_versie2024.xlsx 250114_pBNG.vProvincie_2023_IndividueleKlanten_versie2024.xlsx 250114_pBNG.vProvincie_2023_Ratio_Lening_Passiva_versie2024.xlsx 250114_pBNG.vProvincie_2023_CO2voetafdruk_Absoluut_Totaal_versie2024.xlsx 250114_pBNG.vProvincie_2023_CO2voetafdruk_Relatief_Totaal_versie2024.xlsx	Werkmap\Provincies\f2. Data uit SQL BNG
250108 provincie berekening scope 3 2018.xlsx 250108 provincie berekening scope 3 2022.xlsx 250108 provincie berekening scope 3 2023.xlsx	Werkmap\Provincies\f4. Berekening BNG

8 Public sector: water boards

8.1 Results public sector: water boards

The water boards represent a small share of BNG's loan portfolio with 0.3% of the total loan portfolio of BNG in 2023.

8.1.1 Coverage ratio and attribution

As for previous years, the coverage ratio for water boards is 100%. Between 2022 and 2023 the outstanding loan volume increased by 23 million euro. The total balance sheet of clients for which a GHG footprint was calculated increased as well. As a result, the ratio of the loan portfolio to the total balance sheet slightly increased. The attribution to BNG slightly increased compared to last year. For 2018, 2022 and 2023, the loan portfolio, the total balance sheet and the coverage ratio are shown in Table 8-1.

Table 8-1 Loan portfolio, coverage ratio and ratio loan portfolio versus total balance sheet for the water boards in 2018, 2022 and 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients of which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)	Total balance sheet of clients of which a GHG footprint was calculated (million euro)	Ratio loan portfolio / total balance sheet of clients of which a GHG footprint was calculated
2018	233	0.3	233	100	5,122	0.046
2022	197	0.2	197	100	5,488	0.036
2023	220	0.3	220	100	5,960	0.037

8.1.2 Financed GHG emissions

Table 8-2 shows the GHG footprint results for water boards in 2018, 2022 and 2023.

Table 8-2 Absolute and relative financed GHG emissions for the water boards in 2018, 2022 and 2023

Source of emissions	Scope	Financed GHG emissions (tonnes/year)			Financed GHG emissions (%)			Relative financed GHG emissions (tCO_2e/million euro)		
		2018	**2022**	**2023**	**2018**	**2022**	**2023**	**2018**	**2022**	**2023**
Direct CO_2 emissions										
Water treatment management	Scope 1									
Natural gas use		111	51	47	0.3	0.3	0.3	0.5	0.3	0.2
Other fuels		50	2	4	0.1	0.0	0.0	0.2	0.0	0.0
Water systems	Scope 1									
Natural gas use		30	21	19	0.1	0.1	0.1	0.1	0.1	0.1
Other fuels		111	24	35	0.3	0.2	0.2	0.5	0.1	0.2
Other	Scope 1									
Natural gas use		50	47	41	0.1	0.3	0.3	0.2	0.2	0.2
Other fuels		0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Own mobility, transport and maintenance	Scope 1	502	218	145	1.5	1.4	1.0	2.2	1.1	0.7
GHG sewage treatment plant	Scope 1	17,139	10,046	11,200	50.9	64.1	78.6	73.5	50.9	50.9
Indirect CO_2 emissions										
Water treatment management^	Scope 2									
Electricity		12,291	2,730	690	36.5	17.4	4.8	52.7	13.8	3.1
Heat		70	55	43	0.2	0.4	0.3	0.3	0.3	0.2
Water systems^	Scope 2									
Electricity			648	73		4.1	0.5		3.3	0.3
Heat			3	0		0.0	0.0		0.0	0.0
Other^	Scope 2									
Electricity			75	10		0.5	0.1		0.4	0.0
Heat			0	3		0.0	0.0		0.0	0.0
Own mobility, transport and maintenance*	Scope 2		16	3		0.1	0.0		0.1	0.0
Commuting	Scope 3	484	159	222	1.4	1.0	1.6	2.1	0.8	1.0
Outsourced transport, and maintenance	Scope 3	1,377	884	947	4.1	5.6	6.7	5.9	4.5	4.3
Materials and raw materials	Scope 3	1,462	696	761	4.3	4.4	5.3	6.3	3.5	3.5
Total all scopes		**33,677**	**15,675**	**14,244**	**100.0#**	**100.0#**	**100.0#**	**144.4**	**79.4**	**64.7**
Total scopes 1 and 2		**30,354**	**13,935**	**12,314**	**90.0**	**88.9**	**86.5**	**130.2**	**70.6**	**56.0**

^For 2018 the indirect CO_2 emissions for water treatment management, water systems, and other are reported as one value under Water treatment management electricity and heat.

*Own mobility, transport, and maintenance were not in the data of 2018.

The sum in these columns is not always exactly 100% due to rounding per sector

Between 2022 and 2023 the absolute GHG emissions decreased for the following scopes: natural gas use for water treatment management, water systems, other segments and own mobility, transport and maintenance in scope 1, all segments in scope 2 except for heat in other segments. Scope 3 GHG emissions increased for all segments. The use of (bio)diesel for the water systems in scope 1 increased between 2022 and 2023 due to the additional use of pumping stations and temporary pumps because of the high rainfall in 2023.[47]

Commuting (scope 3) and outsourced transport and maintenance increased, unfortunately reversing the decrease caused by the Corona crisis. Overall, financed GHG emissions decreased by 1,431 tonnes. This is mainly due to a decrease in financed GHG emissions for scope 2 between 2022 and 2023. Overall, the decrease in financed GHG emissions in scope 1 and 2 is the result of a shift from purchasing European green electricity to Dutch green electricity.[48] The total relative financed GHG emissions decreased by 14.7 tonnes per million euro.

The water boards are making good progress in all three scopes. The 'Klimaatmonitor Waterschappen, verslagjaar 2023' (Arcadis, 2024)[49] shows that water boards are making progress in solar energy production, wind energy production and the production of green gas.[50] The investments made in sustainable energy are clearly visible in the reduction of the GHG emissions in scope 2 when comparing 2023 with the reference year 2018. This is because, for example, if water boards switch from European wind energy to Dutch wind energy, a different emission factor is used for calculation.

GHG emissions from purchased electricity are expected to decrease further in the coming years, as more water boards are willing to purchase electricity from renewable sources in the Netherlands. In addition, the water boards have already made their vehicle fleets greener and are planning to continue these efforts.

8.2 Public sector: water boards' approach

8.2.1 Scopes 1, 2 and 3

The Klimaatmonitor waterschappen, verslagjaar 2023 (Arcadis, 2024)[51] forms the basis for the calculations of water baords. This monitor was developed by Arcadis for the Unie van Waterschappen and the NWB Bank. This monitor describes in detail the emissions per scope and per individual water authority. The description of this approach is therefore brief. More information can be found in the 'klimaatmonitor waterschappen, verslagjaar 2023' (Arcadis, 2024).[52]

Adjustments in methodology

This year, the method of calculating nitrous oxide emissions of the sewage treatment by CBS has changed. The calculation of nitrous oxide emissions of the sewage treatment

[47] Klimaatmonitor_Waterschappen_verslagjaar_2023.pdf
[48] Ibid.
[49] Ibid.
[50] Ibid.
[51] Ibid.
[52] Ibid.

based on the IPCC 2019 model is carried out by CBS. CBS performs these calculations on behalf of the National Inventory Report (NIR), the inventory of greenhouse gas emissions with which the Netherlands meets its international reporting obligations.
Last year, CBS submitted a request for a method change for the national determination of nitrous oxide emissions by water boards. The request was based on a scientific Canadian study[53] that reviewed the measurements used to determine the emission factor for the IPCC 2019 refinement and supplemented them with more recent measurements. This study results in a lower emission factor of 0.011 kg N_2O-N/kg N influent on average, instead of 0.016 kg N_2O-N/kg N influent. Emissieregistratie, a partnership between RIVM, CBS, PBL, WUR and Deltares, approved the change. The emission factor for N_2O was therefore adjusted from 0.016 kg N_2O-N/kg N influent to 0.011 kg N_2O-N/kg N influent, or from 1.6% to 1.1%. The change in methodology has been applied retrospectively for all years (2018, 2022) and for the most recent year 2023. Table 8-3 shows the effect of the methodology change for previous years.

Table 8-3 Effect of the change in methodology on the financed GHG emissions

Scopes	New 2022	Previous 2022	Difference* (%)	New 2018	Previous 2018	Difference* (%)
Scope 1 GHG sewage treatment plant	10,046	13,524	-0.3	17,139	22,881	-0,3

*The difference is calculated with the following formula: (New - Previous)/Previous*100

General factsheet

Topic	Description
Scopes covered	The report 'Klimaatmonitor wateschappen, verslagjaar 2023' (Arcadis, 2024) covers all three scopes in detail. Table 8-4 shows the underlying themes of the scopes. All scopes presented by Arcadis in the report 'Klimaatmonitor Waterschappen, verslagjaar 2023' (Arcadis, 2024) in Table 1 are also used for this report.
Portfolio covered	Data is collected for all 21 water boards in the Netherlands. This implies that the portfolio coverage ratio is 100%.

Table 8-4. The different scopes included in the water boards' approach

Direct CO_2 emissions	
Water treatment management	Scope 1
Water systems	Scope 1
Other	Scope 1
Own mobility, transport and maintenance	Scope 1
GHG emissions of the sewage treatment plant	Scope 1
Indirect CO_2 emissions	
Water treatment management	Scope 2
Water systems	Scope 2
Other	Scope 2
Own mobility, transport and maintenance	Scope 2
Commuting	Scope 3
Outsourced transport and maintenance	Scope 3
Materials and raw materials	Scope 3

[53] De Haas, D., & Andrews, J. (2022). Nitrous oxide emissions from wastewater treatment - Revisiting the IPCC 2019 refinement guidelines. https://doi.org/10.1016/j.envc.2022.100557

Data	Data were used from the report 'Klimaatmonitor Waterschappen, verslagjaar 2023' (Arcadis, 2024). This monitor was developed by Arcadis for the Union of Water Boards (Unie van Waterschappen) and NWB Bank. This monitor describes in detail the emissions in the three scopes for each individual water authority. For the report 'Klimaatmonitor Waterschappen, verslagjaar 2023' (Arcadis, 2024) the calculations were made by using emission factors based on 'well to wheel' (WTW). The PCAF methodology prescribes the use of 'tank to wheel' (TTW) based emission factors. Therefore, Arcadis provided Het PON & Telos with the data from the 'Klimaatmonitor Waterschappen, verslagjaar 2023' (Arcadis, 2024) calculated based on 'tank to wheel' (TTW) emission factors. These data can be found in the file 'Data NWB TTW waarden VJ2023.xlsx'. Arcadis obtained the data from the water boards by means of a questionnaire that collected both quantitative and qualitative data. The data on the total balance sheet per water authority comes from the WAVES database and is provided to the Unie van Waterschappen by the water boards themselves.
Grid emission factors	The 'klimaatmonitor waterschappen' (Arcadis, 2024) uses emission factors from www.CO2emissiefactoren.nl. The only difference is that the monitor uses the 'well to wheel' (WTW) factors, and not the 'tank to wheel' factors (TTW). The PCAF harmonized approach prescribes the use of the TTW values. Therefore, Arcadis has provided Het PON & Telos with the data from the 'Klimaatmonitor Waterschappen, verslagjaar 2023' (Arcadis, 2024) calculated based on 'tank to wheel' (TTW) emission factors.
Calculation steps	The file 'Data NWB TTW waarden VJ2023.xlsx' contains all the TTW values. The values were summed up to obtain the categories per scope that are shown in Table 5-4. The exact calculation steps per scope can be found in the Arcadis (2024) report[54]. After calculating scopes 1, 2, and 3 GHG emissions, these GHG emissions were multiplied by the ratio of outstanding loan to total balance sheet ratio per client. For example, if the ratio of outstanding loans to total balance sheet is 25%, 25% of the water boards' scope 1 and 2 GHG emissions are attributed to BNG. The financed GHG emissions per client are added up to result in the total financed GHG emissions per sector. The financed GHG emissions and relative financed emissions are reported per scope. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume in million euro of the clients for which a GHG footprint was calculated in this report.
Avoided emissions	Data on renewable energy use per water authority are available in the Arcadis (2024) report.[55]
Asset class specific considerations	The approach for water boards is in line with the public loan approach in the PCAF methodology.
Attribution	To calculate the GHG footprint according to the PCAF principles, a general approach has been developed. First, the GHG emissions of the different entities in the sector are calculated. Then, the BNG's share of the total balance sheet is used to determine the share of GHG emissions for which BNG is responsible. $$\sum \boldsymbol{CO_2eq} \times \frac{\boldsymbol{Outstanding\ loan\ volume}}{\boldsymbol{Total\ balance\ sheet\ (equity + debt)}}$$ Finally, the individual scopes and the sum of the scopes of all individual organisations have been aggregated.
Absolute vs. relative emissions	For the water boards, the total financed GHG emissions were calculated in tonnes. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume of the clients for which a GHG footprint was calculated in this report.

[54] Klimaatmonitor_Waterschappen_verslagjaar_2023.pdf
[55] Ibid.

Limitations	Not all scope 3 emissions are yet monitored by the water boards.
Data quality estimate	The GHG emissions are calculated based on data provided by the water boards themselves, but the data are not audited. Therefore, the data quality score is 2. The GHG emissions of methane and nitrous oxide from sewage treatment plants were calculated based on an IPCC model. This does not take into account the individual situation of the sewage treatment plants. However, the data is sector-specific. Therefore, the data quality score for scope 1 GHG emissions from the sewage treatment plant is 3.

Factsheets per data source

Topic	Description
Data	Fuel, heat and electricity use per water authority in TTW
Data file	Data NWB TTW waarden VJ2023.xlsx 2018: 250212 RWZI data 2018.xlsx
Data Source	Arcadis, 2024
Year	2023
Last update	September 2023
Date of download	Received by email from Arcadis on 17-9-2024 Werkmap\Waterschappen\b.Ruwe data\Ontvangen mails RE-CO2-voetafdruk waterschappen berekend op basis van TTW emissiesfactoren.msg
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Werkmap\Waterschappen\b.Ruwe data
Data quality	Score 2 and 3 The methodology for water boards is scaled to data quality level 2 due to the detailed underlying information provided in the Arcadis study (2024). Except for the GHG emissions from the sewage treatment plant. The GHG emissions of methane and nitrous oxide from sewage treatment plants were calculated based on an IPCC model. This does not take into account the individual situation of the sewage treatment plants. However, the data is sector-specific. Therefore, the data quality score for scope 1 GHG emissions from the sewage treatment plant is 3.
Unit of measurement	Multiple
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Total balance sheet per water authority
Data file	Totale passiva 2023.xlsx
Data Source	Unie van Waterschappen, WAVES, ABF Research
Year	2023
Last update	7-10-2024
Date of download	28-10-2024
Link to webpage	https://live-waves.databank.nl/jive
Filters used to obtain the datafile	Waterschapsspiegel > Alle gegevens > Financiën > Gerealiseerd > Balans > Total passiva Year: 2023
Internal location	Werkmap\Waterschappen\b.Ruwe data
Data quality	Score 1 High data quality. Provided directly by water boards from internal accounting systems. Passiva data have been verified by an auditor.

Unit of measurement	Euro
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Waterschappen\a. Printscreens\ Totale passiva 2023.png

List of the calculation sheets	Location
241015_Waterschappen_BNG_bank_verslagjaar2023.xlsx	Werkmap\Waterschappen\f4. Berekening BNG
241028 Totaaloverzicht emissies waterschappen 2022 BNG Bank.xlsx	Werkmap\Waterschappen\f4. Berekening BNG
250212_BNG_Totaaloverzicht emissies waterschappen 2018 aangepast indeling.xlsx	Werkmap\Waterschappen\f4. Berekening BNG

9 Public sector: joint arrangements

9.1 Results joint arrangements

The joint arrangements are a small sector within the loan portfolio of BNG. The sector accounts for 1.5% of BNG's loan portfolio.

Tables 9-1 and 9-2 show the results for the joint arrangements in 2023. A comparison over time is not yet possible. The total relative financed GHG emissions (Table 9-2) are 66.1 tCO_2e per million euro.

Table 9-1 Loan portfolio and coverage ratio of joint arrangements in 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients for which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)
2023	1,303	1.5	1,303	100.0

Table 9-2 Absolute and relative financed GHG emissions for joint arrangements in 2023

Scope	Financed GHG emission (tonnes/year)	Financed GHG emission (%)	Relative financed GHG emission (tCO_2e/million euro)
	2023	**2023**	**2023**
Scope 1	28,911	33.5	22.2
Scope 2	4,547	5.3	3.5
Scope 3	52,717	61.1	40.5
Total	**86,175**	**100.0***	**66.1**

*The sum in these columns is not always exactly 100% due to rounding per sector

9.2 Joint arrangement approach

See for the joint arrangement approach the general factsheet and factsheets per data source in section 5.2 (Housing related approach). The coverage ratio for the joint arrangements is 100%. For the joint arrangements, the loans of this sector were selected from the loan portfolio of 31-12-2023.

List of the calculation sheets	Location
BNGDOCS-#3592573-v2-Emissies overige klanten kredietportefeuille.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank\Bestanden ontvangen van BNG Bank eigen berekeningen

10 Public sector: other public institutions

10.1 Results other public institutions

The other public institutions are a small sector within the loan portfolio of BNG. The sector accounts for 0.6% of BNG's loan portfolio.

Tables 10-1 and 10-2 show the results for the other public institutions in 2023. A comparison over time is not yet possible. The total relative financed GHG emissions (Table 10-2) are 62.7 tCO_2e per million euro.

Table 10-1 Loan portfolio and coverage ratio of other public institutions in 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients of which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)
2023	510	0.6	510	100.0

Table 10-2 Absolute and relative financed GHG emissions for other public institutions in 2023

Scope	Financed GHG emission (tonnes/year)	Financed GHG emission (%)	Relative financed GHG emission (tCO_2e/million euro)
	2023	**2023**	**2023**
Scope 1	10,522	32.9	20.6
Scope 2	1,812	5.7	3.6
Scope 3	19,674	61.5	38.6
Total	**32,008**	**100.0***	**62.7**

*The sum in these columns is not always exactly 100% due to rounding per sector

10.2 Other public institutions approach

See for the other public institutions approach the general factsheet and factsheets per data source in section 5.2 (Housing related approach). The coverage ratio for the other public institutions is 100%. For the other public institutions, the loans of this sector were selected from the loan portfolio of 31-12-2023.

List of the calculation sheets	Location
BNGDOCS-#3592573-v2-Emissies overige klanten kredietportefeuille.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank\Bestanden ontvangen van BNG Bank eigen berekeningen

11 Healthcare sector

11.1 Results healthcare sector

The healthcare sector represents a small share of BNG's loan portfolio with 7.6% of the total loan portfolio of BNG in 2023.

11.1.1 Coverage ratio and attribution

Between 2022 and 2023, the outstanding loan volume of BNG to the healthcare sector decreased by 95 million euro between 2022 and 2023. The coverage ratio increased to 100% and therefore the loan portfolio of clients for which a GHG footprint was calculated increased by 197 million euro. The total balance sheet of clients for which a GHG footprint was calculated also increased. As a result, the ratio of the loan portfolio to the total balance sheet slightly decreased compared to last year. The attribution to BNG slightly decreased. For 2018, 2022 and 2023, the loan portfolio, the total balance sheet and the coverage ratio are shown in Table 11-1.

Table 11-1 Loan portfolio, coverage ratio and ratio loan portfolio versus total balance sheet for the healthcare sector in 2018, 2022 and 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients for which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)	Total balance sheet of clients of which a GHG footprint was calculated (million euro) *	Ratio loan portfolio / total balance sheet of clients for which a GHG footprint was calculated
2018	7,031	8.6	6,167	87.7	42,209	0.15
2022	6,724	7.8	6,432	95.7	48,323	0.13
2023	6,629	7.6	6,629	100.0	56,614*	0.12*

*This is based on 98.6% of outstanding loans to this sector. Within the 98.6% of the loan portfolio the total balance sheet of eleven healthcare institutions were missing. For these institutions, the average loan to total balance sheet ratio of the other institutions was used to calculate a fictional total balance sheet for 2023. The average ratio loan portfolio/total balance sheet of 0.14 was used.

11.1.2 Energy consumption and financed GHG emissions

Between 2022 and 2023, total natural gas consumption decreased, and total electricity consumption increased. The set of clients is not the same in both years and there are also some changes in the source data (energy) in 2023 (see section 11.2.1). This ensures that the figures for the different years in Table 11-2 and 11-3 are not directly comparable. The emission factors for natural gas and unknown electricity decreased and the attribution to BNG slightly decreased. These changes affect GHG emissions.

Table 11-2 Total energy consumption of the healthcare sector in 2018, 2022, and 2023

Year	Natural gas consumption (m^3)	Electricity consumption (kWh)
2018	583,236,160	1,302,739,082
2022	532,826,386	1,275,180,965
2023	531,745,272	1,324,961,406

Table 11-3 shows the GHG footprint results for the healthcare sector in 2018, 2022 and 2023.

Table 11-3 Absolute and relative financed GHG emissions for the healthcare sector in 2018, 2022 and 2023

	Scope	Financed GHG emissions (tonnes/year)			Financed GHG emissions (%)			Relative financed GHG emissions (tCO_2e/million euro)		
		2018	**2022**	**2023**	**2018**	**2022**	**2023**	**2018**	**2022**	**2023**
Natural gas use	Scope 1	153,476	120,441	119,642	53.8	57.9	59.9	24.9	18.7	18.0
Electricity use	Scope 2	78,711	59,719	51,496	27.6	28.7	25.8	12.8	9.3	7.8
Commuting (car, bus, tram, metro, train)	Scope 3	53,058	27,787	28,748	18.6	13.4	14.4	8.6	4.3	4.3
Total		**285,245**	**207,946**	**199,885**	**100.0***	**100.0***	**100.0***	**46.3**	**32.3**	**30.2**
Total scope 1 and 2		**232,187**	**180,160**	**171,137**	**81.4**	**86.5**	**85.7**	**37.7**	**28.0**	**25.8**

*The sum in these columns is not always exactly 100% due to rounding per sector

Table 11-4 Financed GHG emissions per financed floor area (m^2) for the healthcare sector in 2018, 2022 and 2023

	Year		
	2018	**2022**	**2023**
Financed GHG emissions real estate related ($kgCO_2e$)/ financed m^2	87.2	76.2	72.4*

*97.5% of outstanding loans to this sector was used to calculate this value (2023)

Between 2022 and 2023, the financed GHG emissions decreased for scope 1 natural gas consumption and scope 2 electricity consumption but increased for scope 3. Total financed GHG emissions decreased by 8,061 tonnes. Due to a change in methodology (see section 10.2.1), it is not possible to compare 2022 with 2023 1:1, but most of the customers that were already clients of BNG in 2022 show a reduction in GHG emissions for both scope 1 and 2. This decrease can also be seen in the financed GHG emissions expressed in relation to the financed building surface. This number decreased by 3.8 $kgCO_2e/m^2$ between 2022 and 2023.

Due to an increase in loans of clients for which a GHG footprint was calculated and a decrease in financed GHG emissions, relative financed GHG emissions decreased from 32.3 to 30.2 tonnes per million euro. In conclusion, the absolute and relative financed GHG emissions for the healthcare sector decreased between 2022 and 2023.

Financed emissions per financed m^2 are relatively high for healthcare institutions compared to other sectors. There is certainly a focus on reducing GHG emissions from healthcare institutions. This is also an important part of Green deal Healthcare 3.0. However, healthcare institutions also face other major challenges, such as the aging population, staff shortages and rising healthcare costs.[56]

11.2 Healthcare sector approach

11.2.1 Scopes 1, 2 and 3

Adjustment in methodology

For the 2023 calculations, energy consumption data were not requested from network operators, but only key figures were used. In the previous year, for 10 to 15% of the healthcare institutions energy consumption was requested from network operators. The key figures are based on previous years' energy consumption, but to estimate energy consumption in 2023, these previous years' actuals have been adjusted based on energy consumption trends known by CBS. New ownership data was requested from Kadaster this year. The previous ownership data was from 2022. For the healthcare sector, the total m^2 has decreased, which affects the results.

General factsheet

Topic	Description
Scopes covered	The healthcare approach covers scopes 1, 2 and part of scope 3. Scope 1 emissions are direct GHG emissions. These emissions result from the consumption of natural gas to heat buildings or for other purposes. Scope 2 emissions are the indirect GHG emissions from the consumption of purchased electricity, heat or steam. The consumption of heat and steam per healthcare institution is not known. Scope 2 therefore only includes purchased electricity. Scope 3 in the current healthcare approach includes estimated emissions from employee commuting.
Portfolio covered	The healthcare sector coverage ratio is 100% for 2023. For 98.5% of the healthcare loan portfolio energy consumption data were available. For 1.5% of the healtcare portfolio no energy consumption data were available, and a less accurate calculation method was used. Of the loans of clients for which a GHG footprint was calculated, scope 3 is part of the GHG footprint for 85.4% of the loans in 2023.
Data	**Data used for the healthcare institutions with energy consumption data** The energy consumption data of healthcare institutions are based on key figures on energy consumption for the healthcare sector from CBS. For a few hospitals, data on natural gas and electricity consumption are taken from annual reports or environmental reports. Data on the total balance sheet per healthcare institution per year come from CIBG; Ministerie van Volksgezondheid, Welzijn en Sport. Geographical annual averages (provinces/NUTS2) for commuting distance data are provided from the Dutch Central Bureau of Statistics (CBS). The same applies to the geographical annual averages (provinces/NUTS2) for business travel distance and distance travelled per means of transportation data.

[56] Uitdagingen in de zorg | Maastricht University

	Data used for the healthcare institutions lacking energy consumption data For sixteen healthcare institutions energy consumption data was not available. The GHG emissions of these clients have been calculated based on the outstanding loan amount and a PCAF emission factor. *Loan-specific information includes:* - NACE codes: Used to classify economic activities and map loans to the corresponding sectors and subsectors. - Outstanding loan amounts: The nominal value of loans provided to clients, which serves as the basis for GHG emissions calculations. - Subsector classifications: Detailed breakdowns of financed activities *Emission Factors:* Emission factors are applied according to the PCAF guidelines, using sector-specific data to estimate scope 1 (direct) and scope 2 (indirect from electricity) emissions. These factors are sourced from reputable databases and methodologies, including DEFRA, FAOSTAT, IPCC EFDB, Joint European Commission, Exiobase, and Probas. These emission factors are expressed in terms of tCO_2e per million euros financed. *Indexing of outdated climate data:* Data has been indexed based on the principle that in the adjustment of economic emissions intensities only the monetary value is adjusted, not the emissions in line with PCAF guidance. A CPI index for the Netherlands was used to adjust this.
Grid emission factors	**Grid emission factors for the healthcare institutions with energy consumption data** Section 2.4 contains more information on emission factors. The following emission factors from Table 2-4 have been used: - Natural gas - Electricity (unknown source) - Public Transport in general (Bus/Tram/Metro average) - Train (unknown type) - Passenger transport, Car, Fuel type unknown, weight class unknown. **Grid emission factors for the healthcare institutions lacking energy consumption data** Grid emission factors represent the average GHG emissions associated with the generation and delivery of electricity consumed by financed organisations. For scope 2 emissions, these factors reflect the carbon intensity of the power grid in the region where the financed activities take place. The grid emission factors are embedded within the sector-specific averages used for PCAF Classification Level 1. These factors ensure that the scope 2 emissions for the loan portfolio account for the electricity consumption of each sector, adjusted for regional variations in energy mix and grid intensity. For this portfolio, grid emission factors are expressed as tCO_2e per million euros financed, providing a standardised approach to estimate indirect emissions from purchased electricity.
Calculation steps	**Calculation steps for the healthcare institutions with energy consumption data** ***Scope 1 & Scope 2*** Scope 1 emissions are the direct GHG emissions of organisations. For healthcare institutions, these emissions result from the use of natural gas to heat buildings or to disinfect medical instruments. Scope 2 emissions include the indirect GHG emissions from the generation of purchased or acquired electricity, steam, heating or cooling consumed by the healthcare institution. As the consumption of steam, heating or cooling use per healthcare institution is not known, scope 2 is only based on emissions from purchased electricity.

Republiq carried out the following steps:

1. Inventory of buildings owned by healthcare institutions
2. Estimate energy consumption data

1. Inventory of buildings owned by healthcare institutions

BNG provided an overview of the healthcare institutions in its loan portfolio. For these institutions, Republiq has inventoried the properties of the healthcare institutions via Kadaster.

2. Estimate energy consumption data

Republiq made an estimate of the energy consumption using key figures of natural gas and electricity consumption. These key figures have been based on actual values for electricity and gas usage for the years 2018 and 2020 and are estimated for the years 2021, 2022 and 2023 according to the development in energy consumption based on trends published by CBS. In addition, floor area classes were taken into account.

Overview by healthcare institution

For each healthcare institution Republiq summarised the following measures:

- Total electricity consumption (in kWh)
- Total gas consumption (in Nm^3)
- Floor area (m^2)

For a few hospitals, data on natural gas and electricity consumption is taken from annual reports or environmental reports.

The total energy consumption per healthcare institution was converted into kg GHG emissions using the emission factor for electricity from unknown sources and natural gas consumption (see section 2.4). These GHG emissions in kg were divided by 1,000 to obtain GHG emissions in tonnes.

Scope 3

Scope 3 should cover all other indirect emissions (not included in Scope 2). In this report, scope 3 is incomplete and only emissions from employee commuting have been included in the calculations.

For the number of full-time equivalent (FTE) employees the GHG emissions of commuting and work-to-work travel have been estimated.

The number of full-time-equivalent (FTE) employees was used for the calculations, based on the data available from the Ministry of Health, Welfare and Sport for 2023.

The average distance travelled per person per by bus/tram/metro, train, bike, car as driver, car as passenger, foot, and other modes of transport (7 modes) was used to calculate the travel mode share.

The average distance travelled per person per year is available at province level (CBS Statline). The average distance a person travels per year to and from work and from work-to-work is allocated to the healthcare institutions based on the province in which the institution is located.

For each mode of transport (other than “other mode of transport”), the number of employees in full-time equivalents (FTE) was multiplied by the average distance travelled per person per year to work and for work-to-work and by the percentage of the mode of transport to calculate the number of kilometres travelled per year by the modes of transport (other than “other mode of transport”).

These kilometres travelled per year per mode were then multiplied by the corresponding emission factor resulting in $kgCO_2e$ emissions for each mode of transport. For car as driver and car as passenger, the total number of kilometres travelled per year was first divided by 1.39 (Conversion factor from travel kilometres to vehicle kilometres, as the average car occupancy rate is 1.39 per car; CO2emissiefactoren.nl, 2023) and then multiplied by the corresponding emission factor resulting in $kgCO_2e$ emissions.

The kilograms of GHG emissions for each mode of transport were added up to obtain the scope 3 emissions. These GHG emissions in kg were divided by 1,000 to obtain GHG emissions in tonnes.

Overall

After calculating the scope 1, 2 and 3 GHG emissions, these GHG emissions were multiplied by the ratio of outstanding loan to total balance sheet ratio per client. For example, if the ratio of outstanding loans to total balance sheet is 25%, 25% of the healthcare institution's scope 1, 2 and 3 GHG emissions are attributed to BNG. The financed GHG emissions per client are added up to obtain the total financed GHG emissions per sector.

The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume of the clients for which a GHG footprint was calculated in this report.

Floor area

The source of the floor area data is the Basic Register of Addresses and Buildings (BAG). The reference date for the total floor area per healthcare institution is 1-1-2024.

To calculate the GHG emissions per m^2 the total financed GHG emissions in $kgCO_2e$ for the healthcare institutions were divided by the total financed floor area (m^2) of the healthcare institutions included in the GHG footprint. The total financed floor area was calculated by multiplying the total floor area by the ratio of outstanding loans to total balance sheet.

For the calculation of the coverage ratio, only those healthcare institutions were taken into account for which it was possible to calculate at least scopes 1 and 2. For some healthcare institutions, scope 3 could not be calculated.

Calculation steps for the healthcare institutions lacking energy consumption data

The calculation of GHG emissions follows a standardised approach based on the PCAF methodology, utilizing the 3b method for business loans and unlisted equity. This method applies emission factors based on economic activity, using sector-specific averages provided through recognised databases. These emission factors are aligned with the primary business activities of the financed organisation and reflect emissions per unit of assets.

The 3b method ensures emissions are attributed proportionally to BNG's share of financing, relative to the borrower's total financial needs. This approach leverages emission factors validated through established methodologies, ensuring they are consistent with the activities financed by the bank. Data quality is assessed in alignment with PCAF standard.

1. *Emission factor assignment:*

The NACE code of each healthcare institution is used to find the sector-specific emission factors.

2. *Loan attribution:*

The GHG emissions for each loan are attributed based on the outstanding loan amount relative to the total emissions associated with the financed activity. This ensures that the emissions reflect the financial share of the organisation covered by the loan.

3. *Indexing of outdated climate data:*

The emission factor has been adjusted by using a CPI index for the Netherlands.

4. *Financed GHG Emissions:*

For each loan, emissions are calculated using the formula:

	Financed GHG Emissions (tCO_2e) = Outstanding Loan Amount (€) * Emission Factor (tCO_2e/M. Euro) 5. *Data Quality assessment:* Each calculation is assigned a Data Quality (DQ) score based on the PCAF standards. Higher scores indicate reliance on sector averages rather than borrower-specific data
Avoided emissions	The avoided emissions for the healthcare sector are not known and therefore not reported in this report.
Asset class specific considerations	For the calculations based on energy consumption data, the approach for the healthcare sector is in line with the 'Commercial real estate' approach in the PCAF methodology.
Attribution	**Attribution for the healthcare institutions with energy consumption data** To calculate the GHG footprint according to the PCAF principles, a general approach has been developed. First, the GHG emissions of the different entities in the sector are calculated. Then, the BNG's share of the total balance sheet is used to determine the share of GHG emissions for which BNG is responsible. $$\sum \boldsymbol{CO_2eq} \times \frac{\boldsymbol{Outstanding\ loan\ volume}}{\boldsymbol{Total\ balance\ sheet\ (equity + debt)}}$$ Finally, the individual scopes and the sum of the scopes of all individual organisations were aggregated. **Attribution for the healthcare institutions lacking energy consumption data** Method 3b (outstanding loan amount): emissions are attributed to BNG based on its proportional financial involvement in the borrower's operations. For business loans, this is calculated as the outstanding loan amount relative to the borrower's total financial needs. This ensures that reported GHG emissions correspond to BNG's share of responsibility for the financed activities, in alignment with the PCAF methodology.
Absolute vs. relative emissions	The financed GHG emissions and relative financed emissions are reported per scope. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume in million euro of the clients for which a GHG footprint was calculated in this report.
Limitations	**Limitations for the healthcare institutions with energy consumption data** For several healthcare institutions data on the total balance sheet were not available. For these institutions, the total balance sheet was calculated based on the average ratio outstanding loan volume / total balance sheet. However, this may have been over- or underestimated. ***Scope 1 & scope 2*** The actual consumption of natural gas and electricity by the healthcare institutions is not known for 2023. Energy consumption has been estimated based on key figures. This is less accurate than actual consumption. For a few hospitals, data on natural gas and electricity consumption were taken from annual reports or environmental reports. The energy consumption data obtained from Republiq only covers buildings owned by the health care institutions. Buildings rented by the institutions are out of scope. However, if the energy consumption of rented buildings is known, the GHG emissions should be added to scope 3. Ideally, emissions from other sources in the primary process of healthcare institutions should also be considered. For example, emissions of other gases from ambulances and trauma helicopters used for medical procedures. Unfortunately, there is no data available. Therefore, only natural gas consumption is considered in scope 1.

	Scope 3 Scope 3 should cover all other indirect emissions (not included in Scope 2). Only a small part of scope 3 is covered for the healthcare institutions. The part that is covered is based on proxy data and therefore the data quality is poor. In the scope 3 calculations, the number of employees (in FTE) has a significant impact on the results. The mobility data used from CBS are based on people working 30 hours or more per week. It was not possible to select a working week of 36 or 40 hours. This selection of people is therefore larger than the group of people working between 36 and 40 hours per week (1 FTE). These factors affect the quality of the data. From 2022, FTE data from fewer healthcare institutions are registered in the database of the Ministry of Health, Welfare and Sport. As a result, FTE data from many healthcare facilities were missing for 2023. To calculate a scope 3 GHG footprint for 2023, the FTE of 20 healthcare institutions with a relatively large loan at BNG were looked up in the annual report of the healthcare institution. For the other healthcare facilities whose FTE data was missing, the FTE number from 2021 was used if possible. A disadvantage is that the GHG footprint does not, or only partly, reflect changes in FTE's. Finally, there are several healthcare institutions for which only scope 1 and scope 2 are calculated, and scope 3 is missing. The number of full-time equivalents (FTEs) is not known for every healthcare institution, so this scope is missing for several of them. This leads to an underestimation of the total scope 3 emissions. **Limitations for the healthcare institutions lacking energy consumption data** Data availability: borrower-specific data is not available for these clients. Therefore, a method with a lower PCAF data quality score has been used. Data quality: PCAF recommends using the Classification Level 2 emission factors for internal analysis only. As a result, Classification level 2 cannot be used for this calculation. Within Classification level 1, it is not possible to distinguish between subsectors. This results in the reliance on the more aggregated Classification Level 1 emission factors, which introduces inherent uncertainties, particularly for sectors with high variability in emissions profiles.
Data quality estimate	**Data quality score for the healthcare institutions with energy consumption data** ***Scope 1 and 2*:** For 83.9% of outstanding loans to this sector data quality score is 3. For these healthcare institutions an estimation for natural gas and electricity consumption was made based on floor area classes. Energy consumption data is based on averaged data that is peer/(sub)-sector-specific, therefore data quality score is 3. For 14.7% of outstanding loans to this sector data quality score is 2. Energy consumption data is obtained from annual reports or environmental reports. The energy consumption data are not verified by an accountant and therefore the data quality score is 2. ***Scope 3:*** data quality score is 5. The GHG emissions are calculated based on average car information. Brand, model, and type are not known and distance travelled is based on local or regional statistical data. Therefore, the data quality score is 5. See option 3b in Table 5-16 on page 106 of the report PCAF (2022)[57] **Data quality score for the healthcare institutions lacking energy consumption data** Data quality score is 5. GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting

[57] https://carbonaccountingfinancials.com/standard.
PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.

	the exclusive use of sector-specific emission factors in the absence of borrower-specific information.

Factsheets per data source

Factsheets for the healthcare institutions with energy consumption data

Topic	Description
Data	Cadastral parcels in ownership of healthcare institutions
Data files	Uitvoer_Instellingen_20241001.xlsx
Data Source	Kadaster
Year	2024
Last update	31-10-2024
Date of download	31-10-2024
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Data can be requested from Republiq
Data quality	2
Unit of measurement	Not applicable
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Electricity consumption (kWh) and natural gas consumption (Nm^3) of some healthcare institutions
Data files	Original files 20241111 – BNG_energieverbruik_zorg.csv BNGDOCS-#3567695-v1-241014_zorginstellingen_zonder_FTE_cijfers_2023_BNG_Bank.xlsx Edited file : 20241111 – BNG_energieverbruik_zorg_aangevuld_jaarverslagdata.xlsx
Data Source	Republiq and Annual reports or environmental reports
Year	2023
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Original files Werkmap\Zorg\b. Ruwe data Edited file Werkmap\Zorg\c. Voorbewerkte data
Data quality	3 Energy consumption data is based on averaged data that is peer/(sub)-sector-specific, therefore data quality score is 3.
Unit of measurement	kWh for electricity and Nm^3 for natural gas
Selections	Not applicable
Data transformation	Not applicable

Data missing	Not for all healthcare institutions in the loan portfiolio, energy consumption data is available
Print screens	Not apllicable

Topic	Description
Data	Total balance sheet per healthcare institution
Data file	Original files: DigiMV2023_MultipleTables_20240812_1625.ods 231209_Passiva.csv (data file from previous year) 240909 invulbestand opgezochte passiva jaar 2023 – Kopie.xlsx Edited files: 240909 Passiva zorg 2022-2023.xlsx
Data Source	Annual reports of healthcare institutions CIBG; Ministerie van Volksgezondheid Welzijn en Sport
Year	2023
Last update	Not applicable
Date of download	Several dates in September – October 2024 for the annual reports of healthcare institutions 19-8-2024 for CIBG; Ministerie van Volksgezondheid Welzijn en Sport
Link to webpage	https://www.jaarverantwoordingzorg.nl/gegevens-bekijken/verantwoordingsgegevens-per-verslagjaar-datasets
Filters used to obtain the datafile	Not applicable
Internal location	Original files: Werkmap\Zorg\b. Ruwe data Edited file: Werkmap\Zorg\c. Voorbewerkte data Annual reports: Werkmap\Zorg\g. Jaarverslagen\Passiva
Data quality	Score 2 Data is acquired from individual annual reports of healthcare institutions. The source data in the annual report is audited. Data is acquired by CIBG from individual annual reports of healthcare institutions. The source data in the annual report is audited, the composite dataset of CIBG is not.
Unit of measurement	Euro
Selections	Not applicable
Data transformation	Not applicable
Data missing	If the total balance sheet for 2023 were missing but data for 2022 were available, this value was used to replace the missing data. If total balance sheet data were also missing for 2022, the total balance sheet was calculated by multiplying the loan volume by an average ratio of the total loan volume to total balance sheet.
Print screens	Werkmap\Zorg\a. Printscreens 240819_Database download DigiMV 2023 (voorlopige dataset).png

Topic	Description
Data	Villages and cities overview in the Netherlands for 2023
Data file	Woonplaatsen_in_Nederland_2023_15112024_124911.xlsx
Data Source	CBS, Statline
Year	2023
Last update	7-3-2023
Date of download	15-11-2014
Link to webpage	https://opendata.cbs.nl/statline/#/CBS/nl/dataset/85516NED/table?ts=1731671215065
Filters used to obtain the datafile	Woonplaatsen: Woonplaatsen op alfabet Onderwerp: gemeente, naam, code, Provincie, naam, code
Internal location	Werkmap\Zorg\b. Ruwe data
Data quality	Not applicable
Unit of measurement	Not applicable
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Zorg\a. Printscreens 241115 Woonplaatsen in Nederland 2023_V1 t/m V4.png

Topic	Description
Data	Average mobility per person per year
Data file	Mobiliteit_per_persoon_persoonskenmerken_motieven_en_regio_s_15112024_132105.csv
Data Source	CBS, Statline
Year	2023
Last update	4-7-2024
Date of download	15-11-2024
Link to webpage	https://opendata.cbs.nl/statline/#/CBS/nl/dataset/84713NED/table?ts=1731672986814
Filters used to obtain the datafile	Populatie: 12 jaar of ouder Marge: waarde Regio's: provincies, landsdelen: Noord-Nederland, Oost-Nederland, West-Nederland en Zuid-Nederland Reismotieven: van en naar het werk & zakelijk, beroepsmatig Persoonskenmerken: Kenmerken: Maatschappelijke participatie: werkzaam 30 uur pw of meer Geslacht: totaal mannen en vrouwen Onderwerp: gemiddeld per persoon per jaar / afstand Perioden: 2023
Internal location	Werkmap\\Zorg\b. Ruwe data
Data quality	Score 3 With sample surveys, such as the ODiN, information is collected from only part of the population. The estimated results based on the sample data are generally not equal to the actual values and therefore have margins of inaccuracy. For more information, see https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/korte-onderzoeksbeschrijvingen/onderweg-in-nederland
Unit of measurement	km
Selections	Not applicable
Data transformation	Some data was missing. See the 'Data missing' section.

Data missing	For the missing values the lowest possible available geographic scale level was used. E.g.: if the data for the province of Groningen were missing, then the data for Noord-Nederland (LD) were used. If that data were not available too, the data for the whole Netherlands were used.
Print screens	Werkmap\Zorg\a.Printscreens Mobiliteit_Reismotieven_V1 t/m V2.png

Topic	Description
Data	Transportation modes per person per province
Data file	Mobiliteit_per_persoon_persoonskenmerken_vervoerwijzen_en_regio_s_15112024_130655.csv
Data Source	CBS, Statline
Year	2023
Last update	4-7-2024
Date of download	15-11-2024
Link to webpage	https://opendata.cbs.nl/statline/#/CBS/nl/dataset/84709NED/table?ts=1731672050096
Filters used to obtain the datafile	Populatie: 12 jaar of ouder Geslacht: totaal mannen en vrouwen Persoonskenmerken: Kenmerken: Maatschappelijke participatie: werkzaam 30 uur pw of meer Vervoerswijzen: totaal / personenauto (bestuurder) / personenauto (passagier) / trein / bus-tram-metro / fiets / lopen / overige vervoerswijze Onderwerp: gemiddeld per persoon per jaar / afstand Periode: 2023 Marge: waarde Regio's: totalen / landsdelen / provincies / overig
Internal location	Werkmap\Zorg\b. Ruwe data
Data quality	Score 3 With sample surveys, such as the ODiN, information is collected from only part of the population. The estimated results based on the sample data are generally not equal to the actual values and therefore have margins of inaccuracy. For more information, see https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/korte-onderzoeksbeschrijvingen/onderweg-in-nederland
Unit of measurement	km
Selections	Not applicable
Data transformation	Some data was missing. See the 'Data missing' section.
Data missing	For the missing values the lowest possible available geographic scale level was used. E.g.: if the data for the province of Groningen were missing, then the data for Noord-Nederland (LD) were used. If that data were not available too, the data for the whole Netherlands were used.
Print screens	Werkmap\Zorg\a.Printscreens 241115 Mobiliteit_Vervoerswijzen_V1 t/m V2.png

Topic	Description
Data	FTE per healthcare institution
Data files	Original files: DigiMV2023_Multiple Tables_20240812_1625.ods 231023_FTE.csv (data file from previous year) Edited datafile: 241113 FTE zorg 2022-2023.xlsx
Data Source	Annual reports of healthcare institutions CIBG; Ministerie van Volksgezondheid Welzijn en Sport

Year	2023
Last update	Not applicable
Date of download	Several dates in September – October 2024 for the annual reports of healthcare institutions 19-8-2024 for CIBG; Ministerie van Volksgezondheid Welzijn en Sport
Link to webpage	https://www.jaarverantwoordingzorg.nl/gegevens-bekijken/verantwoordingsgegevens-per-verslagjaar-datasets
Filters used to obtain the datafile	Not applicable
Internal location	Original files: Werkmap\Zorg\b. Ruwe data Edited file: Werkmap\Zorg\c. Voorbewerkte data
Data quality	Score 2 Data is acquired by CIBG from individual annual reports of healthcare institutions. The source data in the annual report is audited, the composite dataset of CIBG is not.
Unit of measurement	FTE
Selections	Not applicable
Data transformation	Sum of personnel in paid employment, self-employed persons and hired staff.
Data missing	From 2022, FTE data from fewer healthcare institutions are registered in the database of the Ministry of Health, Welfare and Sport. As a result, FTE data from many healthcare facilities were missing for 2023. To calculate a scope 3 GHG footprint for 2023, the FTE of 20 healthcare institutions with a relatively large loan at BNG was looked up in the annual report of the healthcare institution. For the other healthcare facilities whose FTE data was missing, the FTE number from 2021 was used if possible. A disadvantage is that the GHG footprint does not, or only partly, reflect changes in FTE's.
Print screens	Werkmap\Zorg\a. Printscreens 240819_Database download DigiMV 2023 (voorlopige dataset).png

Factsheets per data source

Factsheets for the healthcare institutions lacking energy consumption data

Topic	Description
Data	Loan portfolio data includes key variables such as NACE codes, outstanding nominal amounts, market segments, subsectors.
Data file	BNG kredietportefeuille 31-12-2023.xls
Data Source	Internal loan portfolio data extracted from BNG's credit systems
Year	Data reflects the loan portfolio per 31-12-2023.
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Klimaatplan\PCAF\Data uitvragen\Portefeuillebestand Kredietportefeuille
Data quality	1
Unit of measurement	Euro (€)
Selections	Portfolio filtered to select the healthcare institutions
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	PCAF Emission Factor Database: Business Loans and Unlisted Equity.
Data file	PCAF_emission_factor_database_Business_loans_and_unlisted_equity
Data Source	Exiobase
Year	2019
Last update	November 2024
Date of download	Data was extracted on November 25, 2024.
Link to webpage	Not applicable
Filters used to obtain the datafile	Selection of emission factors relevant to business loans and unlisted equity.
Internal location	Klimaatplan\PCAF\PCAF EF database
Data quality	The emission factors provided by the PCAF database are sourced from globally recognised and validated datasets, ensuring a high level of reliability for emissions calculations. These factors are specific to various sectors, regions, and activities, and are derived from reputable sources such as DEFRA, Climate Trace, and FAOSTAT.B
Unit of measurement	tCO_2e per mln Euro (tCO_2e / M. Euro)
Selections	In the dataset, filters were applied to ensure that only emission factors corresponding to methodology Option 3a and Option 3b, as outlined in the PCAF guidelines, were selected. These emission factors are sourced from the Exiobase assets database (2019), which provides sector-specific data for scope 1 and scope 2 emissions. Additional filters: - Region: EU member states - Comments: Emission factor recommended to use for financed emission calculations
Data transformation	Emission factors are directly applied to calculate emissions.
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Consumer Price Index which can be used to update the outdated emission factors to the recent reporting year.
Data file	PCAF_DB Financed emissions calculation worksheet 0424
Data Source	https://data.imf.org
Year	Conversion factor to convert from 2019 to 2020-2023
Last update	April 2024
Date of download	Not applicable
Link to webpage	https://db.carbonaccountingfinancials.com/
Filters used to obtain the datafile	Not applicable
Internal location	Not applicable
Data quality	Not applicable
Unit of measurement	Numerical
Selections	Country = The Netherlands
Data transformation	The emission factors from the PCAF database were divided by the Consumer Price Index factor. This is consistent with the methodology used in the PCAF emissions calculation tool.
Data missing	Not applicable
Print screens	Not applicable

List of the calculation sheets	Location
241127 leningportefeuille zorg BNG Bank.xlsx 240909_FTE.csv 241127_Leningportefeuille BNG Bank.csv 241014 passiva zorg.csv 241112 energiedata zorginstellingen BNG.csv Emissiefactoren – PCAF 2024.csv	Werkmap\Zorg\b. Ruwe data Werkmap\Zorg\d. Data voor SQL Werkmap\Emissiefactoren\d. Data voor SQL
241203_BNG_Zorg_2023_versie2024.ipynb	Werkmap\Zorg\e. SQL notebooks\BNG Bank
241203_pBNG.vZorg_2023_IndividueleKlanten_versie2024.xlsx 241203_pBNG.vZorg_2023_scopestotaal_versie2024.xlsx 241203_pBNG.vZorg_2023_Ratio_Lening_Passiva_versie2024.xlsx	Werkmap\Zorg\f2. Data uit SQL BNG
BNGDOCS-#3590683-v2-Woco_s_onderwijs- en zorginstellingen zonder emissies van HPT VERSIE3.slxs	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank\Bestanden ontvangen van BNG Bank eigen berekeningen
241209 samenvoeging alle GHG emissies zorg BNG Bank 2023.xlsx 250116 BNG Bank zorg 2018_m2.xlsx 250116_pBNG.vZorg_2022_scopestotaal_zorginstelling_versie2024_m2.xlsx 250116_pBNG.vZorg_2023_IndividueleKlanten_versie2024_m2.xlsx	Werkmap\Zorg\f4. Berekening BNG

12 Educational institutions

12.1 Results educational institutions

The education sector represents a small share of BNG's loan portfolio with 1.2% of the total loan portfolio of BNG in 2023.

12.1.1 Coverage ratio

Between 2022 and 2023, the education loan portfolio decreased by 22 million euro. However, due to an increase in the coverage ratio, the loan volume of clients for which a GHG footprint was calculated increased by 378 million euro between 2022 and 2023. Total balance sheet of clients for which a GHG footprint was calculated also increased and therefore the ratio loan portfolio versus total balance sheet did not change. For 2018, 2022 and 2023, the loan portfolio, the total balance sheet and the coverage ratio are shown in Table 12-1.

Table 12-1 Loan portfolio, coverage ratio and ratio loan portfolio versus total balance sheet for the educational institutions in 2018, 2022 and 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans	Loans of clients for which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)	Total balance sheet of clients for which a GHG footprint was calculated (million euro)	Ratio loan portfolio / total balance sheet of clients for which a GHG footprint was calculated
2018	979	1.2	531	54.2	4,903	0.11
2022	1,057	1.2	657	62.2	6,819	0.10
2023	1,035	1.2	1,035	100.0	7,623*	0.10*

*This is based on 73% of outstanding loans to this sector. Within 73% of the loan portfolio, the total balance sheet of eight educational institutions was missing. For these institutions, the average loan to total balance sheet ratio of the other institutions was used to calculate a fictional total balance sheet for 2023. The average ratio loan portfolio/total balance sheet of 0.19 was used.

12.1.2 Energy consumption and financed GHG emissions

Table 12-2 is included in this report to show the total energy consumption data that is behind the GHG footprint. Because the clients included in the loan portfolio and the coverage ratio have changed between 2022 and 2023, the energy consumption data cannot be compared between the years.

Table 12-2 Total energy consumption of the educational institutions in 2018, 2022 and 2023

Year	Natural gas consumption (m^3)	Electricity consumption (kWh)
2018	55,187,126	148,237,870
2022	58,831,258	143,713,415
2023*	27,835,018	157,766,850

* 73.2% of outstanding loans to this sector was used to calculate the figures of 2023

Table 12-3 shows the GHG footprint results for education institutions in 2018, 2022 and 2023.

Table 12-3 Absolute and relative financed GHG emissions for the educational institutions in 2018, 2022 and 2023

Source of emissions	Scope	Financed GHG emissions (tonnes/year)			Financed GHG emissions (%)			Relative financed GHG emissions (tCO_2e/million euro)		
		2018	**2022**	**2023**	**2018**	**2022**	**2023**	**2018**	**2022**	**2023**
Natural gas use	Scope 1	9,453	8,066	6,750	59.4	62.4	49.3	17.8	12.3	6.5
Electricity use	Scope 2	6,469	4,853	6,929	40.6	37.6	50.7	12.2	7.4	6.7
Total		**15,923**	**12,919**	**13,679**	**100.0***	**100.0***	**100.0***	**30.0**	**19.7**	**13.2**

*The sum in these columns is not always exactly 100% due to rounding per sector

Table 12-4 Financed GHG emissions per financed floor area (m^2) for the education institutions in 2018, 2022 and 2023

	Year		
	2018	**2022**	**2023**
Financed GHG emissions real estate related ($kgCO_2e$)/ financed m^2	41.6	35.0	28.8*

* 89.5% of outstanding loans to this sector was used to calculate this value (2023)

When interpreting these data over the years, the increase in coverage ratio and changes in the source data should be taken into account (see section 12.2.1). A positive development is that the relative financed GHG emissions and the financed GHG emissions per financed m^2 are lower than in 2018 and 2022, while more clients are included.

In education, there is also a big challenge to make buildings more sustainable to meet the climate targets.

12.2 Educational institutions approach

12.2.1 Scope 1 and 2

Adjustments in methodology

For the 2023 calculations, energy consumption data were not requested from network operators, but only key figures based on energy consumption known from CBS were used. The key figures are broken down by type of education (primary, secondary and higher education). In previous years, indicators were used for the entire education sector. By subdividing the indicators according to the type of education, the energy consumption of an institution can be better predicted.

Compared to the previous methodology, the key figure for gas consumption turned out to be lower for primary and secondary education and to have remained the same for higher education. The key figure for electricity consumption also turned out to be lower for primary and secondary education, but higher for higher education.

General factsheet

Topic	Description
Scopes covered	The education sector covers both scopes 1 and 2. Scope 1 emissions are direct GHG emissions. These emissions result from the consumption of natural gas to heat buildings or for other purposes. Scope 2 emissions are the indirect GHG emissions from the consumption of purchased electricity, heat or steam. The consumption of heat and steam per educational institution is not known. Scope 2 therefore only includes purchased electricity.
Portfolio covered	The portfolio coverage ratio for this sector is 100%. For 73.2% of the education loan portfolio energy consumption data were available. For 26.8% of the education portfolio no energy consumption data were available, and a less accurate calculation method was used.
Data	**Data used for the education institutions with energy consumption data** The energy consumption data of educational institutions are based on key figures on energy consumption for the education sector from CBS. Data of the total balance sheet per educational institute per year, are coming from DUO, the Dutch Education Service of Ministry of Education, Culture and Science. **Data used for the education institutions lacking energy consumption data** For fifteen educational institutions energy consumption data was not available. For eleven of these clients, the GHG emissions are calculated based on the outstanding amount and a PCAF emission factor. For the other four clients emissions are based on m^2 data of the client which lead to a better data quality score. *Loan-specific information includes:* - NACE codes: Used to classify economic activities and map loans to the corresponding sectors and subsectors. - Outstanding loan amounts: The nominal value of loans provided to clients, which serves as the basis for GHG emissions calculations. - Subsector classifications: Detailed breakdowns of financed activities *Emission Factors:* Emission factors are applied according to the PCAF guidelines, using sector-specific data to estimate scope 1 (direct) and scope 2 (indirect from electricity) emissions. These factors are sourced from reputable databases and methodologies, including DEFRA, FAOSTAT, IPCC EFDB, Joint European Commission, Exiobase, and Probas. These emission factors are expressed in terms of tCO_2e per million euros financed. *Indexing of outdated climate data:* Data has been indexed based on the principle that in the adjustment of economic emissions intensities only the monetary value is adjusted, not the emissions in line with PCAF guidance. A CPI index for the Netherlands was used to adjust this. *Client specific data (m^2 and total balance sheet):* For four clients documents were available which contain the m^2 of the property owned by these clients and the activities these buildings are used for. Annual reports are also available for these clients, which were used to collect the balance sheet totals.
Grid emission factors	**Grid emission factors for the education institutions with energy consumption data** Section 2.4 contains more information on emission factors. The following emission factors from Table 2-4 were used:

	- Natural gas - Electricity (Unknown source) **Grid emission factors for the education institutions lacking energy consumption data** Grid emission factors represent the average GHG emissions associated with the generation and delivery of electricity consumed by financed organisations. For scope 2 emissions, these factors reflect the carbon intensity of the power grid in the region where the financed activities take place. The grid emission factors are embedded within the emission factors used for the calculations based on outstanding loan amount, as well as the emission factors used for calculations based on m^2.
Calculation steps	**Calculation steps for the education institutions with energy consumption data** The following steps were performed by Republiq: 1. Inventory of buildings owned by educational institutions 2. Estimate energy consumption data *1. Inventory of buildings owned by educational institutions* Republiq has made a list of all the buildings that are owned by the educational institutions that are clients at BNG. To create this list for primary and secondary schools, Republiq made use of data from DUO (Dienst Uitvoering Onderwijs). For some missing primary and secondary schools and for higher education, Republiq manually looked up which buildings are used by the educational institutions or Republiq has obtained these data from Kadaster. *2. Estimate energy consumption data* Republiq estimated the energy consumption by using key figures of natural gas and electricity consumption. *Overview by educational institution* For each educational institution Republiq summarised the following measures: - Total electricity consumption (in kWh) - Total gas consumption (in Nm^3) - Floor area (m^2) The total energy consumption per educational institution was converted into kg GHG emissions using the emission factor for electricity from unknown sources and natural gas consumption (see section 2.4). These GHG emissions in kg were divided by 1,000 to obtain GHG emissions in tonnes. After calculating the scope 1 and 2 GHG emissions, these GHG emissions were multiplied by the ratio of outstanding loan to total balance sheet ratio per client. For example, if the ratio of outstanding loans to total balance sheet is 25%, 25% of the education institution's scope 1, 2 and 3 GHG emissions are attributed to BNG. The financed GHG emissions per client are added up to obtain the total financed GHG emissions per sector. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume of the clients for which a GHG footprint was calculated in this report. *Floor area* The source of the floor area data is the Basic Register of Addresses and Buildings (BAG). The reference date for the total floor area per healthcare institution is 1-1-2024. To calculate the GHG emissions per m^2 the total financed GHG emissions in $kgCO_2e$ for the educational institutions were divided by the total financed floor area (m^2) of the educational institutions included in the GHG footprint. The total financed floor

	area was calculated by multiplying the total floor area by the ratio of outstanding loans to total balance sheet. **Calculation steps for the education institutions lacking energy consumption data** ***Method based on outstanding amount:*** The calculation of GHG emissions follows a standardised approach based on the PCAF methodology, utilizing the 3b method for business loans and unlisted equity. This method applies emission factors based on economic activity, using sector-specific averages provided through recognised databases. These emission factors are aligned with the primary business activities of the financed organisation and reflect emissions per unit of assets. The 3b method ensures emissions are attributed proportionally to BNG's share of financing, relative to the borrower's total financial needs. This approach leverages emission factors validated through established methodologies, ensuring they are consistent with the activities financed by the bank. Data quality is assessed in alignment with PCAF standard. 1. *Emission factor assignment:* The NACE code of each education institution is used to find the sector-specific emission factors. 2. *Loan attribution:* The GHG emissions for each loan are attributed based on the outstanding loan amount relative to the total emissions associated with the financed activity. This ensures that the emissions reflect the financial share of the organisation covered by the loan. 3. *Indexing of outdated climate data:* The emission factor has been adjusted by using a CPI index for the Netherlands. 4. *Financed GHG Emissions:* For each loan, emissions are calculated using the formula: Financed GHG Emissions (tCO_2e) = Outstanding Loan Amount (€) * Emission Factor (tCO_2e/M. Euro) 5. *Data Quality assessment:* Each calculation is assigned a Data Quality (DQ) score based on the PCAF standards. Higher scores indicate reliance on sector averages rather than borrower-specific data. ***Method based on m^2:*** 1. *Emission factor assignment:* The type of building and the activities for which the building is used determine which emission factor is assigned to the specific client. This detailed client information is available within BNG. 2. *Loan attribution:* The GHG emissions for each loan are attributed based on the outstanding loan amount relative to total balance sheet of the client. 3. *Financed GHG Emissions:* For each loan, emissions are calculated using the formula: Financed GHG Emissions (tCO_2e) = (Outstanding loan amount (€) / Total balance sheet (€)) * m^2 * Emission Factor (tCO_2e/m^2) 4. *Data Quality assessment:* Each calculation is assigned a Data Quality (DQ) score based on the PCAF standards. Higher scores indicate reliance on sector averages rather than borrower-specific data.
Avoided emissions	The avoided emissions for the educational institutions are not known and therefore not reported in this report.
Asset class specific considerations	For the calculation based on energy consumption data, the approach for the educational institutions is in line with the 'Commercial real estate' approach in the PCAF methodology.
Attribution	**Attribution for the education institutions with energy consumption data**

	To calculate the GHG footprint according to the PCAF principles, a general approach has been developed. First, the GHG emissions of the different entities in the sector are calculated. Then, the BNG's share of the total balance sheet is used to determine the share of GHG emissions for which BNG is responsible. $$\sum \boldsymbol{CO_2eq} \times \frac{\boldsymbol{Outstanding\ loan\ volume}}{\boldsymbol{Total\ balance\ sheet\ (equity + debt)}}$$ Finally, the individual scopes and the sum of the scopes of all individual organisations were aggregated. **Attribution for the education institutions lacking energy consumption data** Method based on outstanding loan amount: emissions are attributed to BNG based on its proportional financial involvement in the borrower's operations. For business loans, this is calculated as the outstanding loan amount relative to the borrower's total financial needs. This ensures that reported emissions correspond to BNG's share of responsibility for the financed activities, in alignment with the PCAF methodology. Method based on m^2: Emissions are attributed to BNG based on the following attribution factor: Outstanding Loan Amount (€)/ Client's Total balance sheet (€)).
Absolute vs. relative emissions	The financed GHG emissions and relative financed emissions are reported per scope. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume in million euro of the clients for which a GHG footprint was calculated in this report.
Limitations	**Limitations for education institutions with energy consumption data** The actual consumption of natural gas and electricity by the education institutions is not known. Energy consumption has been estimated based on key figures. This is less accurate than actual consumption. Ideally, GHG emissions of cars in possession of educational institutions should also be part of scope 1. Unfortunately, these data are not available. Some primary school buildings are in possession of municipalities. It might be possible that for some primary school buildings energy consumption is included in the GHG emissions of municipalities. **Limitations for education institutions lacking energy consumption data** Data availability: borrower-specific data is not available for all of these clients. Therefore, a method with a lower PCAF data quality score has been used for eleven of them. Data quality: PCAF recommends using the Classification Level 2 emission factors for internal analysis only. As a result, Classification level 2 cannot be used for this calculation. Within Classification level 1, it is not possible to distinguish between subsectors. This results in the reliance on the more aggregated Classification Level 1 emission factors, which introduces inherent uncertainties, particularly for sectors with high variability in emissions profiles.
Data quality estimate	**Data quality score for education institutions with energy consumption data** For 73.2% of outstanding loans to this sector, the data quality score is 3. Energy consumption data is based on averaged data that is peer/(sub)-sector-specific, therefore data quality score is 3. **Data quality score for education institutions lacking energy consumption data** For 16.3% of outstanding loans to this sector, the data quality is score 4. The calculations rely on Level 4 data, GHG emissions are calculated based on an emission factor per floor area. For 10.5% of outstanding loans to this sector, the data quality is score 5. GHG emissions were calculated based on the outstanding loan amount and an emission

	factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.

Factsheets per data source

Factsheets for the education institutions with energy consumption data

Topic	Description
Data	Primary education locations
Data file	02.-alle-schoolvestigingen-basisonderwijs.csv
Data Source	DUO
Year	2024
Last update	01-06-2024
Date of download	18-06-2024
Link to webpage	https://duo.nl/open_onderwijsdata/primair-onderwijs/scholen-en-adressen/hoofdvestigingen-basisonderwijs.jsp
Filters used to obtain the datafile	Not applicable
Internal location	Data can be requested from Republiq
Data quality	1
Unit of measurement	Not applicable
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Secondary education locations
Data file	02.-alle-vestigingen-vo.csv
Data Source	Duo
Year	2024
Last update	01-06-2024
Date of download	18-06-2024
Link to webpage	https://duo.nl/open_onderwijsdata/voortgezet-onderwijs/adressen/vestigingen.jsp
Filters used to obtain the datafile	Not applicable
Internal location	Data can be requested from Republiq
Data quality	1
Unit of measurement	Not applicable
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Electricity use (kWh) and natural gas use (Nm^3) per education institution
Data file	Original file : 20241030 - BNG_energieverbruik_onderwijs.csv
Data Source	Republiq
Year	2023
Last update	Not applicable
Date of download	Not applicable

Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Werkmap\Onderwijs\b. Ruwe data
Data quality	3 Energy consumption data are based on averaged data that is peer/(sub)-sector-specific, therefore data quality score is 3.
Unit of measurement	kWh for electricity and Nm^3 for natural gas
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Total balance sheet per educational institution
Data files	Original files: 241028_28.-informatie-over-de-rechtspersoon-2019-2023-standaard.xlsx 241028 Passiva onderwijs-2019-2023.xlsx Edited file: 241028_Passiva BNG Bank.xlsx
Data Source	DUO: Education Service of Ministry of Education, Culture and Science and annual reports
Year	2023
Last update	16-9-2024
Date of download	28-10-2024
Link to webpage	https://duo.nl/open_onderwijsdata/onderwijs-algemeen/financiele-overzichten/financiele-verantwoording-uit-xbrl.jsp
Filters used to obtain the datafile	Not applicable
Internal location	Original files: Werkmap\Onderwijs\b. Ruwe data Edited file: Werkmap\Onderwijs\c. Voorbewerkte data Werkmap\Onderwijs\g. Jaarverslagen\BNG Bank
Data quality	Score 2 Schoolboards send the data to DUO. The numbers are not checked by accountants or by DUO/the Ministry of Education, Culture and Science.
Unit of measurement	Euro
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\Onderwijs\a. Printscreens 241028 KVK onderwijs.png 241028 Passiva onderwijs.png

Factsheets per data source

Factsheets for the education institutions lacking energy consumption data

Topic	Description
Data	Loan portfolio data includes key variables such as NACE codes, outstanding nominal amounts, market segments, subsectors.
Data file	BNG kredietportefeuille 31-12-2023.xls
Data Source	Internal loan portfolio data extracted from BNG's credit systems
Year	Data reflects the loan portfolio per 31-12-2023.
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Klimaatplan\PCAF\Data uitvragen\Portefeuillebestand Kredietportefeuille
Data quality	1
Unit of measurement	Euro (€)
Selections	Portfolio filtered to select the education institutions
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	PCAF Emission Factor Database: Business Loans and Unlisted Equity.
Data file	PCAF_emission_factor_database_Business_loans_and_unlisted_equity
Data Source	Exiobase
Year	2019
Last update	November 2024
Date of download	Data was extracted on November 25, 2024.
Link to webpage	Not applicable
Filters used to obtain the datafile	Selection of emission factors relevant to business loans and unlisted equity.
Internal location	Klimaatplan\PCAF\PCAF EF database
Data quality	The emission factors provided by the PCAF database are sourced from globally recognised and validated datasets, ensuring a high level of reliability for emissions calculations. These factors are specific to various sectors, regions, and activities, and are derived from reputable sources such as DEFRA, Climate Trace, and FAOSTAT.B
Unit of measurement	tCO_2e per mln Euro (tCO_2e / M. Euro)
Selections	In the dataset, filters were applied to ensure that only emission factors corresponding to methodology Option 3a and Option 3b, as outlined in the PCAF guidelines, were selected. These emission factors are sourced from the Exiobase assets database (2019), which provides sector-specific data for scope 1 and scope 2 emissions. Additional filters: - Region: EU member states - Comments: Emission factor recommended to use for financed emission calculations
Data transformation	Emission factors are directly applied to calculate emissions.
Data missing	Not applicable

Print screens	Not applicable

Topic	Description
Data	Consumer Price Index which can be used to update the outdated emission factors to the recent reporting year.
Data file	PCAF_DB Financed emissions calculation worksheet 0424
Data Source	https://data.imf.org
Year	Conversion factor to convert from 2019 to 2020-2023
Last update	April 2024
Date of download	Not applicable
Link to webpage	https://db.carbonaccountingfinancials.com/
Filters used to obtain the datafile	Not applicable
Internal location	Not applicable
Data quality	Not applicable
Unit of measurement	Numerical
Selections	Country = The Netherlands
Data transformation	The emission factors from the PCAF database were divided by the Consumer Price Index factor. This is consistent with the methodology used in the PCAF emissions calculation tool.
Data missing	Not applicable
Print screens	Not applicable

List of the calculation sheets	Location
241030_BNG_energieverbruik_onderwijs.csv 241028_Leningportefeuille BNG Bank.csv 241028_Passiva BNG Bank.csv Emissiefactoren – PCAF 2024.csv	Werkmap\Onderwijs\d. Data voor SQL Werkmap\Emissiefactoren\d. Data voor SQL
241104_BNG_Onderwijs_2023_versie2024.ipynb	Werkmap\Onderwijs\e. SQL notebooks
241107_pBNG.vOnderwijs_2023_CO2voetafdruk_Absoluut_Totaal_versie2024.xlsx 241107_pBNG.vOnderwijs_2023_CO2voetafdruk_Relatief_Totaal_versie2024.xlsx 241107_pBNG.vOnderwijs_2023_IndividueleKlanten_versie2024.xlsx 241107_pBNG.vOnderwijs_2023_Ratio_Lening_Passiva_versie2024.xlsx	Werkmap\Onderwijs\f2. Data uit SQL BNG
BNGDOCS-#3590683-v2-Woco_s_onderwijs- en zorginstellingen zonder emissies van HPT VERSIE3.slxs	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank\Bestanden ontvangen van BNG Bank eigen berekeningen
241209 samenvoeging alle GHG emissies onderwijs BNG Bank 2023.xlsx 250116_pBNG.vOnderwijs_2023_IndividueleKlanten_versie2024_m2.xlsx 250116 BNG Bank onderwijs 2018_m2.xlsx 250116 BNG Bank onderwijs 2022_m2.xlsx	Werkmap\Onderwijs\f4. Berekening BNG

13 Public infrastructure: public transport

13.1 Results public transport

The public transport sector is a small sector within the loan portfolio of BNG. The sector accounts for 1.3% of BNG's loan portfolio.

Tables 13-1 and 13-2 show the results for the public transport sector in 2023. A comparison over time is not yet possible.

The relative financed GHG emissions (Table 13-2) show that the public transport sector is not a GHG intensive sector because its relative financed GHG emissions of the public transport sector are below the overall relative financed GHG emissions of the BNG total loan portfolio of 2022 (21.8 tCO_2e/million euro). This is in line with the trend for public transport to become more environmentally friendly. Since 2017, for example, all electric passenger trains have been powered by green electricity. And from 2025, all new buses must be powered by 100% renewable energy or fuel. From 2030, all buses must be completely emission-free.[58]

Table 13-1 Loan portfolio and coverage ratio of the public transport sector in 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients of which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)
2023	1,153	1.3	1,153	100.0

Table 13-2 Absolute and relative financed GHG emissions for the public transport sector in 2023

Scope	Financed GHG emission (tonnes/year)	Financed GHG emission (%)	Relative financed GHG emission (tCO_2e/million euro)
	2023	**2023**	**2023**
Scope 1	5,836	35.2	5.0
Scope 2	612	3.7	0.5
Scope 3	10,145	61.1	8.8
Total	**16,592**	**100.0***	**14.4**

*The sum in these columns is not always exactly 100% due to rounding per sector

[58] Duurzaam openbaar vervoer | Openbaar vervoer (ov) | Rijksoverheid.nl

13.2 Public transport approach

General factsheet

Topic	Description
Scopes covered	For the public transport sector scopes 1, 2 and 3 are covered.
Portfolio covered	The public transport sector coverage ratio is 100% for 2023. For 35% of outstanding loans to this sector, GHG emissions from the public transport sector were determined based on data from the client's own annual reports or other reports. For 65% of outstanding loans to this sector, GHG emissions were calculated based on the outstanding loan amount and an emission factor.
Data	*Loan-specific information includes:* - NACE codes: Used to classify economic activities and map loans to the corresponding sectors and subsectors. - Outstanding loan amounts: The nominal value of loans provided to clients, which serves as the basis for emissions calculations. - Subsector classifications: Detailed breakdowns of financed activities *Emission Factors:* Emission factors are applied according to the PCAF guidelines, using sector-specific data to estimate scope 1 (direct), scope 2 (indirect from electricity), and scope 3 (other indirect) emissions. These factors are sourced from reputable databases and methodologies, including DEFRA, FAOSTAT, IPCC EFDB, Joint European Commission, Exiobase, and Probas. These emission factors are expressed in terms of tCO_2e per million euros financed. *Indexing of outdated climate data:* Data have been indexed based on the principle that in the adjustment of economic emissions intensities only the monetary value is adjusted, not the emissions in line with PCAF guidance. A CPI index for the Netherlands was used to adjust this. *GHG emissions from the clients:* Annual reports are used to collect the GHG emissions reported for some clients.
Grid emission factors	Grid emission factors represent the average GHG emissions associated with the generation and delivery of electricity consumed by financed organisations. For scope 2 emissions, these factors reflect the carbon intensity of the power grid in the region where the financed activities take place. The grid emission factors are embedded in the sector-specific averages used for PCAF Classification Level 1. These factors ensure that the scope 2 emissions for the loan portfolio account for the electricity consumption of each sector, adjusted for regional variations in energy mix and grid intensity. For this portfolio, grid emission factors are expressed as tCO_2e per million euros financed, providing a standardised approach to estimate indirect emissions from purchased electricity.
Calculation steps	For a few clients, emission data from annual reports were used (35%). For the other clients (65%) the calculation of GHG emissions follows a standardised approach based on the PCAF methodology, utilizing the 3b method for business loans and unlisted equity to ensure consistency in the assessment of financed emissions. This methodology applies emission factors based on economic activity, using sector-specific averages provided through recognised databases. These emission factors are aligned with the primary business activities of the financed organisation and reflect emissions per unit of assets. The 3b method ensures emissions are attributed proportionally to BNG's share of financing, relative to the borrower's total financial needs. This approach leverages emission factors validated through established methodologies, ensuring they are

	consistent with the activities financed by the bank. Data quality is assessed in alignment with PCAF standard. 2. Emission factor assignment: The NACE code of each company in the loan portfolio is used to determine the sector-specific emission factors. In addition, expert judgement was used when the mapping based on NACE codes seemed less reliable. In these cases, a better fit was made based on the subsector classification or more detailed information on the activities of the company. This information was largely derived from internal documents prepared by our credit department. 3. Loan attribution: The GHG emissions for each loan are attributed based on the outstanding loan amount relative to the total emissions associated with the financed activity. This ensures that the emissions reflect the financial share of the organisation covered by the loan. 4. Indexing of outdated climate data: The emission factor has been adjusted by using a CPI index for the Netherlands. 5. Financed GHG Emissions: For each loan, emissions are calculated using the formula: Financed GHG Emissions (tCO_2e) = Outstanding Loan Amount (€) * Emission Factor (tCO_2e/M. Euro). 6. Data Quality assessment: Each calculation is assigned a Data Quality (DQ) score based on the PCAF standards. Higher scores indicate reliance on sector averages rather than borrower-specific data.
Avoided emissions	Not applicable
Asset class specific considerations	No additional considerations
Attribution	GHG emissions are attributed to BNG based on its proportional financial involvement in the borrower's operations. For business loans, this is calculated as the outstanding loan amount relative to the borrower's total financial needs. This ensures that reported GHG emissions correspond to BNG's share of responsibility for the financed activities, in alignment with the PCAF methodology.
Absolute vs. relative emissions	For the public transport sector, the total financed GHG emissions were calculated in tonnes. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume of the clients for which a GHG footprint was calculated in this report.
Limitations	Data availability: for many loans, borrower-specific data were not available. In particular, relatively small companies do not disclose information on GHG emissions. For relatively large companies it is also not always documented how GHG emissions are calculated. It is unknown whether they have used the emission factors based on 'Tank to Wheel' or 'Well to Wheel' and whether they have subtracted their avoided emissions from the total GHG emissions. Therefore, the used GHG emissions for annual reports might be calculated by using a different method than used for current report. Scope 3 complexity: indirect emissions, particularly for scope 3, are estimated using economic activity data, which may not fully capture the variability in emissions across borrowers. Data quality: PCAF recommends using the Classification Level 2 emission factors for internal analysis only. As a result, Classification level 2 cannot be used for this calculation. Within Classification level 1, it is not possible to distinguish between subsectors. This results in the reliance on the more aggregated Classification Level 1

	emission factors, which introduces inherent uncertainties, particularly for sectors with high variability in emissions profiles.
Data quality estimate	For 35% of outstanding loans to this sector, GHG emissions were determined based on data from the client's own annual reports or other reports. If emission data from annual reports are used, the data quality score is 1. For 65% of outstanding loans to this sector, GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.

Factsheets per data source

Topic	Description
Data	Loan portfolio data includes key variables such as NACE codes, outstanding nominal amounts, market segments, subsectors.
Data file	BNG kredietportefeuille 31-12-2023.xls
Data Source	Internal loan portfolio data extracted from BNG's credit systems
Year	Data reflects the loan portfolio per 31-12-2023.
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Klimaatplan\PCAF\Data uitvragen\Portefeuillebestand Kredietportefeuille
Data quality	1
Unit of measurement	Euro (€)
Selections	Portfolio filtered to select the clients of the public transport sector
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	PCAF Emission Factor Database: Business Loans and Unlisted Equity.
Data file	PCAF_emission_factor_database_Business_loans_and_unlisted_equity
Data Source	Exiobase
Year	2019
Last update	November 2024
Date of download	Data was extracted on November 25, 2024.
Link to webpage	Not applicable
Filters used to obtain the datafile	Selection of emission factors relevant to business loans and unlisted equity.
Internal location	Klimaatplan\PCAF\PCAF EF database
Data quality	The emission factors provided by the PCAF database are sourced from globally recognised and validated datasets, ensuring a high level of reliability for emissions calculations. These factors are specific to various sectors, regions, and activities, and are derived from reputable sources such as DEFRA, Climate Trace, and FAOSTAT.B
Unit of measurement	tCO_2e per mln Euro (tCO_2e / M. Euro)
Selections	In the dataset, filters were applied to ensure that only emission factors corresponding to methodology Option 3a and Option 3b, as outlined in the PCAF guidelines, were selected. These emission factors are sourced from the Exiobase assets database (2019), which provides sector-specific data for scope 1 and scope 2 emissions.

	Additional filters: - Region: EU member states - Comments: Emission factor recommended to use for financed emission calculations
Data transformation	Emission factors are directly applied to calculate emissions.
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Consumer Price Index which can be used to update the outdated emission factors to the recent reporting year.
Data file	PCAF_DB Financed emissions calculation worksheet 0424
Data Source	https://data.imf.org
Year	Conversion factor to convert from 2019 to 2020-2023
Last update	April 2024
Date of download	Not applicable
Link to webpage	https://db.carbonaccountingfinancials.com/
Filters used to obtain the datafile	Not applicable
Internal location	Not applicable
Data quality	Not applicable
Unit of measurement	Numerical
Selections	Country = The Netherlands
Data transformation	The emission factors from the PCAF database were divided by the Consumer Price Index factor. This is consistent with the methodology used in the PCAF emissions calculation tool.
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Annual reports of clients containing the client's emissions and balance sheet totals.
Data file	Multiple files in Klimaatplan\PCAF\Jaarverslagen klanten
Data Source	Websites of the clients
Year	2023
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Klimaatplan\PCAF\Jaarverslagen klanten
Data quality	Data quality score 1, emissions from audited annual reports
Unit of measurement	Total balance sheet: mln Euro GHG emissions: $ktCO_2e$
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

List of the calculation sheets	Location
BNGDOCS-#3592573-v2-Emissies overige klanten kredietportefeuille.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank\Bestanden ontvangen van BNG Bank eigen berekeningen

14 Public infrastructure: infrastructure

14.1 Results infrastructure

The infrastructure sector is a small sector within the loan portfolio of BNG. The sector accounts for 1.2% of BNG's loan portfolio.

Tables 14-1 and 14-2 show the results for the infrastructure sector in 2023. A comparison over time is not yet possible.

The relative financed GHG emissions (Table 14-2) show that the infrastructure sector is a GHG intensive sector because it is one of the four sectors with the highest relative financed GHG emissions in BNG's loan portfolio in 2023 (waste collection and processing, infrastructure, network operators (energy, telecom) and spatial planning. The infrastructure sector includes, for example, ports and infrastructure projects. Scope 3 emissions are particularly high in this sector (86.5% of total).

Table 14-1 Loan portfolio and coverage ratio of the infrastructure sector in 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients for which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)
2023	1,028	1.2	1,028	100.0

Table 14-2 Absolute and relative financed GHG emissions for the infrastructure sector in 2023

Scope	Financed GHG emission (tonnes/year)	Financed GHG emission (%)	Relative financed GHG emission (tCO_2e/million euro)
	2023	**2023**	**2023**
Scope 1	29,479	12.4	28.7
Scope 2	2,476	1.0	2.4
Scope 3	205,068	86.5	199.5
Total	**237,024**	**100.0***	**230.6**

*The sum in these columns is not always exactly 100% due to rounding per sector

14.2 Infrastructure approach

See for the infrastructure approach the general factsheet and factsheets per data source in section 13.2 (Public transport approach).

The coverage ratio for the infrastructure sector is 100%. For 31% of outstanding loans to this sector, GHG emissions were determined based on data from the client's own annual reports or other reports. For 69% of outstanding loans to this sector, GHG emissions were calculated based on the outstanding loan amount and emission factor.

For 28.4% of outstanding loans to this sector, the data quality score is 1. GHG emission data is obtained from annual reports or environmental reports verified by an accountant. Therefore, the data quality score is 1.

For 2.5% of outstanding loans to this sector, the data quality score is 2. GHG emission data is obtained from annual reports or environmental reports. The energy consumption data are not verified by an accountant and therefore the data quality score is 2.

For 69.1% of outstanding loans to this sector, the data quality is score 5. GHG emissions were calculated based on the outstanding loan amount and emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.

For the infrastructure sector, the loans of this sector were selected from the loan portfolio of 31-12-2023.

List of the calculation sheets	Location
BNGDOCS-#3592573-v2-Emissies overige klanten kredietportefeuille.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank\Bestanden ontvangen van BNG Bank eigen berekeningen

15 Public infrastructure: waste collection and processing

15.1 Results waste collection and processing

The waste collection and processing sector is a small sector within the loan portfolio of BNG. The sector accounts for 0.8% of BNG's loan portfolio.

Tables 15-1 and 15-2 show the results for the waste collection and processing sector in 2023. A comparison over time is not yet possible.

The relative financed GHG emissions (Table 15-2) show that the waste collection and processing sector is a GHG intensive sector because it is one of the four sectors with the highest relative financed GHG emissions in BNG's loan portfolio in 2023 (waste collection and processing, infrastructure, network operators (energy, telecom) and spatial planning. Scope 1 emissions are particularly high in this sector (79.0% of total).

Table 15-1 Loan portfolio and coverage ratio of the waste collection and processing sector in 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients for which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)
2023	697	0.8	697	100.0

Table 15-2 Absolute and relative financed GHG emissions for the waste collection and processing sector in 2023

Scope	Financed GHG emission (tonnes/year)	Financed GHG emission (%)	Relative financed GHG emission (tCO_2e/million euro)
	2023	**2023**	**2023**
Scope 1	213,910	79.0	306.9
Scope 2	36,380	13.4	52.2
Scope 3	20,209	7.5	29.0
Total	**270,500**	**100.0***	**387.8**

*The sum in these columns is not always exactly 100% due to rounding per sector

15.2 Waste collection and processing approach

See for the waste collection and processing approach the general factsheet and factsheets per data source in section 13.2 (Public transport approach).

The coverage ratio for the waste collection and processing sector is 100%. For 74% of the outstanding loans in this sector, GHG emissions were determined based on data from the client's own annual reports or other reports. For 26% of the outstanding loans in this sector,

GHG emissions were calculated based on the outstanding loan amount and an emission factor.

For 74% of outstanding loans to this sector, GHG emissions were determined based on data from the client's own annual reports or other reports. If emission data from annual reports are used, the data quality score is 1.

For 26% of outstanding loans to this sector, GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.

For the waste collection and processing sector, the loans of this sector were selected from the loan portfolio of 31-12-2023.

List of the calculation sheets	Location
BNGDOCS-#3592573-v2-Emissies overige klanten kredietportefeuille.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank\Bestanden ontvangen van BNG Bank eigen berekeningen

16 Public infrastructure: drinking water companies

16.1 Results drinking water companies

The drinking water companies represent a small share of BNG's loan portfolio with 0.8% of the total loan portfolio of BNG in 2023.

16.1.1 Coverage ratio

The GHG footprint has been calculated for 92.2% of BNG's total outstanding loans to the drinking water companies in 2023. Between 2019 and 2020 the calculation method for the drinking water companies has changed and the coverage ratio and GHG emissions for 2018 could not be recalculated. Therefore, 2020 is the reference year for drinking water companies instead of 2018.
The loans to the drinking water companies for which a GHG footprint was calculated increased by 107 million Euro between 2022 and 2023, while total balance sheet decreased. Therefore, ratio loan portfolio versus total balance sheet slightly increased. For 2020, 2022, and 2023, the loan portfolio and coverage ratio are shown in Table 16-1.

Table 16-1 Loan portfolio, coverage ratio and ratio loan portfolio versus total balance sheet for the drinking water companies in 2020, 2022 and 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients for which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)[59]	Total balance sheet of clients for which a GHG footprint was calculated (million euro)	Ratio loan portfolio / total balance sheet of clients for which a GHG footprint was calculated
2020	686	0.8	603	88.0	6.241	0.097
2022	548	0.6	517	94.3	6.145	0.084
2023	677	0.8	624	92.2	6.111	0.10

16.1.2 Financed GHG emissions

Table 16-2 shows the GHG footprint results for the drinking water companies in 2020, 2022 and 2023.

Table 16-2 Absolute and relative financed GHG emissions for the drinking water companies in 2020, 2022 and 2023

Scope	Financed GHG emissions (tonnes/year)			Financed GHG emissions (%)			Relative financed GHG emissions (tCO_2e/million euro)		
	2020	**2022**	**2023**	**2020**	**2022**	**2023**	**2020**	**2022**	**2023**
Scope 1	5,921	5,365	6,080	19.9	26.4	28.0	9.8	10.4	9.7
Scope 2	16,941	10,585	10,283	56.8	52.0	47.4	28.1	20.5	16.5
Scope 3	6,941	4,406	5,354	23.3	21.6	24.7	11.5	8.5	8.6
Total	**29,803**	**20,356**	**21,717**	**100.0***	**100.0***	**100.0***	**49.4**	**39.3**	**34.8**
Total scope 1 and 2	**22,862**	**15,950**	**16,363**	**76.7**	**78.3**	**75.3**	**37.9**	**30.9**	**26.2**

*The sum in these columns is not always exactly 100% due to rounding per sector

Between 2022 and 2023 the total financed GHG emissions increased by 1.361 tonnes. The percentage of outstanding loan volume / total balance sheet increased in comparison to 2022 (from 0.084 to 0.10). The latter may be one of the reasons the GHG emissions allocated to the BNG increased. However, the GHG emissions per drinking water company before attribution to BNG decreased between 2022 and 2023. The relative financed GHG emissions decreased by 4.5 tCO_2e per million euro between 2022 and 2023. In conclusion, the absolute GHG emissions increased for drinking water companies while the relative financed GHG emissions decreased.

As stated above, the GHG emissions per drinking water company before attribution to BNG decreased between 2022 and 2023, but there is still more to achieve. The primary task of the drinking water companies is to produce and deliver safe and reliable drinking water at acceptable costs. Some drinking water companies still rely on fossil fuel for purifying water and to prepare, transport, and distribute drinking water. To make the drinking water chain more sustainable, drinking water companies, water boards and municipalities need to work together.

Since this year (2023), avoided financed emissions are reported in Table 16-3. A comparison in time is not yet possible. The avoided financed emissions are from self-generated green electricity that is fed back into the grid. The financed captured emissions are the CO_2 emissions that are captured in the water softening installations[60]. This applies to drinking water companies that use surface water. These avoided and captured emissions are not included in the results in Table 16-2 but are reported separately in Table 16-3.

[60]Oesterholt, F., Van den Brand, T., De Kramer, D. (2023). Berekening CO_2-voetafdruk van drinkwaterbedrijven. KWR|PCD 11|december 2023.

Table 16-3 Avoided financed GHG emissions for the drinking water companies in 2023

Year	Financed avoided GHG emissions* (tonnes/year)	Relative financed avoided GHG emissions (tCO_2e/million euro)	Financed removals: GHG emissions captured in water softening installations (tonnes/year)	Relative financed removals: GHG emissions captured in water softening installations (tCO_2e/million euro)
2023	705	1.1	379	0.6

*Avoided GHG emissions are gross avoided GHG emissions. Data to calculate net avoided emissions were not available

16.2 Drinking water companies approach

16.2.1 Scope 1, 2, and 3

Adjustments in methodology

In comparison to last year, minor adjustments have been made to the methodology. These changes are implemented for the 2023 figures but have not been retroactively applied to the figures for previous years. The most significant adjustment is the inclusion of GHG emissions related to the purchase of drinking water and/or semi-finished products, if the purchase is made from a drinking water company outside BNG's loan portfolio. Last year, these purchases were not included. Another adjustment compared to last year is a more precise calculation of methane-related GHG emissions.

The methodology of the drinking water companies has a standard calculation approach[61]. This approach can be extended with extra options to be added to the calculation. Although this methodology to calculate the GHG footprint for drinking water companies is published, there are still differences in the way the different drinking water companies calculate their own GHG footprint. One could say that the standard calculation method is a golden mean but deviates from the real GHG footprint. For example, scope 3 is incomplete, and which emissions are included in scopes 1, 2 or 3 varies between the drinking water companies. Although there are shortcomings in the standard calculation methodology of the drinking water companies, the standard calculation methodology has been used for this report to be as close as possible to the working methods of the drinking water companies.

The components of the standard calculation are:

Scope 1

- CH_4 and CO_2 emissions during extraction and treatment of groundwater
- Emissions from the use of natural gas
- Emissions from the use of aggregates
- Emissions from company cars
- Emissions from own energy generation
- Since last year (2022), drinking water companies have been allowed to compensate scope 1 GHG emissions for the CO_2 that is captured in the water softening installations[62]. This applies to drinking water companies that using

[61] Oesterholt, F., Van den Brand, T., De Kramer, D. (2023). Berekening CO_2-voetafdruk van drinkwaterbedrijven. KWR|PCD 11|december 2023.
[62] Ibid.

surface water. In the current report, this captured CO_2 is excluded from the data as PCAF requires it to be reported separately from scopes 1, 2 and 3. Therefore, avoided emissions related to this activity are not part of the GHG emissions that are presented in Table 9-2, but are presented separately in Table 9-3.

Scope 2

- Indirect emissions for purchased energy.

Scope 3

- (Air) travel
- Chemicals
- Transport by third parties (suppliers of chemicals and materials)
- Transport of drinking water production residues
- Purchase of drinking water and/or semi-finished products if purchased from a drinking water company outside BNG's loan portfolio

There are two clear differences between the standard calculation method used by the drinking water companies and the PCAF methodology. The first difference is that the drinking water companies use the emission factors based on 'Well to Wheel' (WTW) for their calculations, whereas the PCAF methodology requires the use of the emission factors based on 'Tank to Wheel' (TTW).
The second difference is that the PCAF methodology requires the use of CO2emissiefactoren.nl to determine the emission factor to be used for green energy from abroad. CO2emissiefactoren.nl prescribes calculating the emission factor for grey electricity instead of zero emissions, as probably some drinking water companies do. For the methane emissions, some of the drinking water companies use 34 kg CO_2 per kg methane, whereas CO2emissiefactoren.nl prescribes to use 28 kg CO_2 per kg methane.

The data collection was collected in collaboration with Vewin.[63] Vewin collected data from the individual drinking water companies for a national and international benchmark based on the standard calculation method mentioned above. Vewin sent the data from this benchmark to the individual drinking water companies with the request to share their individual data with Het PON & Telos for this report. All individual drinking water companies were contacted by Het PON & Telos and asked to provide the additional data necessary to calculate the GHG footprint according to the PCAF methodology. These additional data were provided by four drinking water companies. Two companies only provided the Vewin benchmark data and one company provided their total GHG emissions per scope.

[63]Vewin is the association of drinking water companies in the Netherlands

General factsheet

Topic	Description
Scopes covered	For the drinking water companies approach scope 1, 2 and parts of scope 3 are covered.
Portfolio covered	The portfolio coverage ratio for this sector is 95.1%.
Data	Data to calculate the GHG emissions for scopes 1, 2 and 3 were obtained from Vewin (benchmark) and the individual drinking water companies. Total balance sheet data are taken from the annual reports of the drinking water companies. For one drinking water company the annual financial report was not available. The total balance sheet data of this drinking water company were requested from the drinking water company itself.
Grid emission factors	Section 2.4 provides further information on emission factors. The following emission factors from Table 2-4 were used: - Natural gas - Global warming potential methane - Average heating networks - Car (fuel and weight class unknown) - Public transport in general (traveled kms; type of transport unknown) - Petrol - Diesel - Biodiesel - Bio-CNG - Grey energy - Electricity from unknown sources - Air travel <700 km - Air travel 700-2500 km - Air travel >2500 km - Bulk goods, Truck, unit with semi-trailer heavy
Calculation steps	Scope 1 contains: - CH_4 and CO_2 emissions during extraction and treatment of groundwater - Emissions from the use of natural gas - Emissions from the use of aggregates - Emissions from company cars - Emissions from own energy generation Methane emissions released during aeration were multiplied by the global warming potential of methane (28 kg CO_2-eq / kg methane; CO2emissiefactoren.nl). The amount of natural gas used for heating was multiplied by the emission factor for natural gas. Emissions from the use of aggregates did not need to be calculated. To calculate the GHG emissions for the car fleet, the litres of fuel used were multiplied by the corresponding emission factor, or the kilometres driven were multiplied by the emission factor for a car of unknown fuel and weight class. No calculation was necessary for the two drinking water companies that only provided Vewin benchmark data. Self-generated energy for the drinking water companies is mainly produced by solar panels and the emission factor is 0. The GHG emissions of the individual scope 1 items were added together to calculate the total scope 1 GHG emissions. Scope 2 contains: - Indirect emissions for purchased energy. CO2emissiefactoren.nl prescribes the use of the emission factor for grey electricity to calculate the GHG emissions for the purchase of green electricity from abroad. The amount of electricity purchased from abroad and the amount of purchased grey electricity were multiplied by the emission factor for grey electricity. Zero emissions were included for green electricity purchased from the Netherlands.

	The GHG emissions of the individual scope 2 items were added together to calculate the total scope 2 GHG emissions. Scope 3 contains: - (Air) travel - Chemicals - Transport by third parties (suppliers of chemicals and materials) - Transport of drinking water production residues Purchase of drinking water and/or semi-finished products if purchased from a drinking water company outside BNG's loan portfolio. For air travel the number of kilometres was multiplied by the corresponding emission factor. No calculation could be made of the two drinking water facilities that provided only Vewin benchmark data. To calculate the GHG emissions for general public transport (train, metro, bus, tram), the number of kilometres travelled was multiplied by the corresponding emission factor for general public transport. To calculate the GHG emissions for car use – both business and commuting - the kilometres travelled were multiplied by the emission factor for a car of unknown fuel type and weight class. No calculation was required for the two drinking water companies that only provided Vewin benchmark data. Emission factors for chemicals are not described on CO2emissiefactoren.nl. Drinking water companies obtain the emission factors for chemicals from their suppliers or from another source. There is no insight into the details of chemical use of each drinking water company. Therefore, the $kgCO_2e$ for chemicals from the Vewin (benchmark) were used. It is possible that in some cases this also includes transport of chemicals, which could lead to double counting. The GHG emissions from the transport of chemicals and other materials by third parties were calculated by multiplying the tonne-kilometres by the emission factor for bulk and goods transport (bulk goods, truck, unit with semi-trailer heavy). The emission factor used was the one most frequently used by CO2emissiefactoren.nl. No calculation was necessary for the two drinking water companies that only supplied Vewin benchmark data. If the drinking water company purchases drinking water and/or semi-finished products from a drinking water company that is not in BNG's loan portfolio, the emissions associated with these purchases are included. No calculation was required for this step. The GHG emissions of the individual scope 3 items were added together to calculate the total scope 3 GHG emissions. One drinking water company only provided their total GHG emissions per scope, therefore these totals do not consist of individual items. After calculating scopes 1, 2, and 3 GHG emissions, these GHG emissions were multiplied by the ratio of outstanding loan to total balance sheet ratio per client. For example, if the ratio of outstanding loans to total balance sheet is 25%, 25% of the drinking water company's scope 1, 2, and 3 GHG emissions are attributed to BNG. The financed GHG emissions per company are added up to result in the total financed GHG emissions per sector. The financed GHG emissions and relative financed emissions are reported per scope. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume in million euro of the clients for which a GHG footprint was calculated in this report.
Avoided emissions	Drinking water companies make investments that result in avoided emissions. If a drinking water company generates its own green electricity and feeds it into the national grid, this is reported as avoided emissions. The electricity generated is multiplied by the emission factor for grey energy.

Asset class specific considerations	The approach for drinking water companies is in line with the public loan approach in the PCAF methodology.
Attribution	To calculate the GHG footprint according to the PCAF principles, a general approach has been developed. First, the GHG emissions, the avoided and removed GHG emissions the different entities in the sector are calculated. Then, BNG's share of the total balance sheet is used to determine the share of GHG emissions for which NWB Bank is responsible. $$\sum \boldsymbol{CO_2eq} \times \frac{\boldsymbol{Outstanding\ loan\ volume}}{\boldsymbol{Total\ balance\ sheet\ (equity + debt)}}$$ Finally, the individual scopes and the sum of the scopes of all individual organisations have been aggregated.
Absolute vs. relative emissions	For the drinking water companies, the total financed GHG emissions were calculated in tonnes. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume of the clients for which a GHG footprint was calculated in this report.
Limitations	The Dutch drinking water companies have published a methodology for calculating the GHG footprint.[64] This methodology is also based on the GHG Protocol. The methodology of the drinking water companies has a standard calculation approach. This approach can be extended with additional options that can be added to the calculation. Although this methodology for calculating the GHG footprint of drinking water companies has been published, there are still differences in the way the different drinking water companies calculate their own GHG footprint. One could say that the standard calculation method is a golden mean but deviates from the real GHG footprint. Scope 3, for example, is incomplete and which emissions are included in scope 1, 2 or 3 varies between the drinking water companies. A limitation is that two drinking water facilities did not share any additional data besides the Vewin benchmark data, and another drinking water company only shared the total GHG emissions per scope. These emissions are based on 'Well to Wheel' but lack the detailed information to calculate all the individual items in scopes 1, 2, and 3 based on 'Tank to Wheel'. It is not possible to make a good conversion factor based on the other drinking water companies to convert the GHG emissions based on 'Well to Wheel' to GHG emissions based on 'Tank to Wheel'. Therefore, the GHG emissions of these drinking water company were included in the calculation based on 'Well to Wheel' and results in an overestimation of the GHG emissions based on 'Tank to Wheel'. For fuel used by company cars, at least one drinking water facility explicitly mentioned that fuel for vessels is included. Other drinking water facilities may not report this. Scope 3 has several limitations. As mentioned earlier, the emission factors for chemicals are not described on CO2emissiefactoren.nl. Drinking water companies obtain the emission factors for chemicals from their suppliers or from another source. There was no insight into the chemical details of each drinking water company. Therefore, $kgCO_2e$ for chemicals was used, which was included in the data obtained from the Vewin benchmark. It is possible that in some cases this includes transport of chemicals, which could lead to double counting. For the transport of drinking water production residues and transport of third parties, there are several uncertainties. For this report, it is possible that a different emission factor has been used than that used by the drinking water companies, as there are several options on CO2emissiefactoren.nl in the category bulk and goods transport. It was decided to use the emission factor that CO2emissiefactoren.nl has identified as the most common.

[64] https://www.praktijkcodesdrinkwater.nl/opbrengst/klimaatneutraliteit/?search=klimaat

	There may also be differences in what the drinking water companies include in the transport of third parties. Some only include the transport of chemicals, others include more items. These details are not known. If the drinking water company purchases drinking water and/or semi-finished products from a drinking water company that is not in BNG's loan portfolio, the emissions related to these purchases are based on 'Well to Wheel' and result in an overestimation of the GHG emissions based on 'Tank to Wheel'. One of the drinking water companies in BNG's loan portfolio is owned by and operates for two other drinking water companies. The drinking water company supplies a semi-finished product to two other drinking water companies in BNG's portfolio. The GHG footprint of this drinking water company is included in these other drinking water companies. The loans to this drinking water company that supplies a semi-finished product to the other drinking water companies were allocated to these two drinking water companies based of the volume of water that was delivered to them compared to the total volume of water supplied to 4 clients (being the 2 drinking water companies and 2 other companies).
Data quality estimate	The GHG emissions were calculated based on data provided by the water companies themselves, but the data are not audited. Therefore, the data quality score for scopes 1 and 2 is 2. Scope 3 GHG emissions are less certain than for scopes 1 and 2 because some details are missing, e.g. distances traveled are known, but details on the means of transport are sometimes missing. Therefore, the data quality score is 3.

Factsheets per data source

Topic	Description
Data	Data used to calculate scopes 1, 2, and 3
Data file	Several Excel files
Data Source	Vewin and individual drinking water companies
Year	2023
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Original data: Werkmap\Waterleidingbedrijven\b. Ruwe data The original emails can be found in: Werkmap\Waterleidingbedrijven\i. Diversen\mails waterleidingbedrijven
Data quality	The GHG emissions were calculated based on data provided by the water companies themselves, but the data are not audited. Therefore, the data quality score for scopes 1 and 2 is 2. Scope 3 GHG emissions are less certain than for scopes 1 and 2 because some details are missing, e.g. distances traveled are known, but details on the means of transport are sometimes missing. Therefore, the data quality score is 3.
Unit of measurement	Several
Selections	Not applicable
Data transformation	Not applicable
Data missing	Some detailed data was missing. See calculation section in the general factsheet.
Print screens	Not applicable

Topic	Description
Data	Total balance sheet
Data files	Several annual reports
Data Source	Annual reports of the individual drinking water companies
Year	2023
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Original data: Werkmap\Waterleidingbedrijven\g. Jaarverslagen
Data quality	Score 1 Data received from drinking water companies. These data are audited by an external accountant.
Unit of measurement	Euro
Selections	Not applicable
Data transformation	Not applicable
Data missing	The total balance sheet of one drinking water company could not be found in the annual report. The data was received by email and was added to the Excel file of this drinking water company.
Print screens	Not applicable

List of the calculation sheets	Location
241015 Waterleidingbedrijven 2023 BNG.xlsx	Waterleidingbedrijven\f4. Berekening BNG

17 Public infrastructure: spatial planning

17.1 Results spatial planning

The spatial planning sector is a small sector within the loan portfolio of BNG. The sector accounts for 0.7% of BNG's loan portfolio.

Tables 17-1 and 17-2 show the results for the spatial planning sector in 2023. A comparison over time is not yet possible.

The relative financed GHG emissions (Table 17-2) show that the spatial planning sector is a GHG intensive sector because it is one of the four sectors with the highest relative financed GHG emissions in BNG's loan portfolio in 2023 (waste collection and processing, infrastructure, network operators (energy, telecom) and spatial planning. Scope 3 emissions are particularly high in the spatial planning sector (87.0% of total).

Table 17-1 Loan portfolio and coverage ratio of the spatial planning sector in 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients for which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)
2023	592	0.7	592	100.0

Table 17-2 Absolute and relative financed GHG emissions for the spatial planning sector in 2023

Scope	Financed GHG emission (tonnes/year)	Financed GHG emission (%)	Relative financed GHG emission (tCO_2e/million euro)
	2023	**2023**	**2023**
Scope 1	7,540	11.3	12.7
Scope 2	1,129	1.7	1.9
Scope 3	57,775	87.0	97.6
Total	**66,444**	**100.0***	**112.2**

*The sum in these columns is not always exactly 100% due to rounding per sector

17.2 Spatial planning approach

See for the spatial planning approach the general factsheet and factsheets per data source in section 13.2 (Public transport approach).

The coverage ratio for the spatial planning sector is 100%. For 100% of outstanding loans to this sector, GHG emissions were calculated based on the outstanding loan amount and an

emission factor. Therefore, the data quality score is 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.

For the spatial planning sector, the loans of this sector were selected from the loan portfolio of 31-12-2023.

List of the calculation sheets	Location
BNGDOCS-#3592573-v2-Emissies overige klanten kredietportefeuille.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank\Bestanden ontvangen van BNG Bank eigen berekeningen

18 Public infrastructure: network operators (energy, telecom)

18.1 Results network operators (energy, telecom)

The network operators (energy, telecom) are a small sector within the loan portfolio of BNG. The sector accounts for 0.6% of BNG's loan portfolio.

Tables 18-1 and 18-2 show the results for the network operators (energy, telecom) in 2023. A comparison over time is not yet possible.

The relative financed GHG emissions (Table 18-2) show that the network operators (energy, telecom) are a GHG intensive sector because it is one of the four sectors with the highest relative financed GHG emissions in BNG's loan portfolio in 2023 (waste collection and processing, infrastructure, network operators (energy, telecom) and spatial planning. Scope 1 emissions are particularly high in this sector (73.7% of total).

Table 18-1 Loan portfolio and coverage ratio of the network operators (energy, telecom) in 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients for which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)
2023	486	0.6	486	100.0

Table 18-2 Absolute and relative financed GHG emissions for the network operators (energy, telecom) in 2023

Scope	Financed GHG emission (tonnes/year)	Financed GHG emission (%)	Relative financed GHG emission (tCO_2e/million euro)
	2023	**2023**	**2023**
Scope 1	54,718	73.7	112.6
Scope 2	2,445	3.3	5.0
Scope 3	17,063	23.0	35.1
Total	**74,226**	**100.0***	**152.7**

*The sum in these columns is not always exactly 100% due to rounding per sector

18.2 Network operators (energy, telecom) approach

See for the network operators (energy, telecom) approach the general factsheet and factsheets per data source in section 13.2 (Public transport approach).

The coverage ratio for the network operators (energy, telecom) sector is 100%. For 13% of outstanding loans to this sector, GHG emissions were determined based on data from the client's own annual reports or other reports.

For 14% of outstanding loans to this sector, GHG emissions were calculated based on production data of heating networks. Data quality score is 3.

For 73% of outstanding loans to this sector, GHG emissions were calculated based on the outstanding loan amount and an emission factor. This results in data quality score 5, reflecting the exclusive use of sector-specific emission factors in the absence of borrower-specific information.

For the network operators (energy, telecom) sector, the loans of this sector were selected from the loan portfolio of 31-12-2023.

List of the calculation sheets	Location
BNGDOCS-#3592573-v2-Emissies overige klanten kredietportefeuille.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank\Bestanden ontvangen van BNG Bank eigen berekeningen

19 Others

19.1 Results other sectors

The sector 'others' is a small sector within the loan portfolio of BNG. The sector accounts for 0.3% of BNG's loan portfolio.

Tables 19-1 and 19-2 show the results for the sector 'others' in 2023. A comparison over time is not yet possible.

Table 19-1 Loan portfolio and coverage ratio of the sector 'others' in 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients for which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)
2023	281	0.3	281	100.0

Table 19-2 Absolute and relative financed GHG emissions for the sector 'others' in 2023

Scope	Financed GHG emission (tonnes/year)	Financed GHG emission (%)	Relative financed GHG emission (tCO_2e/million euro)
	2023	**2023**	**2023**
Scope 1	15,478	68.1	55.1
Scope 2	714	3.1	2.5
Scope 3	6,525	28.7	23.2
Total	**22,717**	**100.0***	**80.7**

*The sum in these columns is not always exactly 100% due to rounding per sector

19.2 Other sectors approach

See for the other sectors approach the general factsheet and factsheets per data source in section 5.2 (Housing related approach). The coverage ratio for sector 'others' is 100%. For the sector 'others', the loans of this sector were selected from the loan portfolio of 31-12-2023.

List of the calculation sheets	Location
BNGDOCS-#3592573-v2-Emissies overige klanten kredietportefeuille.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank\Bestanden ontvangen van BNG Bank eigen berekeningen

20 Energy: renewable energy

The energy sector includes the subsectors: biomass, geothermal, wind, solar and some other clients. Only the wind and solar sub-sectors are included in this chapter.

These sub-sectors are very important for the energy transition and the reduction of greenhouse gas emissions. Investments in these sub-sectors will contribute to the greening of our national electricity grid. This chapter contains the financed GHG emissions from this sector during the production, installation, maintenance and dismantling of wind turbines and solar panels. These GHG emissions are not released gradually over the course of a year, but at specific times during their lifetime. However, they are converted to an annual basis in this report. In addition, this chapter also contains the financed avoided emissions of wind- and solar parks. Net avoided emissions are the gross avoided emissions minus emissions generated during production, installation, maintenance and dismantling.

20.1 Results Wind energy

The wind energy sector represents a share of 0.5% within BNG's loan portfolio.

20.1.1 Coverage ratio and attribution

For the wind energy sector in BNG's loan portfolio the coverage ratio of the GHG footprint is 100%. On average, BNG finances 11% of the total assets of its clients in the wind energy sector for which GHG data was available. This means that 11% of the avoided emissions generated by these clients can be attributed to BNG.

Table 20-1 Loan portfolio, coverage ratio and ratio loan portfolio versus total balance sheet, for the wind energy sector in 2023

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients for which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)	Total balance sheet of clients for which a GHG footprint was calculated (million euro)	Ratio loan portfolio / total balance sheet of clients for which a GHG footprint was calculated
2023	403	0.5	403	100	3,667	0.11

20.1.2 Financed GHG emissions

Total GHG emissions for all wind parks for production, installation, maintenance and dismantling were 7,504 tonnes for 2023. Total gross avoided emissions for all wind parks were 332,089 tonnes for 2023. This results in net avoided emissions of 324,585 tonnes CO_2e for 2023.

Table 20-2 Financed GHG emissions for the production, installation, maintenance and dismantling of wind parks and the gross and net avoided emissions by these wind parks

Source of emissions	Financed GHG emission (tonnes/year)
	2023
Generated emissions during production, installation, maintenance, dismantling	7,504
Gross avoided emissions	332,089
Net avoided emissions	324,585

20.2 Wind energy sector approach

General factsheet

Topic	Description
Scopes covered	Scope 3 This chapter only contains the financed GHG emissions from this sector during the production, installation, maintenance and dismantling of wind turbines. These GHG emissions are not released gradually over the course of a year, but at specific times during their lifetime. However, they are calculated and reported on an annual basis in this report. In addition, this chapter also contains the financed avoided emissions of wind parks.
Portfolio covered	The wind energy coverage ratio for 2023 is 100%.
Data	Data on actual energy production in 2023, type of wind turbines and total balance sheet were obtained from BNG. Data on GHG emissions from production, installation, maintenance and dismantling were obtained from the wind turbine manufacturers or, where this information was not available, from the scientific literature.
Grid emission factors	The emission factor used to calculate the gross avoided GHG emissions is based on grey energy 'Well to Wheel' (WTW) of 0.456 $kgCO_2e$ /kWh in 2023.
Calculation steps	First, the GHG emissions for production, installation, maintenance and dismantling were calculated using actual production in 2023. The actual production was multiplied by an emission factor that indicates how many emissions are released per kWh produced for production, installation, maintenance and dismantling. This emission factor was taken from the LCA of the wind turbine in question where possible, otherwise a general emission factor based on scientific literature was used. This resulted in the GHG emissions for production, installation, maintenance and dismantling. Second, the avoided GHG emissions were calculated. To calculate the avoided GHG emissions, the actual energy production in 2023 was multiplied by the "Well to Wheel" emission factor for grey electricity. This gives the total avoided emissions in 2023. After calculating the GHG emissions and the avoided GHG emissions, these GHG emissions were multiplied by the ratio of outstanding loan to total balance sheet ratio per client. For example, if the ratio of outstanding loans to total balance sheet is 25%, 25% of the emissions are attributed to BNG. The financed GHG emissions per client are added up to result in the total financed GHG emissions per sector. The financed GHG emissions and relative financed emissions are reported per scope. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume in million euro of the clients for which a GHG footprint was calculated in this report.
Avoided emissions	See Table 13-2
Asset class specific considerations	For the wind energy sector, the methodology of asset class 'Project finance' is followed.

Attribution	To calculate the GHG footprint according to the PCAF principles, a general approach has been developed. First, the GHG emissions of the different entities in the sector are calculated. Then, BNG's share of the total balance sheet is used to determine the share of GHG emissions for which BNG is responsible. $$\sum \boldsymbol{CO_2eq} \times \frac{\boldsymbol{Outstanding\ loan\ volume}}{\boldsymbol{Total\ balance\ sheet\ (equity + debt)}}$$ Finally, the individual scopes and the sum of the scopes of all individual wind parks were aggregated.
Absolute vs. relative emissions	For the wind energy sector, the total financed GHG emissions and avoided GHG emissions were calculated in tonnes. The relative financed GHG emissions and avoided GHG emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume of the clients for which a GHG footprint was calculated in this report.
Limitations	For some wind turbines, the GHG emissions in grams per kWh for production, installation, maintenance and dismantling were not known. In this case, data from the scientific literature was used to determine the best value to use.
Data quality estimate	Score 3 GHG emissions are calculated based on energy production data received from the wind parks themselves, but the data is not verified. Information on GHG emissions for production, installation, maintenance and dismantling is mainly obtained from scientific literature. Therefore, the data quality score is 3.

Factsheets per data source

Topic	Description
Data	Energy production, total balance sheet and type of wind turbines
Data file	BNGDOCS-#3566256-v2-Windparken_per_31-12-2023.xlsx
Data Source	BNG
Year	2023
Last update	Not applicable
Email received	Data windparken BNG Bank 2023.msg
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Werkmap\Wind- en zonneparken\BNG Bank\b. Ruwe data Werkmap\Wind- en zonneparken\BNG Bank\i. Diversen\Ontvangen emails
Data quality	Score 2 The data are not audited, but data comes from the wind parks themselves.
Unit of measurement	Energy production: kWh Total balance sheet: Euro
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	GHG emissions for production, installation, maintenance and dismantling
Data file	Several files
Data Source	Several sources
Year	Several years
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable

Filters used to obtain the datafile	Not applicable
Internal location	Werkmap\Wind- en zonneparken\BNG Bank\i. Diversen\Literatuur Windparken
Data quality	Score between 2 and 3. Some information is specific to wind turbines (LCA) (score 2) and some is not (scientific literature) (score 3).
Unit of measurement	gCO_2e / kWh
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

List of the calculation sheets	Location
241031_Berekening_Windparken_BNG_2023.xlsx	Werkmap\Wind- en zonneparken\BNG Bank\f4. Berekening BNG

20.3 Results Solar energy

The solar energy sector represents a share of 0.3% within BNG's loan portfolio.

20.3.1 Coverage ratio and attribution

For the solar energy sector in BNG's loan portfolio the coverage ratio of the GHG footprint is 45%. On average, BNG finances 67% of the total assets of its clients in the solar energy sector for which GHG data was available. This means that 67% of the avoided emissions generated by these clients can be attributed to BNG.

Table 20-3 Loan portfolio, coverage ratio and ratio loan portfolio versus total balance sheet, for the solar energy sector in 2023

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loans of clients for which a GHG footprint was calculated (million euro)	Coverage ratio of total loan portfolio (%)	Total balance sheet of clients for which a GHG footprint was calculated (million euro)	Ratio loan portfolio / total balance sheet of clients for which a GHG footprint was calculated
2023	287	0.3	130	45	194	0.67

20.3.2 Financed GHG emissions

Total GHG emissions for all solar parks for production, installation, maintenance and dismantling were 5,368 tonnes for 2023. Total gross avoided emissions for the solar parks included in the calculation were 61,193 tonnes for 2023. This results in net avoided emissions of 55,825 tonnes CO_2e for 2023.

Table 20-4 Financed GHG emissions for the production, installation, maintenance and dismantling of solar parks and the gross and net financed avoided emissions by these solar parks

Source of emissions	Financed GHG emission (tonnes/year)
	2023
Generated emissions during production, installation, maintenance, dismantling	5,368
Gross avoided emissions	61,193
Net avoided emissions	55,825

20.4 Solar energy sector approach

General factsheet

Topic	Description
Scopes covered	Scope 3 This chapter only contains the financed GHG emissions from this sector during the production, installation, maintenance and dismantling of solar panels. These GHG emissions are not released gradually over the course of a year, but at specific times during their lifetime. However, they are calculated and reported on an annual basis in this report. In addition, this chapter also contains the financed avoided emissions of solar parks.
Portfolio covered	The solar energy coverage ratio for 2023 is 45%.
Data	Data on actual energy production in 2023 and total balance sheet were obtained from BNG. Data on GHG emissions from production, installation, maintenance and dismantling were obtained from scientific literature.
Grid emission factors	The emission factor used to calculate the gross avoided GHG emissions is based on grey energy 'Well to Wheel' (WTW) of 0.456 kgCO_2e /kWh in 2023.
Calculation steps	First, the GHG emissions for production, installation, maintenance and dismantling were calculated using actual production in 2023. The actual production was multiplied by an emission factor that indicates how many emissions are released per kWh produced for production, installation, maintenance and dismantling. This emission factor was taken from scientific literature. This resulted in the GHG emissions for production, installation, maintenance and dismantling. Second, the avoided GHG emissions were calculated. To calculate the avoided GHG emissions, the actual energy production in 2023 was multiplied by the "Well to Wheel" emission factor for grey electricity. This gives the total avoided emissions in 2023. After calculating the GHG emissions and the avoided GHG emissions, these GHG emissions were multiplied by the ratio of outstanding loan to total balance sheet ratio per client. For example, if the ratio of outstanding loans to total balance sheet is 25%, 25% of the emissions are attributed to BNG. The financed GHG emissions per client are added up to result in the total financed GHG emissions per sector. The financed GHG emissions and relative financed emissions are reported per scope. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume in million euro of the clients for which a GHG footprint was calculated in this report.
Avoided emissions	See Table 14-2
Asset class specific considerations	For the solar energy sector, the methodology of asset class 'Project finance' is followed.
Attribution	To calculate the GHG footprint according to the PCAF principles, a general approach has been developed. First, the GHG emissions of the different entities in the sector are

	calculated. Then, BNG's share of the total balance sheet is used to determine the share of GHG emissions for which BNG is responsible. $$\sum CO_2eq \times \frac{Outstanding\ loan\ volume}{Total\ balance\ sheet\ (equity + debt)}$$ Finally, the individual scopes and the sum of the scopes of all individual wind parks were aggregated.
Absolute vs. relative emissions	For the solar energy sector, the total financed GHG emissions and avoided GHG emissions were calculated in tonnes. The relative financed GHG emissions and avoided GHG emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume of the clients for which a GHG footprint was calculated in this report.
Limitations	For the solar panels, the GHG emissions in grams per kWh for production, installation, maintenance and dismantling were not known. Data from scientific literature was used to determine the best value to use.
Data quality estimate	Score 3 GHG emissions are calculated based on energy production data received from the wind parks themselves, but the data is not verified. Information on GHG emissions for production, installation, maintenance and dismantling is obtained from scientific literature. Therefore, the data quality score is 3.

Factsheets per data source

Topic	Description
Data	Energy production and total balance sheet
Data file	BNGDOCS-#3588621-v1-Productiedata_zonneparken_2023.xlsx
Data Source	BNG
Year	2023
Last update	Not applicable
Email received	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Werkmap\Wind- en zonneparken\BNG Bank\b. Ruwe data
Data quality	Score 2 The data are not audited, but data comes from the solar parks themselves.
Unit of measurement	Energy production: MWh Total balance sheet: Euro
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	GHG emissions for production, installation, maintenance and dismantling
Data file	Several files
Data Source	Several sources
Year	Several years
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Werkmap\Wind- en zonneparken\BNG Bank\i. Diversen\Literatuur Zonnepanelen

Data quality	Score 3. All information is from scientific literature
Unit of measurement	gCO_2e / kWh
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

List of the calculation sheets	Location
241204_Berekening_Zonneparken_BNG_2023.xlsx	Werkmap\Wind- en zonneparken\BNG Bank\f4. Berekening BNG

21 Total GHG footprint for BNG's loan portfolio for 2018, 2022 and 2023

21.1 Coverage ratio by a GHG footprint

In summary, Table 21-1 shows the overview of outstanding loan volume per sector and subsector and the coverage ratio for 2018, 2022 and 2023.

Table 21-1 Total outstanding loans of BNG and part covered in the GHG assessment for the years 2018, 2022 and 2023[65]

Market segment	Sector	Total loan portfolio (million euro)			Coverage ratio by GHG footprint of total loan portfolio (%)		
		2018	**2022^**	**2023**	**2018**	**2022**	**2023**
Housing	Social housing associations*	38,947	44,118	45,957	94.0	96.8	100.0
	Housing related	496	715	784	0.0	0.0	100.0
Public sector	Municipalities*	26,066	25,765	25,104	99.6	100.0	100.0
	Provinces	137	421	449	100.0	100.0	100.0
	Water boards	233	197	220	100.0	100.0	100.0
	Joint arrangements	1,362	1,270	1,303	0.0	2.8	100.0
	Other public institutions	768	560	510	0.0	0.0	100.0
Healthcare	Healthcare*	7,031	6,724	6,629	87.7	95.7	100.0
Education	Educational institutions*	979	1,057	1,035	54.2	62.2	100.0
Public infrastructure	Public transport	909	986	1,153	0.0	27.7	100.0
	Infrastructure	1,220	1,126	1,028	72.6	71.4	100.0
	Waste collection and processing	754	710	697	0.0	0.0	100.0
	Drinking water companies#	811	548	677	0.0	94.3	92.2
	Spatial planning	754	631	592	0.0	0.0	100.0
	Network operators (energy, telecom)	451	603	486	0.0	0.0	100.0
Others	Others	381	317	281	0.0	18.3	100.0
Energy	Renewable energy	309	867	808	0.0	0.0	65.9
	Sustainability projects	19	48	52	0.0	0.0	0.0
Total		**81,628**	**86,664**	**87,767**	**86.4**	**89.8**	**99.6**

^The current report does not include data for 2019, 2020, and 2021. It is decided to calculate 3 years: the reference year (2018) and the two most recent years, 2022 and 2023.

#For drinking water companies, the reference year is not 2018, but 2020. Sector specific data is presented in chapter 16.

Between 2022 and 2023, the loan portfolio increased by 1.103 million euros. The part of the loan portfolio covered with a GHG footprint has increased compared to 2022 (from 77,848 million euro in 2022 to 87,388 million euro in 2023; Table 21-2). The coverage ratio of the GHG footprint increased by 9.8%pt to 99.6%. This increase in coverage ratio is due to an improved

[65]Reference date for the year 2023 is 31-12-2023, reference date for the year 2022 is 31-12-2022, and reference date for the year 2018 is 31-12-2018.

coverage ratio within sectors such as social housing, healthcare and education, but also new sectors have been added. The data used to calculate the GHG footprint from new sectors came from (annual) reports from the clients themselves or the GHG footprint was calculated based on outstanding loan amounts or revenue using a sector-specific emission factor. Calculating the GHG footprint based on outstanding loans or revenue is less accurate and is of poorer data quality. The GHG footprint is now more complete, but a challenge remains to improve the data quality in the coming years. Although the coverage ratio for 2023 is 99.6%, not all sectors in Table 21-2 include scope 1, 2 and 3 emissions (see Appendix A). Where scope 3 emissions are included, these are not always complete, for instance, in sectors such as healthcare.

21.2 Financed GHG emissions of BNG's loan portfolio

The GHG footprint results for the total outstanding loans of BNG in 2018, 2022 and 2023 are shown in Table 21-2.

The absolute GHG emissions presented in Table 21-2 depend on the following factors:

- Loan volume
- Coverage ratio
- Completeness of the scopes
- Ratio outstanding loan / total balance sheet (attribution to BNG)
- Emission factors
- Change in methodology that cannot be applied retrospectively
- Absolute GHG emissions of the clients (behavior/decisions/size of building).

Table 21-2 shows that for 99.6% of BNG's loan portfolio, the total financed GHG emissions are 2,445,423 tCO_2e, the relative financed GHG emissions are 28.2 tCO_2e per million euro and the overall data quality score is 2.8 on a scale of 1 (best) to 5 (poor).
Due to the addition of new sectors in this year's report and an overall increase in coverage ratio of 9.8%pt, the absolute and relative financed GHG emissions cannot be compared with previous years. To be able to compare the GHG footprint between 2022 and 2023, an extra row called 'sectors in scope in 2022' has been added to Table 21-2. This comparison shows that the financed GHG emissions decreased by 12,855 tCO_2e and the relative financed GHG emissions decreased by 1.1 tCO_2e/million (Table 21-2). This shows that for the majority of the loan portfolio (92%), the absolute and relative financed GHG emissions decreased between 2022 and 2023. The same picture emerges when comparing scope 1 and 2 of the sectors for which BNG has set targets in their climate action plan (Table S-2: social housing, municipalities, healthcare and education). This is supported by the figures for financed GHG emissions per financed m^2 for these four sectors (see the individual chapters). The social housing sector has the lowest financed GHG emissions per financed m^2 (22.0 $kgCO_2e/m^2$; 2023) and the healthcare institutions have the highest (72.4 $kgCO_2e/m^2$; 2023). For all four sectors, financed GHG emissions per financed m^2 have decreased over time.

Table 21-2 Absolute and relative financed GHG emissions for the years 2018, 2022 and 2023

Market segment	Sector ^	Scope#	Loans of clients for which a GHG footprint was calculated (million euro)			Financed GHG emissions (tCO_2e)			Relative financed GHG emissions (tCO_2e/million euro)			Data quality **
			2018	**2022^**	**2023**	**2018**	**2022**	**2023**	**2018**	**2022**	**2023**	**2023**
Housing	Social housing associations*	1-2	36,617	42,688	45,957	635,242	492,426	458,990	17.3	11.5	10.0	2.0
	Housing related	1-2-3	0	0	784	-	-	5,395	-	-	6.9	5.0
Public sector	Municipalities*	1-2-3	25,973	25,765	25,104	1,078,520	881,339	913,282	41.5	34.2	36.4	3.7
	Provinces	1-2-3	137	421	449	8,703	16,537	12,546	63.6	39.2	27.9	4.0
	Water boards	1-2-3	233	197	220	33,677	15,675	14,244	144.4	79.4	64.7	2.8
	Joint arrangements	1-2-3	0	36	1,303	-	513	86,175	-	14.2	66.1	5.0
	Other public institutions	1-2-3	0	0	510	-	-	32,008	-	-	62.7	5.0
Healthcare	Healthcare*	1-2-3	6,167	6,432	6,629	285,245	207,946	199,885	46.3	32.3	30.2	3.2
Education	Educational institutions*	1-2	531	657	1,035	15,923	12,919	13,679	30.0	19.7	13.2	3.4
Public infrastructure	Public transport	1-2-3	0	273	1,153	-	1,099	16,592	-	4.0	14.4	3.6
	Infrastructure	1-2-3	885	804	1,028	14,017	120,520	237,024	15.8	149.9	230.6	3.8
	Waste collection and processing	1-2-3	0	0	697	-	-	270,500	-	-	387.8	2.0
	Drinking water companies	1-2-3	0	517	624	-	20,356	21,717	-	39.3	34.8	2.2
	Spatial planning	1-2-3	0	0	592	-	-	66,444	-	-	112.2	5.0
	Network operators (energy, telecom)	1-2-3	0	0	486	-	-	74,226	-	-	152.7	4.2
Others	Others	1-2-3	0	58	281	-	214	22,717	-	3.7	80.7	5.0
Energy	Renewable energy##	3	0	0	533	-	-	-	-	-	-	-
Total	**All Sectors**		**70,542**	**77,848**	**87,388**	**2,071,328**	**1,769,542**	**2,445,423**	**29.4**	**22.7**	**28.2**	**2.8**
Total	**Sectors in scope in 2022^^**			**76,677**	**80,019**		**1,647,196**	**1,634,343**		**21.5**	**20.4**	

^In current report, data of the years 2019, 2020 and 2021 are not included. It is decided to calculate 3 years: the reference year (2018) and the two most recent years, 2022 and 2023 current report.
#This column presents which sectors contain only scope 1 and 2 and which sectors contain (parts of) scope 3 in 2023.
**Weighted average data quality score. More details about the data quality score can be found in section 2.3.
^^Social housing, municipalities, provinces, water boards, healthcare, education and drinking water companies.
Net avoided emissions have been calculated for wind and solar farms but are not included in this table because generated and avoided emissions may not be added together.

Most of the newly added sectors have high financed GHG emissions per million euro (relative GHG emissions). This is partly because these sectors all report (part of) their scope 3 GHG emissions, which is not yet the case for the social housing and education sectors which have been calculated since 2019. The three newly added sectors with the highest relative financed GHG emissions are: waste collection and processing, infrastructure and network operators (energy, telecom). Together, these sectors cover only 2.5% of BNG's loan portfolio, but the financed GHG emissions per million euro are 263 tCO_2e. For some of the new sectors, scope 1 or 3 emissions are particularly high, while scope 2 emissions are relatively low. For the new sectors, BNG's aim is to improve data quality in the coming years and to monitor whether GHG emissions per million euro are decreasing.

As mentioned in section 2.3, the data quality score for scope 3 is mostly 4 or 5. Therefore, the data used to calculate scope 3 financed GHG emissions are of lower quality than the data used to calculate scope 1 and 2 financed GHG emissions. For this reason, Table 21-3 shows the financed GHG emissions for scopes 1 and 2 separately from scope 3. For all three years, scope 1 and 2 financed GHG emissions account for between 53% and 60% of total financed GHG emissions.

Table 21-3 Absolute and relative financed GHG emissions divided in the different scopes for the years 2018, 2022 and 2023

Market segment	Sector	Financed GHG emissions (tCO_2e)			Relative financed GHG emissions (tCO_2e/million euro)		
		2018	**2022**	**2023**	**2018**	**2022**	**2023**
		Scopes 1 and 2					
Housing	Social housing associations	635,242	492,425	458,990	17.3	12.5	10.0
	Housing related	-	-	1,031	-	-	1.3
Public sector	Municipalities	287,454	220,953	237,308	11.1	8.6	9.5
	Provinces	445	782	721	3.3	1.9	1.6
	Water boards	30,354	13,935	12,314	130.2	70.6	56.0
	Joint arrangements[#]	-	209	33,458	-	5.8	25.7
	Other public institutions	-	-	12,334	-	-	24.2
Healthcare	Healthcare	232,187	180,160	171,137	37.6	28.0	25.8
Education	Educational institutions	15,923	12,919	13,679	30.0	19.7	13.2
Public infrastructure	Public transport[#]	-	495	6,447	-	1.8	5.6
	Infrastructure[#]	14,017	8,279	31,955	15.8	10.3	31.1
	Waste collection and processing	-	-	250,290	-	-	358.9
	Drinking water companies	-	15,950	16,363	-	30.9	26.2
	Spatial planning	-	-	8,669	-	-	14.6
	Network operators (energy, telecom)	-	-	57,163	-	-	117.6
Others	Others[#]	-	69	16,192	-	1.2	57.5
Total scopes 1 and 2		**1,215,621**	**946,176**	**1,328,052**	**17.2**	**12.2**	**15.2**

Market segment	Sector	Financed GHG emissions (tCO_2e)			Relative financed GHG emissions (tCO_2e/million euro)		
		2018	**2022**	**2023**	**2018**	**2022**	**2023**
		Scope 3					
Housing	Social housing associations	-	-	-	-	-	-
	Housing related	-	-	4,364	-	-	5.6
Public sector	Municipalities	791,066	660,386	675,974	30.5	25.6	26.9
	Provinces	8,258	15,754	11,825	60.3	37.4	26.3
	Water boards	3,324	1,740	1,930	14.2	8.8	8.8
	Joint arrangements[#]	-	304	52,717	-	8.4	40.4
	Other public institutions	-	-	19,674	-	-	38.6
Healthcare	Healthcare	53,058	27,787	28,748	8.6	4.3	4.3
Education	Educational institutions	-	-	-	-	-	-
Public infrastructure	Public transport[#]	-	604	10,145	-	2.2	8.8
	Infrastructure[#]	-	112,241	205,068	-	139.6	199.5
	Waste collection and processing	-	-	20,209	-	-	29.0
	Drinking water companies	-	4,406	5,354	-	8.5	8.6
	Spatial planning	-	-	57,775	-	-	97.5
	Network operators (energy, telecom)	-	-	17,063	-	-	35.1
Others	Others[#]	-	145	6,525	-	2.5	23.2
Total scope 3		**855,706**	**823,367**	**1,117,371**	**12.1**	**10.6**	**12.9**

*GHG emissions for infrastructure for 2018 cannot be divided into scopes 1, 2 and 3. Thise GHG emissions are included in scopes 1 and 2.

[#] For 2022, GHG emissions for joint arrangements, public transport, infrastructure and sector 'others' have been allocated to scopes 1, 2 and 3 based on the allocation for the year 2023.

BNG finances renewable energy projects such as wind- and solar parks. These projects displace emissions that would otherwise have occurred without these projects. The net avoided emissions (gross avoided emissions - GHG emissions for production, installation, maintenance and dismantling) of these projects demonstrate a quantifiable positive contribution to decarbonisation. The net financed avoided GHG emissions were calculated for 65.9% of the renewable energy sector in BNG's loan portfolio in 2023, and this net financed avoided GHG emissions are 15.6% of the financed generated GHG emissions (380,410 tCO_2e avoided versus 2,445,423 tCO_2e generated). In addition, this year it is also known which housing associations and drinking water companies generate their own green electricity and which part of it they feed back into the public grid. As avoided emissions should be reported separately, these figures are shown separately in Table 21-4.

Table 21-4 Absolute and relative financed avoided GHG emissions for 2023

Market segment	Sector	Loans of clients for which a GHG footprint was calculated (million euro)	Financed avoided GHG emissions (tCO_2e)*	Relative financed avoided GHG emissions (tCO_2e/million euro)	Data quality**
		2023	**2023**	**2023**	
Housing	Social housing associations	45,957	15,141	0.3	2.0
Public infrastructure	Drinking water companies	624	705	1.1	2.0
Energy	Renewable energy	533	380,410	714.3	3.0
Total	**All sectors**	**47,114**	**396,256**	**8.4**	

*GHG emissions from renewable energy are net avoided emissions, but for social housing associations and drinking water companies GHG emissions are gross avoided emissions as data to calculate net avoided emissions were not available.

**More details about the data quality score can be found in section 2.3.

External factors will always have an impact on GHG emissions. In the last five years, events such as the COVID-19 crisis and the conflicts in the world have affected energy prices, energy consumption and travel patterns. Changes in weather conditions, especially in winter, can have an impact on GHG emissions. The energy consumption of social housing associations, municipalities, healthcare and education institutions has been corrected for weather conditions. In other sectors, the figures are not adjusted for weather conditions. Rainfall affects, for example, the energy consumption of water boards. Long term monitoring of the GHG footprint of BNG's loan portfolio will show whether the reduction is temporary, e.g. due to external factors, or whether it is a long-term positive development due to structural changes in behavior or investments in sustainable energy sources and/or investments in more sustainable real estate.

This year, 99.6% of BNG's loan portfolio is included in the GHG footprint. The significant increase in the coverage ratio complicates year-over-year comparison. Now that the coverage ratio is close to 100%, the focus in the coming years will be more on improving data quality and making scope 3 more complete. This improvement will also affect comparability with previous years, but the most important aim is to have the GHG footprint as complete as possible and to reduce it.

22 Total GHG footprint of BNG's bonds and medium term notes for 2022 and 2023

BNG not only finances organisations through loans, but also through marketable debt securities. This year, for the first time, financed GHG emissions were calculated for the bond and medium term notes portfolio. This was achieved for 48% of this portfolio. This chapter presents the financed GHG emissions from its bonds and medium term notes.

22.1 Coverage ratio by a GHG footprint

BNG holds debt securities of sovereigns and supranationals and multilateral development banks, municipalities, public infrastructure and others. Table 22-1 shows the outstanding amounts and coverage ratio of the GHG footprint of the bonds and medium term notes issued by sovereigns and supranationals and multilateral development banks. Table 22-1 shows this for the bonds and medium term notes issued by municipalities, public infrastructure and others. For all bonds and medium term notes except for municipalities, the outstanding amounts increased between 2022 and 2023 (Table 22-1 and 22-2).

The coverage ratio of the GHG footprint of the bonds and medium term notes issued by sovereigns and supranationals and multilateral development banks is 87.1% for 2023 (Table 22-1). For these bonds and medium term notes the total outstanding amounts for which a GHG footprint was calculated increased by 3,146 million euro.

Table 22-1 Total outstanding bonds and medium term notes issued by sovereigns and supranationals and multilateral development banks and part covered in the GHG assessment for the years 2022 and 2023[66]

Bonds and medium term notes	Total bonds and medium term notes (million euro)		Coverage ratio by GHG footprint of total bonds (%)	
	2022	**2023**	**2022**	**2023**
Sovereigns	3,294	3,808	100.0	100.0
Supranationals and Multilateral development banks	2,785	5,462	58.7	78.1
Total	**6,079**	**9,270**	**81.1**	**87.1**

The coverage ratio of the GHG footprint of the bonds and medium notes issued by municipalities, public infrastructure and others is 15.2% for 2023 (Table 22-2). For these bonds and medium term notes the total outstanding amounts for which a GHG footprint was calculated increased by 20 million euro.

[66]Reference date for the year 2023 is 31-12-2023 and reference date for the year 2022 is 31-12-2022.

Table 22-2 Total outstanding bonds and medium term notes issued by municipalities, public infrastructure and others and part covered in the GHG assessment for the years 2022 and 2023[67]

Bonds and medium term notes	Total bonds and medium term notes (million euro)		Coverage ratio by GHG footprint of total bonds (%)	
	2022	**2023**	**2022**	**2023**
Municipalities	1,297	1,247	100.0	100.0
Public infrastructure	336	436	100.0	100.0
Others	8,971	9,410	0.0	0.0
Total	**10,603**	**11,093**	**15.4**	**15.2**

22.2 Financed GHG emissions of BNG's bonds and medium term notes

Total financed GHG emissions for the bonds and medium term notes issued by sovereigns and supranationals and multilateral development banks are 1,889,958 tCO_2e, the relative financed GHG emissions are 234.1 tCO_2e per million euro and the overall data quality score is 3.8 on a scale of 1 (best) to 5 (poor). Total financed GHG emissions increased by 565,112 tCO_2e between 2022 and 2023 (Table 22-3). For the sovereigns, all three scopes increased between 2022 and 2023. For the supranational and multilateral development banks, only scope 1 is shown in Table 22-3. Total relative financed GHG emissions excluding and including LULUCF decreased by 34.7 tCO_2e per million euro and 35.9 tCO_2e per million euro, respectively between 2022 and 2023 (Table 22-3). This shows that GHG emissions per million euro have reduced. These bonds and medium term notes are relatively CO_2 intensive (relatively high CO_2e per million euros). It will be interesting to see if this will be reduced in the coming years.

Table 22-3 Absolute and relative financed GHG emissions for bonds and medium term notes issued by sovereigns and supranationals and multilateral development banks in the years 2022 and 2023

Bonds and medium term notes	Scopes	Bonds and medium term notes for which a GHG footprint was calculated (million euro)		Financed GHG emissions (tCO_2e)		Relative financed GHG emissions (tCO_2e/million euro)		Data quality **
		2022	**2023**	**2022**	**2023**	**2022**	**2023**	**2023**
Sovereigns excl. LULUCF	1-2-3	3,294	3,808	1,038,470	1,159,639	315.3	304.5	2.5
Supranationals and Multilateral development banks excl. LULUCF	1	1,634	4,266	286,376	730,319	175.3	171.2	5.0
Total excl. LULUCF		**4,928**	**8,074**	**1,324,846**	**1,889,958**	**268.8**	**234.1**	**3.8**
Sovereigns incl. LULUCF*	1-2-3	3,294	3,808	1,016,476	1,136,087	308.6	298.3	
Supranationals and Multilateral development banks incl. LULUCF	1	1,634	4,266	261,176	667,603	159.8	156.5	
Total incl. LULUCF		**4,928**	**8,074**	**1,277,652**	**1,803,689**	**259.3**	**223.4**	

[67] Ibid.

*LULUCF is Land Use, Land Use Change and Forestry. LULUCF is the only sector where net removal of CO_2 from the atmosphere is possible through carbon sequestration in biomass (wood, plants) and soil. In this table, GHG emissions including LULUCF are therefore lower than those excluding LULUCF.

Total financed GHG emissions for the bonds and medium term notes issued by municipalities and public infrastructure are 94,977 tCO_2e, the relative financed GHG emissions are 56.4 tCO_2e per million euro and the overall data quality score is 3.1 on a scale of 1 (best) to 5 (poor). Total financed GHG emissions increased by 7,607 tCO_2e between 2022 and 2023 (Table 22-4). For public infrastructure bonds and medium term notes, total financed GHG emissions increased due to an increase in scopes 2 and 3. Scope 3 emissions seem to be more complete in 2023 for commuting, and electricity consumption for buildings, leased cars and heating seems to increase compared to 2022. For municipal bonds and medium term notes total financed GHG emissions decreased due to a decrease in scope 3 emissions. Scope 3 emissions decreased for two specific municipalities due to less spending on civil engineering in one municipality and less spending on waste in the other.
The total relative financed GHG emissions also increased by 2.9 tCO_2e per million euro between 2022 and 2023 (Table 22-4). This shows that GHG emissions per million euro have increased. The bonds and medium term notes issued by public infrastructure are relatively CO_2 intensive (relatively high CO_2e per million euros). It will be interesting to see if this will be reduced in the coming years.

Table 22-4 Absolute and relative financed GHG emissions for bonds and medium term notes issued by municipalities and public infrastructure in the years 2022 and 2023

Bonds and medium term notes	Scopes	Bonds and medium term notes for which a GHG footprint was calculated (million euro)		Financed GHG emissions (tCO_2e)		Relative financed GHG emissions (tCO_2e/million euro)		Data quality **
		2022	**2023**	**2022**	**2023**	**2022**	**2023**	**2023**
Municipalities	1-2-3	1,297	1,247	33,259	32,261	25.7	25.9	3.8
Public infrastructure	1-2-3	336	436	54,111	62,716	161.0	143.8	1.1
Total		**1,633**	**1,682**	**87,370**	**94,977**	**53.5**	**56.5**	**3.1**

22.3 Municipality bonds and medium term notes approach

See for the municipality bonds and medium term notes approach the general factsheet and factsheets per data source in section 6.2 (Municipality loan portfolio). For the calculation of the financed GHG emissions, the outstanding bonds and medium term notes are used in relation to the total balance sheet, rather than the outstanding loans of the loan portfolio.

List of the calculation sheets	Location
Gemeentelijke obligaties 31-12-2022.xlsx Gemeentelijke obligaties 31-12-2023.xlsx	Werkmap\Gemeenten\b. Ruwe data
241204 bonds BNG bewerking voor SQL.xlsx	Werkmap\Gemeenten\c. Voorbewerkte data
Aardgas_elektra_gemeente_v2024.csv Banen_gemeente_2018_2020_2022_2023.csv Banen_sectorO_gemeente_2018_2020_2021_2022_2023.csv Bonds_BNG_gemeente_2022_2023.csv Passiva_gemeente_2018_2020_2021_2022_2023.csv bGemeenteBerekeningen.tgemeente_Scope3_versie2024.csv	Werkmap\Gemeenten\d. Data voor SQL
Emissiefactoren – PCAF 2024.csv	Werkmap\Emissiefactoren\d. Data voor SQL
2411204_BNG_Gemeente_bonds_2022_versie2024 241204_BNG_Gemeente_bonds_2023_versie2024	Werkmap\Gemeenten\e. SQL notebooks\BNG Bank
250114_pBNG.vGemeente_2022_CO2voetafdruk_Absoluut_Totaal_Bonds_versie2024.xlsx 250114_pBNG.vGemeente_2022_CO2voetafdruk_Relatief_Totaal_Bonds_versie2024.xlsx 250114_pBNG.vGemeente_2022_IndividueleKlanten_Bonds_versie2024.xlsx 250114_pBNG.vGemeente_2022_Ratio_Lening_Passiva_Bonds_versie2024.xlsx 250123_pBNG.vGemeente_2023_CO2voetafdruk_Absoluut_Totaal_Bonds_versie2024.xlsx 250123_pBNG.vGemeente_2023_CO2voetafdruk_Relatief_Totaal_Bonds_versie2024.xlsx 250123_pBNG.vGemeente_2023_IndividueleKlanten_Bonds_versie2024.xlsx 250123_pBNG.vGemeente_2023_Ratio_Lening_Passiva_Bonds_versie2024.xlsx	Werkmap\Gemeenten\f2. Data uit SQL BNG
250108 scope 3 gemeente 2018.xlsx 250108 scope 3 gemeente 2022.xlsx 250123 scope 3 gemeente 2023.xlsx	Werkmap\Gemeenten\f4. Berekening BNG

22.4 Public infrastructure bonds and medium term notes approach

General factsheet

Topic	Description
Scopes covered	For the public infrastructure bonds and medium term notes, scopes 1 and 2 are covered.
Portfolio covered	For six companies in the Public infrastructure bonds and medium term notes portfolio, emissions are calculated based on data from the companies' annual reports. The coverage ratio is 100%.
Data	Annual reports are used to collect the GHG emissions reported by the companies in the Public infrastructure bonds and medium term notes portfolio.

Grid emission factors	No emission factors are used.
Calculation steps	Emissions and balance sheet totals over 2023 are collected from the annual reports. In case the metric of the reported emissions differs from tCO_2e, the emissions are converted to tCO_2e. All companies also reported their 2022 emissions in the same annual reports. Therefore, these GHG emissions were also collected. For one client, scope 3 emissions were only available for 2022. These 2022 scope 3 emissions were used as a proxy for 2023.
Avoided emissions	Not applicable
Asset class specific considerations	No additional considerations
Attribution	The attribution factor is used to determine which part of the emissions BNG Bank is accountable for: Outstanding nominal amount (€) / Total balance sheet of the company (€) In the end, the separate scopes and the sum of the scopes of all individual organisations were aggregated.
Absolute vs. relative emissions	For the public infrastructure bonds and medium term notes, the total financed GHG emissions were calculated in tonnes. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume of the clients for which a GHG footprint was calculated in this report.
Limitations	It is not always documented how GHG emissions are calculated. It is unknown whether the used emission factors are based on 'Tank to Wheel' or 'Well to Wheel' and whether avoided emissions were subtracted from the total GHG emissions. Therefore, the used GHG emissions from the annual reports might be calculated by using a different method than used for current report.
Data quality estimate	As the reported GHG emissions are collected from audited annual reports, the PCAF data quality score is 1.

Factsheets per data source

Topic	Description
Data	Bonds portfolio data
Data file	Alle obligaties BNG 2023.xls, Alle obligaties BNG 2022.xls
Data Source	Internal bonds portfolio data extracted from BNG's credit systems
Year	Data reflects the bonds portfolio per 31-12-2023 and per 31-12-2022
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Klimaatplan\PCAF\Data uitvragen\Obligaties BNG
Data quality	Not applicable
Unit of measurement	Euro
Selections	Portfolio filtered to select the clients of the Public Infrastructure sector
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Annual reports of clients containing the client's emissions and balance sheet totals.
Data file	Multiple files in Klimaatplan\PCAF\Jaarverslagen klanten
Data Source	Websites of the clients

Year	2023
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Klimaatplan\PCAF\Jaarverslagen klanten
Data quality	Data quality score 1, emissions from audited annual reports
Unit of measurement	Total balance sheet: mln Euro GHG emissions: $ktCO_2e$
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

List of the calculation sheets	Location
BNGDOCS-#3565292-v1-Emissies NL Corporate portefeuille 31-12-2023.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank\Bestanden ontvangen van BNG Bank eigen berekeningen

22.5 Sovereigns, Supranationals and Multilateral development banks approach

General factsheet

Topic	Description
Scopes covered	For the sovereigns, scope 1, 2 and 3 are covered. For the supranationals and multilateral development banks (MDB), only scope 1 is covered, due to the lack of data. The scope 1 emissions are defined in the PCAF Financed Emissions Standard as "domestic GHG emissions from sources located within the country territory." These direct (scope 1) GHG emissions are attributable to emissions generated within a countries' boundaries and includes emissions from exported goods and services. As described by the PCAF Financed Emissions Standard, the scope 1 definition aligns with the definition of production emissions. Production emissions are emissions attributable to emissions produced domestically and include domestic consumption and exports. The scope 2 emissions are defined in the PCAF Financed Emissions Standard as "GHG emissions occurring as a consequence of the domestic use of grid-supplied electricity, heat, steam and/or cooling which is imported from another territory." Scope 2 are emissions attributable to the import, of electricity, steam, heat and cooling from outside the country territory. The scope 3 emissions are defined in the PCAF Financed Emissions Standard as "GHG emissions attributable to non-energy imports as a result of activities taking place within the country territory." These emissions are related to all other imports from goods or services from outside the country territory except for the energy related emissions included in scope 2. Due to the data availability of different sources, scope 1 emissions are provided in CO_2e and scope 2 and 3 emissions in CO_2.
Portfolio covered	The portfolio coverage of the sovereigns is 100%, the portfolio coverage of the supranationals and multilateral development banks is 78% for 2023.

Data	***Outstanding nominal amounts*** of the sovereigns, supranationals and multilateral development banks in the 2022 and 2023 portfolio. This includes investment balances at the end of each year. ***Emission factors*** are used from the PCAF database: - *Sovereigns* The source of the scope 1 emissions is United Nations Framework Convention on Climate Change (UNFCCC). For the countries that report GHG emissions annually to the UNFCCC, scope 1 emissions (incl. and excl. LULUCF) were extracted from UNFCCC and divided by the countries' PPP-adjusted GDP (from World Bank) to obtain emission intensities per M. international $. The database includes CO_2e emission factors for scope 1, both including and excluding land use, land-use change, and forestry (LULUCF). The metric of the emission factor is tCO_2e/M int. $. Scope 2 and 3 emissions are derived from indicators provided in the OECD tool. Annual CO_2 emissions are divided by the countries' PPP-adjusted GDP (from World Bank) to obtain CO_2 emission intensities per M. international $. As only CO_2 data is available the metric of the emission factor is tCO_2/M int. $. - *Supranationals and agencies:* Scope 1 emission factors based on 2020 supranational data aligned with PCAF guidelines. This concerns supranational production emissions per PPP-adjusted GDP. The metric of the emission factor is tCO_2e/M int. $. Due to lack of data, only scope 1 emissions are included in the calculations. ***Indexing of outdated climate data*** Data has been indexed based on the principle that in the adjustment of economic emissions intensities only the monetary value is adjusted, not the emissions in line with PCAF guidance. A CPI index for the Netherlands was used to adjust this. This indexation factor is available for each combination of base year of the emission factor and reporting year. ***Currency conversion*** Because the emission factors are based on USD and the outstanding nominal amounts of the bond and medium term notes's portfolio are in euros, a currency conversion factor is used to adjust the emission factors. Because the exact date of the emission factor is unknown, an average annual currency conversion factors have been used equal to the base year of the emission factor.
Grid emission factors	While not directly applicable to sovereign debt, grid-specific emission factors are embedded within the country-level scope 2 emission factors provided by PCAF. These factors represent the average grid emissions associated with electricity, heat, and cooling consumption across sovereign regions. They are essential for calculating the indirect emissions of sovereigns, reflecting national energy consumption patterns and grid mixes.
Calculation steps	1. Portfolio attribution: - Emissions are attributed to BNG's financial involvement in each sovereign or agency based on outstanding amounts in euros. - Emissions are proportionally calculated for each scope (1, 2, and 3) using tailored emission factors. For de supranationals and MDB's, only scope 1 emissions are calculated. 2. Emission Factor application: - Scope 1: Uses PCAF methodology Option 1 when direct national emission data is available, or Option 3b for proxy data based on GDP-adjusted metrics. - Scope 2 and 3: Applies PCAF methodology Option 3a. 3. Use of proxy data: For missing or incomplete country-specific data, proxy emission factors from OECD or supranational data sources are applied.

	4. Adjustment of the emission factors: Scope-specific emission factors (provided in tCO_2e/Million USD for scope 1 and tCO_2/Million USD for scope 2 and 3) are divided by the USD-to-EUR conversion rate and the inflation factor corresponding to the base year of the emission factor and the reporting year. 5. Calculating the financed emissions: The following formula is used for calculating the finance ed emissions: *Financed GHG Emissions (tCO_2e) = Adjusted emission factor * (Outstanding Amount (EUR)/10^6)* 6. Distinct treatment of agencies: agencies are treated similarly to sovereign entities in terms of emission factors and methodology. This ensures consistency across the portfolio.
Avoided emissions	Not applicable
Asset class specific considerations	No additional considerations
Attribution	Emissions for sovereigns, supranationals and agencies are attributed proportionally to the outstanding nominal amount of the loan or investment as a share of the total financed asset. For sovereign debt, emissions are allocated based on the share of financing relative to the country's GDP or total outstanding debt.
Absolute vs. relative emissions	The total financed GHG emissions were calculated in tonnes. The relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume of the clients for which a GHG footprint was calculated in this report.
Limitations	Data availability: for many supranationals and MDB's, granular emission data rely on proxies or regional averages due to limited reporting. Temporal mismatch: scope 2 and Scope 3 emission factors are derived from datasets of 2018, introducing potential inaccuracies. Sector aggregation: MDB's are treated similarly to sovereigns, which may generalize emissions profiles for entities with diverse operational scopes. Grid emissions: scope 2 factors rely on average grid emissions, which may not fully capture specific national or regional energy consumption patterns.
Data quality estimate	*Sovereigns:* Scope 1: Data quality is classified as score 1 in the PCAF database. Scope 2 and 3: Emission factors for these scopes are assigned as data quality score 4 in the PCAF database. *Supranationals*: Scope 1: Data quality is classified as score 5 in the PCAF database.

Factsheets per data source

Topic	Description
Data	Bonds portfolio data
Data file	Alle obligaties BNG 2023.xls, Alle obligaties BNG 2022.xls
Data Source	Internal bonds portfolio data extracted from BNG financial systems
Year	Data reflects the bonds portfolio per 31-12-2023 and per 31-12-2022
Last update	Not applicable
Date of download	Not applicable
Link to webpage	Not applicable

Filters used to obtain the datafile	Asset classes: Financial assets at FVTPL, Financial assets at FVOCI, Interest-bearing securities at AC
Internal location	Klimaatplan\PCAF\Data uitvragen\Obligaties BNG
Data quality	1
Unit of measurement	Outstanding nominal amount in euros (€)
Selections	Portfolio filtered to select the sovereigns, supranationals and multilateral development banks.
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	***Emission factors for Sovereign Debt*** This dataset provides emission factors for scope 1, scope 2 and scope 3 emissions associated with sovereign debt. Metrics include emissions per capita and emissions per PPP-adjusted GDP, covering production and consumption emissions for various countries and regions. The dataset includes: - Country-specific and regional emission factors for sovereign debt. - Scope 1 emissions: National GHG emissions (with and without LULUCF). - Scope 2 and scope 3 emissions: Derived from proxies such as GDP or population data. - Historical data from 2015 to 2021 for various European countries. - Data sources: OECD, UNFCCC, and OWID (Global Carbon Budget). - *Scope 3 upstream, downstream, classification types, codes, and levels* are not provided (all cells are empty).
Data file	PCAF_emission_factor_database_Sovereign_debt.xlsx
Data Source	***Sovereigns*** The source of the scope 1 emissions is United Nations Framework Convention on Climate Change (UNFCCC). For the countries that report GHG emissions annually to the UNFCCC, scope 1 emissions (incl. and excl. LULUCF) were extracted from UNFCCC and divided by the countries' PPP-adjusted GDP (from World Bank) to obtain emission intensities per M. international $. The database includes CO_2e emission factors for scope 1, both including and excluding land use, land-use change, and forestry (LULUCF). Scope 2 and 3 emissions are derived from indicators provided in the OECD tool. Annual CO_2 emissions are divided by the countries' PPP-adjusted GDP (from World Bank) to obtain CO_2 emission intensities per M. international $. ***Supranationals and multilateral development banks*** To identify the relevant in scope supranational institutions, PCAF relied on Standard & Poor's (S&P) Supranational Special Edition 2023. This annual report covers the credit rating for 36 multilateral lending institutions and other nonbank supranational institutions. Each supranational is composed of member countries, and financed countries, which can be distinct. Some institutions may only finance projects in their member countries, while others finance projects more broadly across countries with similar issues. As per PCAF's follow the money principle, supranational country lists are drafted based on available public information displayed of financed projects either through the institution's website or annual report. Of the 32 supranational institutions provided by S&P, PCAF has estimated financed emissions for 28 supranational institutions
Year	Covers data from 2015 to 2021
Last update	2024
Date of download	25-11-2024
Link to webpage	https://db.carbonaccountingfinancials.com/

Filters used to obtain the datafile	- Sovereign entities filtered by country and region. - Emission factors aligned with asset class "Sovereign Debt." - Country-specific data prioritized; regional averages applied where country data was unavailable.
Internal location	Klimaatplan\PCAF\PCAF EF database
Data quality	Scope 1 emissions: High-quality data (PCAF Option 1a) sourced from verified national reports to UNFCCC (Data quality score 1). Scope 2 and Scope 3 emissions: Medium-quality data using regional or proxy-based calculations (PCAF Option 3a/3b, Data quality score 4).
Unit of measurement	- tCO_2/Capita - tCO_2/Million PPP-adjusted GDP
Selections	- Filters applied to include sovereign entities within Europe, utilizing PCAF-recommended methodology options. - Exclusions: entities or regions without aligned emission factors, such as specific non-European countries.
Data transformation	Not applicable
Data missing	- Classification types, codes, and levels - Limited Scope 2 and Scope 3 (upstream and downstream) data for some regions - Certain countries lack detailed LULUCF-adjusted Scope 1 emissions.
Print screens	Not applicable

Topic	Description
Data	Consumer Price Index which can be used to update the outdated emission factors to the recent reporting year.
Data file	PCAF_DB Financed emissions calculation worksheet 0424
Data Source	https://data.imf.org Inflatie | CBS
Year	Conversion factor to convert from base year 2019-2023 to reporting year 2019-2023
Last update	Not applicable
Date of download	Not applicable
Link to webpage	https://db.carbonaccountingfinancials.com/
Filters used to obtain the datafile	Not applicable
Internal location	Not applicable
Data quality	Not applicable
Unit of measurement	Numerical
Selections	Country = The Neterlands
Data transformation	The indexation table from the PCAF database only contains indexation factors for base year 2019 and reporting year 2020-2023. This table is extended with indexation factors for base year 2020-2023. Data from CBS is used.
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Currency conversion factors which can be used to convert the emission factor from tCO_2e/$ mln to tCO_2e/€ mln.
Data file	Not applicable
Data Source	https://data.worldbank.org/indicator/PA.NUS.FCRF
Year	2018-2023
Last update	Not applicable

Date of download	Not applicable
Link to webpage	https://data.worldbank.org/indicator/PA.NUS.FCRF
Filters used to obtain the datafile	Not applicable
Internal location	Not applicable
Data quality	Not applicable
Unit of measurement	Numerical
Selections	USD to EUR
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

List of the calculation sheets	Location
BNGDOCS-#3593868-v2-Emissies 2023 van de obligaties van Sovereigns_Supra_s en MDB_s VERSIE 2. xlsx BNGDOCS-#3595224-v2-Emissies 2022 van de obligaties van Sovereigns_Supra_s en MDB_s VERSIE 2. xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank\Bestanden ontvangen van BNG Bank eigen berekeningen
250124 Datakwaliteit BNG Bank Bonds 2023.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\BNG Bank

Appendix A

By sector, which components make up the different scopes

Sector	Scope	Description scope
Social housing sector	1	Natural gas consumption
	2	Electricity consumption
	2	Consumption of district heating
Housing related	1/2/3	Direct and indirect emissions from the upstream value chain
Municipalities	1	Natural gas consumption
	1	Kilometres driven with cars owned by the municipal organisation
	2	Electricity consumption
	3	Purchased good and services that could significantly contribute to GHG emissions
Provinces	1	Natural gas consumption
	1	Kilometres driven with cars owned by the municipal organisation
	2	Electricity consumption
	3	Purchased good and services that could significantly contribute to GHG emissions
Water boards	1	Direct emissions from: Water treatment management Water systems Other Own mobility, transport and maintenance GHG emissions of sewage treatment plant
	2	Indirect emissions from: Water treatment management Water systems Other Own mobility
	3	Indirect emissions from: Commuting Outsourced transport and maintenance Materials and raw materials
Joint arrangements	1/2/3	Direct and indirect emissions from the upstream value chain
Other public institutions	1/2/3	Direct and indirect emissions from the upstream value chain
Healthcare	1	Natural gas consumption
	2	Electricity consumption
	3	Emissions due to commuting
Education	1	Natural gas consumption
	2	Electricity consumption
Public transport	1/2/3	Direct and indirect emissions from the upstream value chain
Infrastructure	1/2/3	Direct and indirect emissions from the upstream value chain
Waste collection and processing	1/2/3	Direct and indirect emissions from the upstream value chain
Drinking water companies	1	CH4 and CO2 emissions during extraction and treatment of groundwater

		Natural gas consumption Fuel consumption for aggregates Kilometres driven or fuel consumption for cars owned by the drinking water companies Emissions from own energy generation
	2	Emissions from purchased electricity
	3	Air(travel) Chemicals Transport Purchase of drinking water and/or semi-finished products if purchased from a drinking water company outside BNG's loan portfolio
Spatial planning	1/2/3	Direct and indirect emissions from the upstream value chain
Network operators (energy, telecom)	1/2/3	Direct and indirect emissions from the upstream value chain
Others	1/2/3	Direct and indirect emissions from the upstream value chain
Renewable energy	3	Generated GHG emissions due to production, installation, maintenance and dismantling

Appendix B

The specific emission factors for the large and medium heat networks for 2022

Supplier	Heat network	GHG emissions ($KgCO_2e / GJ_{th}$)
Vattenfall	Almere	23.49
Annatuurlijk	Enschede	8.54
Vattenfall	Arnhem	13.06
Vattenfall	Duiven/Westervoort	12.07
Vattenfall	Nijmegen Waalsprong	14.04
Eneco	Utrecht/Nieuwegein	21.43
HVC warmtenet	Warmtenet regio Alkmaar	9.23
SVP	Purmerend	26.49
HVC	Warmtenet Dordrecht	11.52
Ennatuurlijk	Midden en West Brabant	15.55
Ennatuurlijk	Eindhoven Strijp	35.80
Ennatuurlijk	Helmond	87.02
Vattenfall	Lelystad	21.24

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About Het PON & Telos

Improving social decision-making

Het PON & Telos is a social knowledge organisation at the heart of society. We consider it our mission to improve social decision-making. We do this by linking scientific knowledge to practical knowledge. In this process every voice counts! We collect, investigate, analyze, and interpret opinions and facts using stimulating approaches and innovative methods. In doing so, we are always focused on sustainable development: the harmonious connection between social, environmental and economic objectives. In this way we contribute to the quality of society at large, now and in the future.

With a multidisciplinary and creative team of nearly 30 research consultants, we work mainly for local and regional authorities in the Netherlands, but also for corporate bodies, banks, care and welfare institutions, funds, and social organisations. We work closely with civic organisations and other knowledge institutions and are an official partner of Tilburg University. We use our knowledge and insights to advise initiators, policy-makers and managers. This enables them to make informed choices and give a positive impulse to the society of tomorrow.

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