Greenhouse Gas Emissions of NWB Bank's Loan Portfolio

The GHG footprint of 2023

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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.

NWB Bank committed itself to PCAF in 2019. Using the PCAF methodology, the GHG emissions of the bank's loan portfolio have been calculated and disclosed in the NWB's annual report from 2019 onwards.[2] The following sectors are part of the loan portfolio: social housing sector, municipalities, water authorities, healthcare institutions, educational institutions, drinking water utilities, and a few other sectors.
Identifying opportunities to improve the methodology is part of the PCAF project for NWB Bank. In this report the overview tables contain the results for the years 2018, 2022 and 2023. The reference year for the NWB Bank is 2018, which will always be recalculated in case of changes to the methodology, whenever possible. In addition, each year the GHG emissions of the most recent and one year before will be (re)calculated. The results for the year 2023 are the most recent. The results are therefore one year behind. Calculating and presenting GHG emissions over a period allows the bank to monitor the evolution of the GHG emissions over time.

This report describes the results and methodology of the GHG emissions assessment of NWB Bank's loan portfolio 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]

This report provides information on direct GHG emissions (scope 1) and indirect GHG emissions (scope 2 and, where available, scope 3). The calculations are based on available data such as energy consumption, travel behavior and purchased materials. Emission factors from CO2emissiefactoren.nl were used to calculate the GHG emissions in most cases. A ratio between the outstanding loan portfolio per client and the total balance sheet of that client has been used to attribute NWB Bank loans to the total assets of the clients

[1] Klimaatbeleid | Klimaatverandering | Rijksoverheid.nl
[2] https://nwbbank.com/en/about-nwb-bank/publications/annual-reports
[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.

emitting GHG, resulting in the financed GHG emissions for NWB Bank loans. These financed GHG emissions are reported in this report.

Table S-1 shows that the total loan volume has increased over the years and Table S-2 shows that the total loan volume with a GHG footprint has increased as well (from 51,993 million euros in 2022 to 55,904 million euros in 2023). Compared to 2022 the coverage ratio has increased. As shown in Table S-1, 98.3% of the NWB Bank's loan portfolio is covered in this GHG emissions report. Although the coverage ratio for 2023 is 98.3%, not all sectors in Table S-1 include scope 1, 2 and 3 emissions (see Table 2-1 and Appendix A). Where scope 3 emissions are included, they are not always complete, for instance, in sectors such as healthcare.

Table S-2 shows that for 98.3% of the loan portfolio, the total financed GHG emissions are 1,458,388 tCO_2e, the relative financed GHG emissions are 26.1 tCO_2e per million euro and the overall data quality score is 2.5 on a scale of 1 (best) to 5 (poor).
Although the loan volume with a GHG footprint has increased, the financed GHG emissions decreased by 54 $ktCO_2e$ between 2022 and 2023 and by 132 $ktCO_2e$ between 2018 and 2023 (Table S-3). Financed GHG emissions are not comparable over time as the coverage ratio increased from 93.4% to 98.3% between 2018 and 2023. Relative financed GHG emissions provide more information. These relative emissions show whether GHG emissions per million euro increase, decrease or remain the same as the coverage ratio increases. Relative financed GHG emissions decreased by 3.0 tCO_2e per million euro between 2022 and 2023 and by 9.6 tCO_2e per million euro between 2018 and 2023. This is a reduction of 26.9%. Not all sectors are included in this reduction, such as drinking water utilities, NHG pass through RMBS and the "other sectors" were not part of the 2018 GHG footprint.

The reduction of 54 $ktCO_2e$ (-3.6%) between 2022 and 2023 is due to a reduction in GHG emissions of 86 $ktCO_2e$ in the sectors of social housing, municipalities, provinces, water authorities, healthcare, education and drinking water utilities. The GHG emissions increased by 16 $ktCO_2e$ for the sectors NHG pass through RMBS and other sectors and increased due to the inclusion of the GHG emissions generated by the renewable electricity sector. The largest reductions in GHG emissions were seen in the water authorities and social housing sectors. For both sectors, the largest reduction was seen in scope 2 (electricity consumption). Water authorities' scope 2 GHG emissions decreased because they replaced European green electricity contracts with Dutch green electricity contracts. Scope 2 emissions from social housing associations may have decreased due to an increase in the use of solar panels on social housing.
Per million euro, the "other sectors" and water authorities have the highest relative financed GHG emissions in 2023. Since 2018, the water authorities have shown the largest decrease in these relative GHG emissions. A small share of clients in the 'other sector" group has a large GHG footprint. Further research should identify opportune mitigation efforts.

NWB Bank aims to significantly reduce its carbon footprint by 2030. The relative financed GHG emissions (per outstanding balance) for the key sectors of water authorities, drinking water utilities, social housing associations, municipalities and healthcare institutions are to be reduced by 43% compared to the 2018 reference year (2020 reference year for drinking

water utilities). For these five sectors, the relative financed GHG emissions are reduced by an average of 36.9% between 2023 and the reference year.

Although it is not possible to make a direct comparison between years at the level of the total loan portfolio due to differences in coverage ratio, this report shows a decrease in the GHG emissions of NWB Bank's loan portfolio, expressed in tCO_2e per million euros. NWB Bank's aim is to accelerate this reduction in the coming years. Targets have been set to reduce GHG emissions in the water authorities, drinking water utilities, social housing, municipalities and healthcare sectors. NWB Bank will support this by encouraging its clients to reduce GHG emissions, by offering loans linked to sustainable development among other things. In addition, NWB Bank aims to improve the completeness of the GHG footprint of its loan portfolio each year, ensuring that actions taken in the field are reflected in the footprint.

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. The rainfall affects, for example, the energy consumption of water authorities. Long term monitoring of the GHG footprint of the bank'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.

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

Market segment	Sector	NACE Code	Total loan portfolio (million euro)			Coverage ratio by GHG footprint of total loan portfolio (%)		
			2018	**2022^**	**2023**	**2018**	**2022^**	**2023**
Social housing	Social housing associations	6820	30,265	31,015	32,591	97.1	97.6	99.7
Public sector	Municipalities	8410	6,583	6,445	5,901	100	100	100
	Provinces	8410	247	324	340	100	100	100
	Water authorities	8410	6,327	7,699	8,370	100	100	100
	Others		16	20	20	-	-	-
Healthcare	Healthcare	8600	2,119	1,871	1,925	89.4	94.6	99.3
Education	Educational institutions	8500	73	122	79	86.2	95.3	100
Networks & Utilities	Drinking water utilities[#]	3600	477	1,134	1,214	-	98.8	97.5
	Renewable electricity	3500	12	863	994	-	-	88.6
Financial counterparties	Credit institutions & other financial institutions	6400	116	350	316	-	-	-
	NHG pass-through RMBS	6400	-	2,230	2,638	-	89.7	91.8
Other	Other sectors^^		1,409	2,322	2,502	-	96.4	92.8
Total			**47,644***	**54,395**	**56,890**	**93.4***	**95.6**	**98.3**

*The total loan portfolio of 2018 is without NHS pass-through RMBS.

^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 utilities the reference year is not 2018, but 2020. Sector specific data is presented in chapter 9. Information shown in Table S-1 is from 2018.

^^Other sectors include credit institutions, other financial institutions, nonfinancial corporates, other public organisations and joint regulations.

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

Table S-2 Absolute and relative financed GHG emissions in 2018, 2022 and 2023

Market segment	Sector	NACE code	Loan portfolio (clients with GHG footprint) (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**
Social housing	Social housing associations	6820	29,383	30,281	32,490	486,014	336,047	318,850	16.5	11.1	9.8	2.0
Public sector	Municipalities	8410	6,583	6,445	5,901	231,344	206,316	200,683	35.1	32.0	34.0	3.7
	Provinces	8410	247	324	341	17,483	11,149	8,814	70.9	34.4	25.9	4.0
	Water authorities	8410	6,327	7,699	8,370	762,026	558,614	508,463	120.4	72.6	60.7	2.8
Healthcare	Healthcare	8600	1,895	1,769	1,912	92,964	65,359	62,519	49.1	36.9	32.7	3.2
Education	Education	8500	63	117	79	271	1,376	1,087	4.3	11.8	13.8	3.0
Networks & Utilities	Drinking water utilities	3600	-	1,120	1,185	-	42,323	34,928	-	37.8	29.5	2.4
	Renewable electricity	3500	-	-	881	-	-	15,160	-	-	17.2	3.0
Financial counterparties	NHG pass-through RMBS	6400	-	1,999	2,422	-	44,767	51,618	-	22.4	21.3	3.0
Other	Other sectors^^		-	2,239	2,323	-	246,635	256,266	-	110.2	110.3	4.6
Total			**44,498**	**51,993**	**55,904**	**1,590,102**	**1,512,586**	**1,458,388**	**35.7**	**29.1**	**26.1**	**2.5**

^In the current report, data for 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.

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

^^Other sectors include credit institutions, other financial institutions, nonfinancial corporates, other public organisations and joint regulations.

Table S-3 Changes in financed GHG emissions over the years

Market segment	Sector	NACE code	Difference in financed GHG emissions (tCO2e)			Difference in financed GHG emissions (%)		
			2018-2022	**2018-2023**	**2022-2023**	**2018-2022**	**2018-2023**	**2022-2023**
Social housing	Social housing associations	6820	-149,967	-167,164	-17,197	-30.9	-34.4	-5.1
Public sector	Municipalities	8410	-25,028	-30,661	-5,633	-10.8	-13.3	-2.7
	Provinces	8410	-6,334	-8,669	-2,335	-36.2	-49.6	-20.9
	Water authorities	8410	-203,412	-253,563	-50,151	-26.7	-33.3	-9.0
Healthcare	Healthcare	8600	-27,605	-30,445	-2,840	-29.7	-32.7	-4.3
Education	Education	8500	1,105	816	-289	407.7	301.1	-21.0
Networks & Utilities	Drinking water utilities	3600			-7,395			-17.5
	Renewable electricity	3500						
Financial counterparties	NHG pass-through RMBS	6400			6,851			15.3
Other	Other sectors^^				9,631			3.9
Total			-77,516	-131,714	-54,198	-4.9	-8.3	-3.6

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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.[6]
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 most 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.[7]
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.[8] 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.[9]

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

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

NWB Bank committed to PCAF in 2019. In 2019, NWB Bank asked Telos[11] to measure the GHG emissions related to the bank's loan portfolio, using the PCAF methodology. The first GHG emissions report was for the year 2018. Since then, the financed GHG emissions have been reported annually and published in the NWB Bank's annual report.[12] Each year, NWB Bank reports on the reference year, which is 2018, the most recent year and one year before.

Finding ways to improve the methodology, for example by changing the calculation methodology or using higher quality data sources, is an ongoing process. These improvements in the quality of the PCAF methodology can also be seen as a further contribution by NWB Bank to the development of the PCAF methodology. For 2023, Het PON & Telos, Republiq and NWB Bank have made some changes to the methodology again. The reasons and justifications for these changes are discussed in detail in this report.

1.2 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).

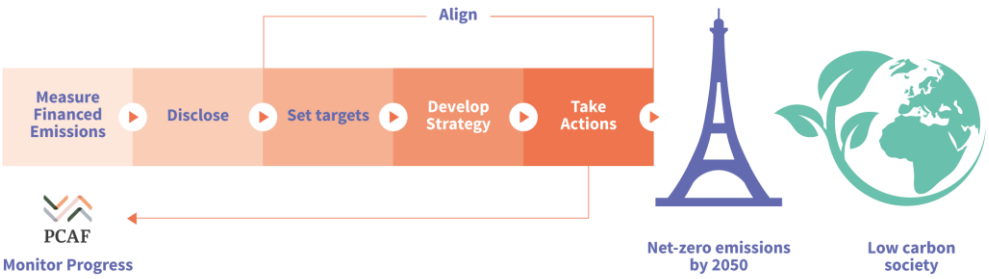

Figure 1. Visualization from GHG footprint to action

Monitoring the climate impact of its lending is an important step for NWB Bank in setting objectives to contribute to the Paris climate targets. Based on this knowledge, the bank also wants to have a positive impact on the (sustainability) activities of its clients. In 2022, NWB Bank presented her climate action plan[13] which was expanded in their 2024 ESG

[10] https://carbonaccountingfinancials.com/about
[11] At that time Telos was an independent research institute, based at Tilburg University. In January 2020 Het PON and Telos have merged and are going further as one organisation called Het PON & Telos. At the same moment this new institute , Het PON & Telos, became official partner of Tilburg University.
[12] https://nwbbank.com/en/about-nwb-bank/publications/annual-reports
[13] https://nwbbank.com/nieuws/nwb-bank-publiceert-haar-klimaatactieplan

transition plan.[14] This plan describes how NWB Bank will contribute to the reduction of GHG emissions to meet the targets of the Paris agreement. The aim is that the NWB Bank's loan portfolio generates net zero GHG emissions by 2050. NWB Bank aims to significantly reduce its carbon footprint by 2030. The relative emissions (per outstanding balance) for the key sectors of water authorities, drinking water utilities, social housing associations, municipalities and healthcare institutions are to be reduced by 43% compared to the 2018 reference year (2020 reference year for drinking water utilities).
Another way in which NWB Bank aims to contribute to the targets of the Paris agreement is by facilitating the energy transition of its clients within its loan portfolio. By 2035, NWB Bank aims to finance renewable energy production equivalent to the total fossil energy consumption of its loan portfolio. In this report, the fossil energy consumption of NWB Bank's loan portfolio is presented (chapter 14), to monitor the energy transition of the portfolio. Further details on the ambition, including the financing of renewable energy production, can be found in NWB Bank's annual reports.

1.3 Reading guide

This report describes the methodology and results of the GHG emissions assessment of NWB Bank's loan portfolio.

Chapter 2 describes the PCAF methodology in general. In chapter 3, the loan portfolio of NWB Bank is presented. Chapter 4 up to 13 describe the results of the coverage ratio and the absolute and relative financed GHG emissions and a description of the methodology for the sectors mentioned below. Chapter 14 summarizes the results of all sectors.
The following sectors are included in this report:

- Social housing sector
- Public sector: Water authorities, Municipalities and Provinces
- Healthcare sector
- Drinking water utilities
- Educational institutions
- NHG pass-through RMBS (mortgages)
- Renewable electricity
- Other sectors

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 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.

[14] NWB Bank publishes ESG transition plan: NWB Bank

The following sectors have been added or substantially expanded:

- Category others is expanded
- Renewable electricity is added

This report presents GHG emissions for 2018 (reference year), 2022 and 2023. In the management summary and in chapter 14, 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.

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*[15], *The harmonized approach for the financial sector in the Netherlands*[16] and *The global GHG accounting & reporting standard*.[17] 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 recalculation 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's 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 NWB Bank and focus on all the direct and indirect GHG emissions for which NWB Bank is responsible for financing different types of organisations. Emissions resulting from a

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

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.

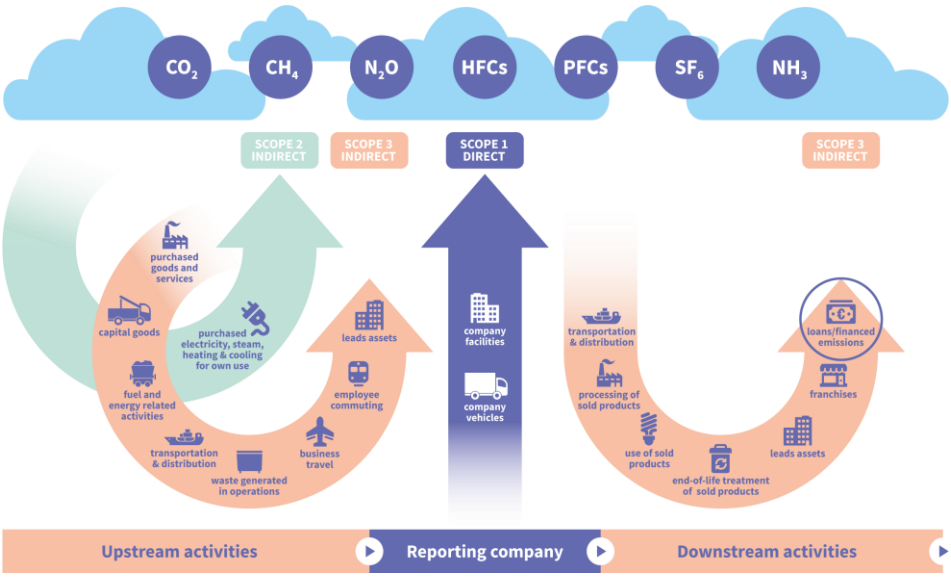

Figure 2. The scope definitions from the GHG Protocol (Image created from GHG Protocol).

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. Table 2-1 shows the scope of coverage per sector. Appendix A provides more information on what exactly is included in the three different scopes.

Table 2-1 Scope coverage per sector

Market segment	Sector	Scope 1	Scope 2	Scope 3
Social housing	Social housing associations	X	X	*
Public sector	Municipalities	X	X	X
	Provinces	X	X	X
	Water authorities	X	X	X
Healthcare	Healthcare	X	X	X
Education	Education	X	X	*
Network & Utilities	Drinking water utilities	X	X	X
	Renewable electricity			X
Financial counterparties	NHG pass-through RMBS	X	X	*
Others	Other sectors	X	X	X

*Scope 3 is not covered as no data were available to calculate the scope. With regard to social housing and NHG pass through RMBS in particular, there is still some discussion about whether scope 3 should be included. This is not currently a requirement of the PCAF methodology. Scope 3 emissions are considered immaterial when spread over the full life cycle of a social dwelling. Therefore, in addition to the lack of data, scope 3 emissions of the social housing sector are not considered.

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 authorities and drinking water utilities, 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 NWB Bank's loan portfolio has been 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 the BNG Bank'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 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 2-2. 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 the asset class that can be used to determine the data quality by sector.[18] 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 2-3 the data quality scores are rounded to a whole number. In Table S-2 (Management summary) and Table 14-2 (Chapter 14) the data quality scores are presented with one decimal place. 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 social housing associations, education institutions, NHG pass-through RMBS and renewable electricity.
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, provinces, water authorities and drinking water utilities.
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 up 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*.[19] This is the case for other sectors.
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*.[20] 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 2-2 Generic data quality

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

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

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 2-3).

Table 2-3 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	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[21], 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 this 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.
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 European 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 6.2.2.
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 organisation, 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 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 European 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 6.2.2.
Water authorities	1: **without** GHG emissions from the sewage treatment plant	2	GHG emissions are calculated based on data provided by the water authorities themselves, but the data are not audited. Therefore, the data quality score is 2.

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

	2 & 3		
Water authorities	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.
Healthcare	1: natural gas consumption 2: electricity consumption	3 or 2	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 (89% of the loanportfolio). For some healthcare institutions, this data is taken from annual reports or sustainability reports. These institutions receive a data quality score 2, rather than 1, because it is not certain that the data has been verified by an auditor (11% of the loan portfolio).
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.
Drinking water utilities	1: direct GHG emissions 2: electricity consumption	2	GHG emissions are calculated based on data provided by the drinking water utilities themselves, but the data are not audited. Therefore, the data quality score is 2.
Drinking water utilities	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.
Education	1: natural gas consumption 2: electricity consumption	3	GHG emissions are calculated based on energy consumption data based on sector-specific key figures, taken into account building type or type of education. The data are sector specific. Therefore, the data quality score is 3.
Other sectors	1, 2 and 3: direct and indirect emissions from the upstream value chain	5 or 2	87% of the loan portfolio in this group receives a data quality score of 5. Only activity-based emission calculations are available for these clients. PCAF advises to aggregate at a sector average level due to data quality concerns at sub-sector level. 12% of the loan portfolio in this group receives a data quality score 2. For these clients, data to calculate GHG emissions are taken from annual reports. These clients receive a data quality score of 2, rather than 1, because it is not certain that the data has been verified by an auditor.
NHG pass-through RMBS	1: natural gas consumption 2: electricity consumption	3	GHG emissions are based on estimated building consumption per floor area based on official building energy labels and floor area.
Renewable electricity	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 the NWB Bank's loan portfolio, emission factors have been used to calculate emissions per tonne GHG emissions. Choosing 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.[22] 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 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.

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.

[22] 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.

An overview of the emission factors used per year is shown in Table 2-4. In general, emission factors have been chosen for each calculation and approach according to year of the data.

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 year's 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 2-4 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 Diesel	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 the year 2018 the emission factor of 2021 and 2022 have been used.
Public transport by train (traveled kms; unknown train type)	Traveler km	0.005	0.005	0.005	0.005	0.002	0.002	0.002	Use of emission factor according to data year.
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 is 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 the 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[23]	*LINK*[24]	*LINK*[25]	*LINK*[26]	*LINK*[27]	*LINK*[28]	*LINK*[29]	

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.[30] 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.

[23] co2emissiefactoren-2017.pdf
[24] co2emissiefactoren-2018.pdf
[25] CO2emissiefactoren-2019.pdf
[26] CO2emissiefactoren-2020.pdf
[27] CO2emissiefactoren-2023-2015-dd-03-04-2023 (3).xlsx
[28] CO2emissiefactoren-2022-okt2023.pdf
[29] CO2emissiefactoren-2023-okt2023.pdf
[30] https://carbonaccountingfinancials.com/standard.
PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.

3 NWB Bank's loan portfolio

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

Table 3-1 Overview of NWB Bank's loan portfolio in 2018, 2022 and 2023[31]

Market segment	Sector	Total loan portfolio (million euro)			Percentage of all loans (%)		
		2018	**2022^**	**2023**	**2018**	**2022^**	**2023**
Social housing	Social housing associations	30,265	31,015	32,591	63.5	57.0	57.3
Public sector	Municipalities	6,583	6,445	5,901	13.8	11.8	10.4
	Provinces	247	324	340	0.5	0.6	0.6
	Water authorities	6,327	7,699	8,370	13.3	14.2	14.7
	Others	16	20	20	0.0	0.0	0.0
Healthcare	Healthcare	2,119	1,871	1,925	4.4	3.4	3.4
Education	Educational institutions	73	122	79	0.2	0.2	0.1
Networks & Utilities	Drinking water utilities	477	1,134	1,214	1.0	2.1	2.1
	Renewable electricity	12	909	994	0.0	1.7	1.8
Financial counterparties	Credit institutions and other financial institutions	116	350	316	0.2	0.6	0.6
	NHG pass-through RMBS[#]	-	2,230	2,638	-	4.1	4.6
Other	Other sectors	1,409	2,277	2,502	3.0	4.4	4.3
Total		**47,644[#]**	**54,396**	**56,890**	**100.0***	**100.0***	**100.0***

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

[#]The total loan portfolio of 2018 is without NHG pass-through RMBS

^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, water authorities and municipalities are the largest sectors in NWB Bank's loan portfolio. The total loan portfolio increased by 2,494 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.

[31] Reference dates for 2018, 2022 and 2023 are 31-12-2018, 31-12-2022 and 31-12-2023, respectively.

Factsheet

List of the calculation sheets	Location
250123 Bankcijfers NWB 2023.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\NWB Bank
250107 Bankcijfers NWB 2022.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\NWB Bank
250212 Bankcijfers NWB 2018.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\NWB Bank
250123 datakwaliteit berekening voor Tabel S-2.xlsx	Werkmap\2_Data\2.1_Origineel met AVG\NWB Bank

4 Social housing sector

4.1 Results Social housing sector

The social housing sector is the largest sector within the loan portfolio of NWB Bank. The sector accounts for 57.3% of the bank's loan portfolio.

4.1.1 Coverage ratio and attribution

The GHG footprint was calculated for 99.7% of the social housing loan portfolio in 2023. Between 2022 and 2023, the outstanding loan volume increased by 1,576 million euro. The loan portfolio of clients with a GHG footprint also increased by 2,209 million euro. Therefore, the coverage ratio increased by 2.1%-pt. The total balance sheet of clients with a GHG footprint increased as well. As a result, the ratio of the loan portfolio to the total balance sheet increased from 0.072 in 2022 to 0.076 in 2023. The attribution to NWB Bank 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 (%)	Loan portfolio (clients with GHG footprint) (million euro)	Coverage ratio of total loan portfolio (%)[32]	Total balance sheet (clients with GHG footprint) (million euro)	Ratio loan portfolio / total balance sheet (clients with GHG footprint)
2018	30,265	63.5	29,383	97.1	307,573	0.096
2022	31,015	57.0	30,281	97.6	421,643*	0.072
2023	32,591	57.3	32,490	99.7	428,879*	0.076

*For 2022, total balance sheet data from 2021 were used and for 2023, total balance sheet data from 2022 were used. This is because more recent data was not available in time.

4.1.2 Financed GHG emissions

Table 4-2 shows the GHG footprint results for the social housing sector in 2018, 2022 and 2023. The total consumption of natural gas and electricity decreased between 2022 and 2023 (data not shown). The emission factors for natural gas and electricity from an unknown source also decreased (Table 2-4). The coverage ratio increased by 2.1%-pt. The ratio of loan portfolio to total balance sheet per client affects the financed GHG emission at sector level. These changes all affect the financed GHG emissions.

[32]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 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	303,968	210,794	216,594	62.5	62.7	67.9	10.3	7.0	6.7
Electricity use	Scope 2	171,496	116,090	95,700	35.3	34.5	30.0	5.8	3.8	2.9
District heating	Scope 2	10,549	9,163	6,556	2.2	2.7	2.1	0.4	0.3	0.2
Total		**486,013**	**336,047**	**318,850**	**100.0***	**100.0***	**100.0***	**16.5**	**11.1**	**9.8**

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

Table 4-3 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	26	22

Between 2022 and 2023, the financed GHG emissions increased for scope 1 natural gas consumption by 5,800 tonnes and decreased for scope 2 electricity consumption by 20,390 tonnes. Total financed GHG emissions decreased by 17,197 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 4-2, see section 4.2.1. The financed GHG emissions per financed m^2 decreased by 4 $kgCO_2e/m^2$. This is in line with the reduction in total energy consumption (data not shown).

Due to an increase in loans covered by a GHG footprint and a decrease in financed GHG emissions, relative financed GHG emissions decreased from 11.1 to 9.8 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.[33] 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.[34] By 2030, 450,000 existing dwellings cease natural gas use for heating purposes. This will require alternative sources of heat, such as district heating. However, a disadvantage of

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

district heating is the relatively high fixed costs. Where tenants use little heat, there are still fixed costs for them to use district heating and this makes connecting social housing to heat networks less attractive.

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 26%. In Table 4-2, the financed GHG emissions for 2022 are 9,163 tCO_2e, but the estimate according to the changed methodology is 6,796 tCO_2e (-26%). Comparing this value with the value for 2023 shows that the reduction in GHG emissions is 3.5% (6,796 tCO_2e estimate for 2022 vs. 6,556 tCO_2e for 2023). This difference is smaller than shown in Table 4-2.

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 for 2023 is 99.7%.
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 this 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'.[35] 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 companies, 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.
Grid emission factors	Section 2.4 provides further information on emission factors. The following emission factors from Table 2-4 were used: - Natural gas - Electricity (unknown source) - Average heating networks In addition, for some heating networks their own emission factors are used (see Appendix B)
Calculation steps	**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 NWB Bank, 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 NWB Bank 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)[36]) 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

[35] Kadaster registers of all real estate (land and buildings) in the Netherlands, showing who has what rights.
[36] 'Standaard jaarafname' 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.

	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) - Total gas consumption (in Nm^3) - Floor area (m^2) The next step was carried out by Het PON & Telos: Het PON & Telos used this 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 NWB Bank. 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 whom a GHG footprint was calculated in this report.
Avoided emissions	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 bank's portfolio, this amounts to 363,506,544 kWh of electricity and 9,742 tonnes financed GHG emissions. This data was 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 avoided financed emissions.
Asset class specific considerations	For the social housing sector, the methodology of asset class 'Mortgages' is followed. Energy consumption of financed buildings (scope 1 and 2) is covered.
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 bank'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 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 whom a GHG footprint was calculated in this report.
Limitations	**Scope 1 natural gas use & scope 2 electricity use** Some of the housing associations in NWB Bank'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 (0.3% of the loan portfolio within the social housing sector). 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 itself (scopes 1, 2 and 3) are not included in this report.
Data quality estimate	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)[37] 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.

Factsheets per data source

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 NWB are missing in this dataset.

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

Print screens	Not applicable

Topic	Description
Data	Supply of energy to social housing corporations
Data file	Original file (datafile received from Republiq): 20240829 - NWB_energieverbruik_woningcorporaties.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	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)[38] 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

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	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 2022 Column E (Balanskant) selected on PASSIVA Column F (Balanstype) selected on PASSIVA
Internal location	Original file: Werkmap\Woningcorporaties\b. Ruwe data

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

	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)[39]
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

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

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

List of the calculation sheets	Location
Emissiefactoren + woningen stadsw 2021 2022.csv Energieverbruik nwb 2021 2022 2023.csv Leningen woco nwb.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
240910_NWB_WOCO_2023_versie2024.ipynb	Werkmap\Woningcorporaties\e. SQL notebooks
240926_pNWB.vWOCO_2023_IndividueleKlanten_versie2024.xslx 240926_pNWB.vWOCO_2023_Ratio_Lening_Passiva_versie2024.xlsx 240926_pNWB.vWOCO_2023_CO2voetafdruk_Absoluut_Totaal_versie2024.xlsx 240926_pNWB.vWOCO_2023_CO2voetafdruk_Relatief_Totaal_versie2024.xlsx	Werkmap\Woningcorporaties\f1. Data uit SQL NWB

240123_pNWB.vWOCO_2018_IndividueleKlanten_m2.xslx 240123_pNWB.vWOCO_2022_IndividueleKlanten_m2.xslx	Werkmap\Woningcorporaties\f3. Berekening NWB

5 Public sector: water authorities

5.1 Results public sector: water authorities

Water authorities represent 14.7% of NWB Bank's total loan portfolio, making them the second-largest sector within the bank's loan portfolio.

5.1.1 Coverage ratio and attribution

It was possible to provide all water authorities with a GHG footprint, resulting in a 100% coverage ratio. The outstanding loan volume has increased over the years. Between 2022 and 2023 the outstanding loan volume increased by 671 million euro. The total balance sheet of clients with a GHG footprint increased as well. As a result, the ratio of the loan portfolio to the total balance sheet remained the same. The attribution to NWB Bank has not changed since last year. For 2018, 2022 and 2023, the loan portfolio, the total balance sheet and the coverage ratio are shown in Table 5-1.

Table 5-1 Loan portfolio, coverage ratio and ratio loan portfolio versus total balance sheet for the water authorities in 2018, 2022 and 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loan portfolio (clients with GHG footprint) (million euro)	Coverage ratio of total loan portfolio (%)	Total balance sheet (clients with GHG footprint) (million euro)	Ratio loan portfolio / total balance sheet (clients with GHG footprint)
2018	6,327	13.3	6,327	100	9,327	0.678
2022	7,699	14.2	7,699	100	11,532	0.668
2023	8,370	14.7	8,370	100	11,966	0.669

5.1.2 Financed GHG emissions

Table 5-2 shows the GHG footprint results for water authorities in 2018, 2022 and 2023.

Table 5-2 Absolute and relative financed GHG emissions for the water authorities 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		3,151	3,649	1,956	0.4	0.7	0.4	0.5	0.5	0.2
Other fuels		710	75	62	0.1	0.0	0.0	0.1	0.0	0.0
Water systems	Scope 1									
Natural gas use		1,566	1,036	1,127	0.2	0.2	0.2	0.2	0.1	0.1
Other fuels		1,783	667	1,433	0.2	0.1	0.3	0.3	0.1	0.2
Other	Scope 1									
Natural gas use		1,663	1,488	1,194	0.2	0.3	0.2	0.3	0.2	0.1
Other fuels		1	2	1	0.0	0.0	0.0	0.0	0.0	0.0
Own mobility, transport and maintenance	Scope 1	12,348	7,804	5,759	1.6	1.4	1.1	2.0	1.0	0.7
GHG sewage treatment plant	Scope 1	390,239	385,564	394,930	51.2	69.0	77.7	61.7	50.1	47.2
Indirect CO_2 emissions										
Water treatment management^	Scope 2									
Electricity		271,761	74,127	33,394	35.7	13.3	6.6	43.0	9.6	4.0
Heat		2,248	1,478	1,302	0.3	0.3	0.3	0.4	0.2	0.2
Water systems^	Scope 2									
Electricity			21,227	11,495		3.8	2.3		2.8	1.4
Heat			26	0		0.0	0.0		0.0	0.0
Other^	Scope 2									
Electricity			2,572	993		0.5	0.2		0.3	0.1
Heat			139	116		0.0	0.0		0.0	0.0
Own mobility, transport and maintenance*	Scope 2		257	96		0.0	0.0		0.0	0.0
Commuting	Scope 3	11,195	5,450	6,923	1.5	1.0	1.4	1.8	0.7	0.8
Outsourced transport and maintenance	Scope 3	31,817	28,815	24,888	4.2	5.2	4.9	5.0	3.7	3.0
Materials and raw materials	Scope 3	33,545	24,237	22,793	4.4	4.3	4.5	5.3	3.1	2.7
Total		**762,027**	**558,614**	**508,463**	**100.0#**	**100.0#**	**100.0#**	**120.4**	**72.6**	**60.7**

^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: water treatment management, other and own mobility, transport and maintenance of scope 1, all segments of scope 2 and outsourced transport and maintenance and materials and raw materials of scope 3. The use of (bio)diesel for the water systems in scope 1 has almost doubled between 2022 and 2023. This is due to the additional use of pumping stations and temporary pumps because of the high rainfall in 2023.[40]

Commuting (scope 3) and business travel increased, unfortunately reversing the decrease caused by the Corona crisis. Overall, financed GHG emissions decreased by 50,151 tonnes. This is mainly due to a decrease in financed GHG emissions for scope 2 between 2022 and 2023. Overall, the decrease in scope 1 and 2 financed GHG emissions is the result of a shift from purchasing European green electricity to Dutch green electricity.[41] The total relative financed GHG emissions decreased by 11.9 tonnes per million euro.

The water authorities are making good progress in all three scopes. The 'Klimaatmonitor Waterschappen, verslagjaar 2023' (Arcadis, 2024)[42] shows that water authorities are making progress in solar energy production, wind energy production and the production of green gas.[43] 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.

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

5.2 Public sector: water authorities approach

5.2.1 Scopes 1, 2 and 3

The 'Klimaatmonitor waterschappen, verslagjaar 2023' (Arcadis, 2024)[44] forms the basis for the calculations of water authorities. 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).[45]

Adjustments in methodology

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

[40] Klimaatmonitor_Waterschappen_verslagjaar_2023.pdf
[41] Ibid.
[42] Ibid.
[43] Ibid.
[44] Ibid.
[45] Ibid.

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[46] 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 5-3 shows the effect of the methodology change for previous years.

Table 5-3 Effect of the change in methodology on the financed GHG emissions of water authorities

Scopes	New 2022	Previous 2022	Difference* (%)	New 2018	Previous 2018	Difference* (%)
Scope 3	558,614	682,822	-18.2	762,026	892,342	-14.6

*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 5-4 shows the underlying themes of the scopes. All scopes presented by Arcadis in the report 'Klimaatmonitor Waterschappen, verslagjaar 2023' (Arcadis, 2024) in Table 1[47] are also used for this report.
Portfolio covered	Data are collected for all 21 water authorities in the Netherlands. This implies that the portfolio coverage ratio is 100%.
Data	Data were used from the report 'Klimaatmonitor Waterschappen, verslagjaar 2023' (Arcadis, 2024). This monitor was developed by Arcadis for the Union of Water Authorities (Unie van Waterschappen) and NWB Bank. This monitor describes in detail the emissions in the three scopes for each individual water authority.

Table 5-4. The different scopes included in the water authorities' 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

[46] 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

	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 authorities 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 authorities 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[48]. 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 authorities' scope 1 and 2 GHG emissions are attributed to NWB Bank. 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 whom a GHG footprint was calculated in this report.
Avoided emissions	Data on renewable energy use by the water authority are available in the Arcadis (2024) report.[49]
Asset class specific considerations	The approach for water authorities 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 bank'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 water authorities, 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 whom a GHG footprint was calculated in this report.
Limitations	Not all scope 3 emissions are yet monitored by the water authorities.

[48] Klimaatmonitor_Waterschappen_verslagjaar_2023.pdf
[49] Ibid.

Data quality estimate	The GHG emissions are calculated based on data provided by the water authorities 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 authorities 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 authorities 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
250110_Waterschappen_NWB_bank_verslagjaar2023.xlsx	Werkmap\Waterschappen\f3. Berekening NWB
241028 Totaaloverzicht emissies waterschappen 2022 NWB Bank.xlsx	Werkmap\Waterschappen\f3. Berekening NWB
250212_Totaaloverzicht emissies waterschappen 2018 NWB nieuwe indeling.xlsx	Werkmap\Waterschappen\f3. Berekening NWB

6 Public sector: municipalities

6.1 Results public sector: municipalities

Municipalities represent 10.4% of NWB Bank's total loan portfolio, making them the third-largest sector within the bank's loan portfolio.

6.1.1 Coverage ratio and attribution

It has been possible to provide all municipalities with a GHG footprint. Between 2022 and 2023, the outstanding loan volume decreased by 544 million euro. The total balance sheet of clients with a GHG footprint increased. As a result, the ratio of the loan portfolio to the total balance sheet decreased as well. The attribution to NWB Bank 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 (%)	Loan portfolio (clients with GHG footprint) (million euro)	Coverage ratio of total loan portfolio (%)	Total balance sheet (clients with GHG footprint) (million euro)	Ratio loan portfolio / total balance sheet (clients with GHG footprint)
2018	6,583	13.8	6,583	100	71,750	0.092
2022	6,445	11.8	6,445	100	78,697	0.082
2023	5,901	10.4	5,901	100	82,442	0.072

6.1.2 Financed GHG emissions

Table 6-2 shows the GHG footprint results for the Dutch municipalities in 2018, 2022 and 2023. The consumption of natural gas and electricity consumption increased between 2022 and 2023 (data not shown), because the floor area owned by municipalities has increased. The emission factors for natural gas and unknown electricity decreased (Table 2-4). Furthermore, the attribution to NWB Bank decreased. These changes all affect the financed GHG emissions.

Table 6-2 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	37,945	29,111	32,681	16.4	14.1	16.3	5.8	4.5	5.5
Fossil fuel use (cars)	Scope 1	955	635	545	0.4	0.3	0.3	0.1	0.1	0.1
Electricity use	Scope 2	29,379	19,772	18,794	12.7	9.6	9.4	4.5	3.1	3.2
Purchased goods and services	Scope 3	163,065	156,798	148,663	70.5	76.0	74.1	24.8	24.3	25.2
Total		**231,344**	**206,316**	**200,683**	**100.0***	**100.0***	**100.0***	**35.1**	**32.0**	**34.0**

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

Table 6-3 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	37	35

Between 2022 and 2023 the financed GHG emissions decreased for all scopes, except for scope 1 natural gas consumption. As mentioned above, the total consumption of natural gas and electricity increased between 2022 and 2023. In 2024 a new inventory of property data was carried out by the 'Kadaster'.[50] This led to an increase in the total floor area owned by municipalities. 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 financed decreased by 2 $kgCO_2e/m^2$. 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 decreased by 5,633 tCO_2e. This decrease is mainly due to a decrease in scope 3 GHG emissions, which decreased by 8,135 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.

The relative GHG emissions increased by 2.0 tonnes per million euro. This is mainly due to a decrease in the loan volume (the denominator becomes smaller) and due to the increase in

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

scope 1 emissions. The 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 6-3).

6.2 Public sector: municipalities approach

6.2.1 Scopes 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 6.2.2.

General factsheet

Topic	Description
Scopes covered	For municipalities, scope 1 natural gas consumption, scope 1 fossil fuel consumption of 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%.
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. This data is 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 provides further information on emission factors. The following emission factors from Table 2-4 were 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'.[51] 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. 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

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

	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 the 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 NWB Bank. 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 whom 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 electricity 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 Bank'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 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 whom 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)[52]

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. Although this data is 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

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

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 this 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 this 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. This data is 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
Aardgas_elektra_gemeente_v2024.csv Banen_gemeente_2018_2020_2022_2023.csv Banen_sectorO_gemeente_2018_2020_2021_2022_2023.csv LeningportefeuilleNWB_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\Gemeenten\Emissiefactoren
240923_NWB_Gemeente_2018_versie2024 241008_NWB_Gemeente_2022_versie2024 241107_NWB_Gemeente_2023_versie2024	Werkmap\Gemeenten\e. SQL notebooks\NWB Bank
250108_pNWB.vGemeente_2018_CO2voetafdruk_Absoluut_Totaal_versie2024.xlsx 250108_pNWB.vGemeente_2018_CO2voetafdruk_Relatief_Totaal_versie2024.xlsx 250108_pNWB.vGemeente_2018_IndividueleKlanten_versie2024.xlsx 250108_pNWB.vGemeente_2018_Ratio_Lening_Passiva_versie2024.xlsx 250108_pNWB.vGemeente_2022_CO2voetafdruk_Absoluut_Totaal_versie2024.xlsx 250108_pNWB.vGemeente_2022_CO2voetafdruk_Relatief_Totaal_versie2024.xlsx 250108_pNWB.vGemeente_2022_IndividueleKlanten_versie2024.xlsx 250108_pNWB.vGemeente_2022_Ratio_Lening_Passiva_versie2024.xlsx 250123_pNWB.vGemeente_2023_CO2voetafdruk_Absoluut_Totaal_versie2024.xlsx 250123_pNWB.vGemeente_2023_CO2voetafdruk_Relatief_Totaal_versie2024.xlsx 250123_pNWB.vGemeente_2023_IndividueleKlanten_versie2024.xlsx 250123_pNWB.vGemeente_2023_Ratio_Lening_Passiva_versie2024.xlsx	Werkmap\Gemeenten\f1. Data uit SQL NWB
250123_pNWB.vGemeente_2018_IndividueleKlanten_m2.xlsx 250123_pNWB.vGemeente_2018_IndividueleKlanten_m2.xlsx Berekening gefinancierde emissies per gefinancierde m2 2018 en 2022 BNG Bank	Werkmap\Gemeenten\f3. Berekening NWB

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 expenditure. 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.

A review of the items relevant to GHG emissions by an expert who works with iv3 data (expenditure data) daily in a municipality has led to changes in the inclusion of task fields, economic subcategories and tangible assets in the calculation. Based on the discussion with the expert, some new items have been included compared to last year because the procurement of certain relevant goods and services by the municipalities is recorded on items that were not yet 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. In addition, based partly on the research of De Bruyn et al. (2020)[53], 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 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 6-4.

Table 6-4 Effect of the change in methodology on the GHG emissions

Scopes	New 2022	Previous 2022	Difference* (%)	New 2018	Previous 2018	Difference* (%)
Scope 3	163,065	363,468	-55.1%	156,798	422,170	-62.9%

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

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

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 and civil engineering works 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 NWB Bank. 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 whom 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 bank'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.
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 European-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	Files for 2017 and 2021 were used to fill in missing data for 2018 and 2022. 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

Topic	Description
Data	Consumer Price Index (CPI)
Data files	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\f3. Berekening NWB
250108 scope 3 gemeente 2022.xlsx	Werkmap\Gemeenten\f3. Berekening NWB
250123 scope 3 gemeente 2023.xlsx	Werkmap\Gemeenten\f3. Berekening NWB

7 Public sector: provinces

7.1 Results public sector: provinces

The provinces represent a small share of the bank's loan portfolio with 0.6% of the total loan portfolio of NWB Bank in 2023.

7.1.1 Coverage ratio and attribution

It has been possible to provide all provinces in the loan portfolio with a GHG footprint, resulting in a 100% coverage ratio. Between 2022 and 2023, the outstanding loan volume has increased by 16 million Euro. The total balance sheet of clients with a GHG footprint 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 NWB Bank 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 (%)	Loan portfolio (clients with GHG footprint) (million euro)	Coverage ratio of total loan portfolio (%)	Total balance sheet (clients with GHG footprint) (million euro)	Ratio loan portfolio / total balance sheet (clients with GHG footprint)
2018	247	0.5	247	100	1,576	0.16
2022	324	0.7	324	100	3,292	0.10
2023	340	0.6	340	100	3,409	0.10

7.1.2 Financed GHG emissions

Table 7-2 shows the GHG footprint results for the provinces in 2018, 2022 and 2023.

Table 7-2 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	176	141	136	1.0	1.3	1.5	0.7	0.4	0.4
Fossil fuel use (cars)	Scope 1	14	11	12	0.1	0.1	0.1	0.1	0.04	0.03
Electricity use	Scope 2	674	480	417	3.9	4.3	4.7	2.7	1.5	1.2
Purchased goods and services	Scope 3	16,619	10,517	8,249	95.0	94.3	93.6	67.4	32.4	24.2
Total		**17,483**	**11,149**	**8,814**	**100.0***	**100.0***	**100.0***	**70.9**	**34.4**	**25.9**

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

Between 2022 and 2023 the financed GHG emissions decreased for all scopes, except for scope 1 fossil fuel use by cars, which increased slightly. In total, the financed GHG emissions decreased by 2,335 tonnes. This decrease in financed GHG emissions is mainly due to a decrease in scope 3 (2,268 tonnes). The decrease in scope 3 is due to the decrease in the emission factors 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 8.5 tonnes per million euro. Both the absolute financed GHG emissions and the relative financed GHG emissions decreased.

7.2 Public sector: provinces approach

7.2.1 Scopes 1, 2 and 3

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 6.2.2. 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 7-3 Effect of the change in methodology on the GHG emissions

Scopes	New 2022	Previous 2022	Difference* (%)	New 2018	Previous 2018	Difference* (%)
Scope 3	10,517	9,286	13.3%	16,619	9,810	69.4%

*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. This data is 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 the 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). 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 NWB Bank. 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 by 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 whom 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 asset, 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 Bank'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 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 whom 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 supply of natural gas and electricity to the 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 is 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 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 data. Therefore, the data quality score is 5. See option 3b in Table 5-16 on page 106 of the PCAF report (2022)[54] Scope 3: data quality score is 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.

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

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

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. Printscreens\241022 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 this 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\Provincies\b. Ruwe data
Data quality	Score 2 The research method of this 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. This data is 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 2023.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: 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

Topic	Description
Data	Consumer Price Index (CPI)
Data files	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 LeningportefeuilleNWB_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
240923_NWB_Provincie_2018_versie2024.ipynb 240927_NWB_Provincie_2022_versie2024.ipynb 240927_NWB_Provincie_2023_versie2024.ipynb	Werkmap\Provincies\e. SQL notebooks
250109_pNWB.vProvincie_2018_IndividueleKlanten_versie2024.xlsx 250109_pNWB.vProvincie_2018_Ratio_Leining_Passiva_versie2024.xlsx 250109_pNWB.vProvincie_2018_CO2voetafdruk_Absoluut_Totaal_versie2024.xlsx 250109_pNWB.vProvincie_2018_CO2voetafdruk_Relatief_Totaal_versie2024.xlsx	Werkmap\Provincies\f1. Data uit SQL NWB

250109_pNWB.vProvincie_2022_IndividueleKlanten_versie2024.xlsx 250109_pNWB.vProvincie_2022_Ratio_Leing_Passiva_versie2024.xlsx 250109_pNWB.vProvincie_2022_CO2voetafdruk_Absoluut_Totaal_versie2024.xlsx 250109_pNWB.vProvincie_2022_CO2voetafdruk_Relatief_Totaal_versie2024.xlsx 250109_pNWB.vProvincie_2023_IndividueleKlanten_versie2024.xlsx 250109_pNWB.vProvincie_2023_Ratio_Leing_Passiva_versie2024.xlsx 250109_pNWB.vProvincie_2023_CO2voetafdruk_Absoluut_Totaal_versie2024.xlsx 250109_pNWB.vProvincie_2023_CO2voetafdruk_Relatief_Totaal_versie2024.xlsx	
250108 provincie berekening scope 3 2018.xlsx 250108 provincie berekening scope 3 2022.xlsx 250108 provincie berekening scope 3 2023.xlsx	Werkmap\Provincies\f3. Berekening NWB

8 Healthcare sector

8.1 Results of the healthcare sector

The healthcare sector represents a small share of the bank's loan portfolio with 3.4% of the total loan portfolio of NWB Bank in 2023.

8.1.1 Coverage ratio and attribution

The GHG footprint was calculated for 99.3% of the healthcare loan portfolio in 2023. Between 2022 and 2023, the outstanding loan volume increased by 54 million euro. The loan portfolio of clients with a GHG footprint increased by 143 million euro. Therefore, the coverage ratio increased by 4.7%. The total balance sheet of clients with a GHG footprint 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 NWB Bank also has not changed. 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 healthcare sector in 2018, 2022 and 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loan portfolio (clients with GHG footprint) (million euro)	Coverage ratio of total loan portfolio (%)	Total balance sheet (clients with GHG footprint) (million euro)*	Ratio loan portfolio / total balance sheet (clients with GHG footprint)
2018	2,119	4.4	1,895	89.4	28,820	0.07
2022	1,871	3.4	1,769	94.6	30,394	0.06
2023	1,925	3.4	1,912	99.3	32,731	0.06

* The total balance sheet of one health institution was missing. For this institution, 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 0.07 was used.

8.1.2 Financed GHG emissions

Table 8-2 shows the GHG footprint results for the healthcare 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 unknown electricity also decreased. The coverage ratio increased by 4.7%. These changes affect the financed GHG emissions.

Table 8-2 Absolute and relative financed GHG emissions for the healthcare 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	49,826	37,607	37,548	53.6	57.5	60.1	26.3	21.2	19.6
Electricity use	Scope 2	25,320	18,786	14,642	27.2	28.8	23.4	13.4	10.6	7.7
Commuting (car, bus, tram, metro, train)	Scope 3	17,818	8,966	10,329	19.2	13.7	16.5	9.4	5.1	5.4
Total		**92,964**	**65,359**	**62,519**	**100.0***	**100.0***	**100.0***	**49.1**	**36.9**	**32.7**

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

Table 8-3 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	89	80	72

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 2,840 tonnes. This decrease is mainly due to the decrease in scope 2 electricity consumption. It is difficult to interpret these changes because the data source for 10 to 15% of the healthcare institutions is different than from previous years (see section 8.2.1). In 2024 a new inventory of property data was carried out by the 'Kadaster'.[55] This led to a decrease in the total floor area owned by healthcare institutions and this also affected the results.
To be able to compare energy consumption regardless of differences in client sets and surface, financed GHG emissions are expressed in relation to financed surface of buildings. This number decreased by 8 $kgCO_2e/m^2$ between 2022 and 2023. However, the use of the other data source for 10 to 15% of the healthcare institutions in 2023 has an effect here as well.

Due to an increase in loans covered by a GHG footprint and a decrease in financed GHG emissions, relative financed GHG emissions decreased from 36.9 to 32.7 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. Many healthcare institutions operate 24 hours a day, resulting in higher energy consumption. There is certainly a focus on reducing GHG emissions from healthcare institutions. This is also an important part of Greendeal Healthcare 3.0. However,

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

healthcare institutions also face other major challenges, such as the aging population, staff shortages and rising healthcare costs.[56]

8.2 Healthcare sector approach

8.2.1 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 portfolio coverage ratio for this sector is 99.3% Of the loans with a GHG footprint, scope 3 is part of the GHG footprint for 91.8% of the loans.
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 by means of transportation data.
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) - Public Transport in general (Bus/Tram/Metro average) - Train (unknown type) - Passenger transport, Car, Fuel type unknown, weight class unknown.

[56] Uitdagingen in de zorg | Maastricht University

Calculation steps	**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* NWB Bank 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 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 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 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 NWB Bank. 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 whom 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.
Avoided emissions	The avoided emissions for the healthcare sector are not known and therefore not reported in this report.
Asset class specific considerations	The approach for the healthcare sector is in line with the 'Commercial real estate' 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 bank's share of the total balance sheet is used to determine the share of GHG emissions for which NWB Bank 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 organisations were aggregated.
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 whom a GHG footprint was calculated in this report.
Limitations	For several healthcare institutions data on the total balance sheet was 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 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 NWB Bank 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 total scope 3 emissions.
Data quality estimate	**Scope 1 and 2:** data quality score is 3 or 2. For most healthcare institutions (89% of the loan portfolio) an estimation for natural gas and electricity consumption was made based on floor area classes. Energy consumption data is based on average data that is peer/(sub)-sector-specific, therefore data quality score is 3. For some healthcare institutions (11% of the loan portfolio), this data is taken from annual reports or sustainability reports. These institutions receive a data quality score 2, rather than 1, because it is not certain that the data has been verified by an auditor. **Scope 3:** data quality score is 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. See option 3b in Table 5-16 on page 106 of the report PCAF (2022)[57]

[57] https://carbonaccountingfinancials.com/standard.

Factsheets per data source

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 – NWB_energieverbruik_zorg.csv BNGDOCS-#3567695-v1-241014_zorginstellingen_NWB_Bank.xlsx Edited file : 20241111 – NWB_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 Werkmap\Zorg\g. Jaarverslagen\Energieverbruik\Gebruikt in berekening 2023\NWB Bank Edited files 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

PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second edition.

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 file: 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 NWB Bank 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

List of the calculation sheets	Location
240909_FTE.csv 240918_Leningportefeuille NWB Bank.csv 241014 passiva zorg.csv 241112 energiedata zorginstellingen NWB.csv	Werkmap\Zorg\d. Data voor SQL
241203_NWB_Zorg_2023_versie2024.ipynb	Werkmap\Zorg\e. SQL notebooks\NWB Bank
241203_pNWB.vZorg_2023_IndividueleKlanten_versie2024.xlsx 241203_pNWB.vZorg_2023_scopestotaal_versie2024.xlsx 241203_pNWB.vZorg_2023_Ratio_Lening_Passiva_versie2024.xlsx	Werkmap\Zorg\f1. Data uit SQL NWB
250109 datakwaliteit sector zorg 2023.xlsx 250123 NWB Bank zorg 2018_m2.xlsx 250123 NWB Bank zorg 2022_m2.xlsx 250123_pNWB.vZorg_2023_IndividueleKlanten_versie2024_m2.xlsx	Werkmap\Zorg\f3. Berekening NWB

9 Drinking water utilities

9.1 Results drinking water utilities

The drinking water utilities represent a small share of the bank's loan portfolio with 2.1% of the total loan portfolio of NWB Bank in 2023.

9.1.1 Coverage ratio and attribution

The GHG footprint has been calculated for 97,5% of the loan portfolio within the drinking water utilities in 2023. Between 2019 and 2020 the calculation method for the drinking water utilities has changed and the coverage ratio and financed GHG emissions for 2018 cannot be recalculated. Therefore, 2020 is the reference year for drinking water utilities instead of 2018.

Between 2022 and 2023, the outstanding loan volume increased by 80 million euro. The loan portfolio of clients with a GHG footprint increased by 65 million euro. The total balance sheet of clients with a GHG footprint 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 NWB Bank also has not changed. For 2018, 2022 and 2023, the loan portfolio, the total balance sheet and the coverage ratio are shown in Table 9-1.

Table 9-1 Loan portfolio, coverage ratio and ratio of loan portfolio to total balance sheet for the drinking water utilities in 2020, 2022 and 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loan portfolio (clients with GHG footprint) (million euro)	Coverage ratio of total loan portfolio (%)[58]	Total balance sheet (clients with GHG footprint) (million euro)	Ratio loan portfolio / total balance sheet (clients with GHG footprint)
2020	836	1.7	820	98.1	6,241	0.13
2022	1,134	2.1	1,120	98.8	6,768	0.17
2023	1,214	2.1	1,185	97.5	7,181	0.17

9.1.2 Financed GHG emissions

Table 9-2 shows the GHG footprint results for the drinking water utilities in 2020, 2022 and 2023.

Table 9-2 Absolute and relative financed GHG emissions for the drinking water utilities 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	7,535	9,558	9,080	20.5	22.6	26.0	9.2	8.5	7.7
Scope 2	19,012	21,407	13,002	51.8	50.6	37.2	23.2	19.1	11.0
Scope 3	10,174	11,358	12,846	27.7	26.8	36.8	12.4	10.1	10.8
Total	**36,721**	**42,323**	**34,928**	**100.0***	**100.0***	**100.0***	**44.8**	**37.8**	**29.5**

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

Between 2022 and 2023 the absolute GHG emissions decreased by 7,395 tonnes. This decrease is mainly due to the decrease in scope 2 electricity consumption. One drinking water utility switched to green electricity. As a result, scope 2 emissions decreased. The total relative financed GHG emissions decreased by 8.3 tCO_2e per million euros.

As noted above, the financed GHG emissions decreased between 2022 and 2023, but there is still more to achieve. The primary task of the drinking water utilities is to produce and deliver safe and reliable drinking water at acceptable costs. Some drinking water utilities still rely on fossil fuel for purifying water and to prepare, transport and distribute drinking water. However, a large part of the energy consumption in the drinking water chain is the energy used to heat water in individual households. Therefore, drinking water utilities, water authorities and municipalities need to work together to make the drinking water chain more sustainable.

Table 9-3 Avoided financed GHG emissions for the drinking water utilities in 2023

Year	Financed avoided GHG emissions (tonnes/year)	Financed removals: GHG emissions captured in water softening installations (tonnes/year)
2023	737	855

Since this year (2023), avoided financed emissions are reported in Table 9-3. 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[59]. This applies to drinking water utilities that use surface water. These avoided and captured emissions are not included in the results in Table 9-2 but are reported separately in Table 9-3.

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

9.2 Drinking water utilities approach

9.2.1 Scopes 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 utility outside the bank'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 drinking water utilities has a standard calculation approach[60]. 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 utilities is published, there are still differences in the way the different drinking water utilities 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 utilities. Although there are shortcomings in the standard calculation methodology of the drinking water utilities, the standard calculation methodology has been used for this report to be as close as possible to the working methods of the drinking water utilities.

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 utilities have been allowed to compensate scope 1 GHG emissions for the CO_2 that is captured in the water softening installations[61]. This applies to drinking water utilities that use 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.

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

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 utility outside the bank's loan portfolio.

There are two clear differences between the standard calculation method used by drinking water utilities and the PCAF methodology. The first difference is that the drinking water utilities 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 utilities do. For the methane emissions, some of the drinking water utilities use 34 kg CO_2 per kg methane, whereas CO2emissiefactoren.nl prescribes to use 28 kg CO_2 per kg methane.

The data was collected in collaboration with Vewin.[62] Vewin collected data from the individual drinking water utilities 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 utilities with the request to share their individual data with Het PON & Telos for this report. All individual drinking water utilities 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 six drinking water utilities. Two utilities only provided the Vewin benchmark data, one utility provided their total GHG emissions per scope and one drinking water utility did not provide any figures.

General factsheet

Topic	Description
Scopes covered	For the drinking water utilities approach scopes 1, 2 and parts of scope 3 are covered.
Portfolio covered	The portfolio coverage ratio for this sector is 97,5%.
Data	Data to calculate the GHG emissions for scopes 1, 2 and 3 were obtained from Vewin (benchmark) and the individual drinking water utilities. Total balance sheet data are taken from the annual reports of the drinking water utilities. For one drinking water utility the annual financial report was not available. The total balance sheet data of this drinking water utility were requested from the drinking water utility 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

[62] Vewin is the association of drinking water utilities in the Netherlands

	- 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 utilities that only provided Vewin benchmark data. Self-generated energy for the drinking water utilities 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 utility outside the bank's loan portfolio. For air travel the number of kilometres was multiplied by the corresponding emission factor. No calculation could be made for the two drinking water facilities that provided only Vewin benchmark data. To calculate the GHG emissions for 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 utilities that only provided Vewin benchmark data. Emission factors for chemicals are not described on CO2emissiefactoren.nl. Drinking water utilities 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 utility. Therefore, the $kgCO_2e$ for chemicals from the Vewin (benchmark) were used. It is possible that in some cases this also includes the 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 utilities that only supplied Vewin benchmark data. If the drinking water utility purchases drinking water and/or semi-finished products from a drinking water utility that is not in the bank'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 utility 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 utility's scope 1, 2 and 3 GHG emissions are attributed to NWB Bank. The financed GHG emissions per utility 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 whom a GHG footprint was calculated in this report.
Avoided emissions	Drinking water utilities make investments that result in avoided emissions. If a drinking water utility 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. The GHG emissions for the CO_2 that is captured in the water softening installations is reported separately. No calculation is performed.
Asset class specific considerations	The approach for drinking water utilities 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 the removed GHG of the different entities in the sector are calculated. Then, the bank'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 utilities, 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 whom a GHG footprint was calculated in this report.
Limitations	The Dutch drinking water utilities have published a methodology for calculating the GHG footprint.[63] This methodology is also based on the GHG Protocol. The methodology of drinking water utilities 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 utilities has been published, there are still differences in the way the different drinking water utilities 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 utilities. A limitation is that two drinking water facilities did not share any additional data besides the Vewin benchmark data and another drinking water utility 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 utilities to convert the GHG emissions based on 'Well to Wheel' to GHG emissions based on 'Tank to Wheel'. Therefore, the GHG emissions of this drinking water utility 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 utilities 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 utility. 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 utilities, 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. There may also be differences in what the drinking water utilities 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 utility purchases drinking water and/or semi-finished products from a drinking water utility that is not in the bank'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 utilities in the bank's loan portfolio is owned by and operates for two other drinking water utilities. The drinking water utility supplies a semi-finished product to two other drinking water utilities in the bank's portfolio. The GHG footprint of this drinking water utility is included in these other drinking water utilities. The loans to this drinking water utility that supplies a semi-finished product to the other drinking water utilities were allocated to these two drinking water utilities based on 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 utilities and 2 other companies).

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

Data quality estimate	The GHG emissions were calculated based on data provided by the water utilities 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 utilities
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 utilities 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 utilities
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 utilities. This data is 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 utility 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 utility.
Print screens	Not applicable

List of the calculation sheets	Location
241111 Waterleidingbedrijven 2023 NWB.xlsx	Waterleidingbedrijven\f3. Berekening NWB

10 Educational institutions

10.1 Results educational institutions

The education sector represents a small share of the bank's loan portfolio with 0.1% of the bank's loan portfolio in 2023.

10.1.1 Coverage ratio and attribution

The GHG footprint was calculated for 100% of the loan portfolio within the education institutions in 2023. Between 2022 and 2023, the outstanding loan volume decreased by 43 million euro. The loan portfolio of clients with a GHG footprint decreased by 38 million euro. However, the coverage ratio increased by 4.7%. The total balance sheet of clients with a GHG footprint decreased as well. As a result, the ratio of the loan portfolio to the total balance sheet has decreased causing a lower attribution to NWB Bank compared to last year. For 2018, 2022 and 2023, the loan portfolio, the total balance sheet and the coverage ratio are shown in Table 10-1.

Table 10-1 Loan portfolio, coverage ratio and ratio loan portfolio versus total balance sheet for educational institutions in 2018, 2022 and 2023.

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loan portfolio (clients with GHG footprint) (million euro)	Coverage ratio of total loan portfolio (%)	Total balance sheet (clients with GHG footprint) (million euro)	Ratio loan portfolio / total balance sheet (clients with GHG footprint)
2018	73	0.2	63	86.2	549	0.11
2022	122	0.2	117	95.3	943	0.12
2023	79	0.1	79	100.0	873*	0.09

* The total balance sheet of one educational institution was missing. For this institution, 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 0.27 was used.

10.1.2 Financed GHG emissions

Table 10-2 shows the GHG footprint results for education institutions 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. The ratio of loan portfolio to total balance sheet per client affects the financed GHG emission at sector level. These changes all affect the financed GHG emissions.

Table 10-2 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	126	830	581	46.5	60.3	53.5	2.0	7.1	7.4
Electricity use	Scope 2	145	546	506	53.5	39.7	46.5	2.3	4.7	6.4
Total		**271**	**1,376**	**1,087**	**100.0***	**100.0***	**100.0***	**4.3**	**11.8**	**13.8**

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

Table 10-3 Financed GHG emissions per financed floor area (m^2) for the educational institutions in 2018, 2022 and 2023

	Year		
	2018	**2022**	**2023**
Financed GHG emissions real estate related ($kgCO_2e$)/ financed m^2	33	28	23

Between 2022 and 2023 the absolute financed GHG emissions decreased for both scopes. Total financed GHG emissions decreased by 289 tonnes. This decrease is mainly due to the decrease in scope 1 natural gas consumption. It is difficult to interpret these changes because the loan portfolio of clients with a GHG footprint decreased and the data source is different from previous years (see section 10.2.1).
To be able to compare energy consumption regardless of differences in client sets, financed GHG emissions are expressed in relation to financed surface of buildings. This number decreased by 5 $kgCO_2e/m^2$ between 2022 and 2023. However, the use of the other data source for 2023 has an effect here as well.

Due to a decrease in loans covered by a GHG footprint, but an increase in coverage ratio, relative financed GHG emissions increased from 11.8 to 13.8 tonnes per million euro between 2022 and 2023. In conclusion, the absolute financed GHG emissions decreased but the relative financed GHG emissions increased for the education institutions.

In education, there is also a big challenge to make buildings more sustainable to meet the climate targets. Although the education sector is a relatively small sector within the NWB Bank's loan portfolio, NWB Bank can still help institutions become more sustainable.

10.2 Educational institutions approach

10.2.1 Scopes 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%.
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.
Grid emission factors	Section 2.4 contains more information on emission factors. The following emission factors from Table 2-4 were used: - Natural gas - Electricity (Unknown source)
Calculation steps	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 buildings that are owned by the educational institutions that are clients at NWB Bank. 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 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 NWB Bank. 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 whom 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.
Avoided emissions	The avoided emissions for the educational institutions are not known and therefore not reported in this report.
Asset class specific considerations	The approach for the educational institutions is in line with the 'Commercial real estate' 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 bank'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 were aggregated.
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 whom a GHG footprint was calculated in this report.
Limitations	The actual consumption of natural gas and electricity by 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.
Data quality estimate	Data quality score 3 Energy consumption data is based on average data that is peer/(sub)-sector-specific, therefore data quality score is 3.

Factsheets per data source

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 - NWB_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 NWB 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 files: Werkmap\Onderwijs\c. Voorbewerkte data Werkmap\Onderwijs\g. Jaarverslagen\NWB 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

List of the calculation sheets	Location
241030_NWB_energieverbruik_onderwijs.csv 241028_Leningportefeuille NWB Bank.csv 241028_Passiva NWB Bank.csv	Werkmap\Onderwijs\d. Data voor SQL
241104_NWB_Onderwijs_2023_versie2024.ipynb	Werkmap\Onderwijs\e. SQL notebooks
241101_pNWB.vOnderwijs_2023_CO2voetafdruk_Absoluut_Totaal_versie2024.xlsx 241101_pNWB.vOnderwijs_2023_CO2voetafdruk_Relatief_Totaal_versie2024.xlsx 241101_pNWB.vOnderwijs_2023_IndividueleKlanten_versie2024.xlsx 241101_pNWB.vOnderwijs_2023_Ratio_Lening_Passiva_versie2024.xlsx	Werkmap\Onderwijs\f1. Data uit SQL NWB
250123 NWB Bank onderwijs 2018_m2.xlsx 250123 NWB Bank onderwijs 2022_m2.xlsx	Werkmap\Onderwijs\f3. Berekening NWB

11 NHG pass-through RMBS

11.1 Results NHG pass-through RMBS

This chapter covers loans to NHG pass-through RMBS. NWB Bank indirectly contributes to the financing and affordability of private residential mortgages by investing in so-called pass-through NHG RMBS bonds. These are residential mortgage-backed securities based on National Mortgage Guarantee mortgages issued by a Dutch bank. NHG pass-through RMBS represents a small portion of the bank's loan portfolio, accounting for 4.6% of NWB Bank's total loan portfolio in 2023.

11.1.1 Coverage ratio and attribution

The GHG footprint was calculated for 91.8% of the loan portfolio for the NHG pass-through RMBS in 2023. Between 2022 and 2023, the outstanding loan volume increased by 408 million euro. The loan portfolio of clients with a GHG footprint increased by 423 million euro. The property value at origination increased as well. The ratio of the loan portfolio to the property value at origination slightly decreased. For 2018, 2022 and 2023, the loan portfolio, the property value at origination and the coverage ratio are shown in Table 11-1. The coverage ratio has increased by 2.1% between 2022 and 2023.

Table 11-1 Loan portfolio and coverage ratio for NHG pass-through RMBS in 2021, 2022 and 2023

NHG pass-through RMBS	Loan portfolio (million euro)	Percentage of all loans (%)	Loan portfolio with GHG footprint (million euro)	Coverage ratio of loan portfolio (%)	Property value at origination (million euro)	Ratio outstanding loan volume/property value at origination
2021	1,329	2.5	-	0.0	-	-
2022	2,230	4.1	1,999	89.7	2,646	0.76
2023	2,638	4.6	2,422	91,8	3,210	0.75

11.1.2 Financed GHG emissions

The results of NWB Bank's financed GHG footprint of the NHG pass-through RMBS for 2022 and 2023 are shown in Table 11-2.

Table 11-2 Absolute and relative financed GHG emissions for NHG pass-through RMBS in 2022 and 2023

Scopes	Financed GHG emissions (tCO_2e/year)		Relative financed GHG emissions (tCO_2e/million euro)	
	2022	**2023**	**2022**	**2023**
Scope 1+2	44,767	51,618	22.4	21.3

The total financed GHG emissions have increased by 6,851 tonnes, but the relative financed GHG emissions have decreased by 1.1 tonnes per million euro. The total financed GHG emissions have increased due to an increase in the loan volume and an increase in the loans with a GHG footprint.

11.2 NHG pass-through RMBS approach

11.2.1 Scopes 1 and 2

Adjustments in methodology

Compared to last year, the methodology for calculating the GHG footprint for NHG pass-through RMBS has been adjusted. Last year, electricity consumption per house was calculated using data from a CBS Statline table on electricity supplied per occupant in kWh, based on house type, floor area and average number of occupants per house. Natural gas consumption per house was calculated using data from a CBS Statline table on natural gas supplied in m^3/m^2 based on house type, energy label, year of construction and floor area. Unfortunately, the previously used CBS Statline table has been discontinued. Therefore, the PCAF European Building Emission Factor Database was used for the mortgage asset class this year. This database provides emission factors in tCO_2e/m^2 per type of house (single or multi-family) and energy label for the years 2022 and 2023. The emission factors do not distinguish between scope 1 and scope 2, so this year the GHG emissions for NHG pass-through RMBS for scope 1 and 2 are not shown separately in the results.

According to the new calculation, GHG emissions have almost doubled for the year 2022. There may be several explanations for this. The previous calculation took more house characteristics into account. The emission factors used in tCO_2e/m^2 were calculated for last year and were much lower than the emission factors used this year from the PCAF European Building Emission Factor Database for the asset class mortgages. The reason for this difference is not known.

Table 11-3 Effect of the change in methodology on the financed GHG emissions

Scopes	New 2022	Previous 2022	Difference* (%)
Total	44,767	22,837	96.0

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

Topic	Description
Scopes covered	For NHG pass-through RMBS scopes 1 and 2 are covered, but these are calculated under the heading of total energy consumption. Scope 1 and 2 are therefore not shown separately in the results.
Portfolio covered	The portfolio coverage ratio for this sector is 91.8%.
Data	Individual house data such as house type, energy label and floor area were obtained from NWB Bank.
Grid emission factors	Emission factors were used from the PCAF European Building Emission Factor Database for the asset class Mortgages. The emission factor used is tCO_2e/m^2.
Calculation steps	For each house it was determined whether it was a single-family or multi-family house. An apartment is classified as a multi-family house and other house types are classified as single-family houses. Based on the energy label and whether the house is a single-family or multi-family house, the emission factor tCO_2e/m^2 was selected and then multiplied by the living area of the dwelling. This gives the GHG emissions per house. Together with the energy label it was indicated for each mortgage whether the energy label was final or provisional. Even though some energy labels are provisional, the emission factor was still selected based on this energy label.

	Some houses did not have an energy label. In this case, label G was used for the calculations. This choice has been made to ensure that the GHG footprint is not underestimated. The GHG emissions per house were multiplied by the ratio of the outstanding amount to the value of the property at origination to calculate the GHG emissions allocated to the NWB Bank (financed GHG emissions). A few ratios of outstanding amount to property value at origination were 1 or slightly higher. The reason for a ratio higher than 1 is that the client still has a bridging loan or is using part of it for sustainability measures. For the calculation of the financed GHG emissions the ratios greater than 1 were set at 1.
Avoided emissions	Avoided emissions are not considered in the calculations.
Asset class specific considerations	The approach for the NHG pass-through RMBS is in line with the 'Mortgages' 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. Subsequently the following formula has been used to determine which part of the emissions NWB Bank is accountable for. $$\sum CO_2eq \times \frac{\textbf{Outstanding loan volume}}{\textbf{Property value at origination}}$$ Finally, the sum of the scopes of all individual mortgages have been aggregated.
Absolute vs. relative emissions	For NHG pass-through RMBS, 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 whom a GHG footprint was calculated in this report.
Limitations	The actual energy consumption per house was not known. Therefore, an emission factor based on the type of house and energy label in tCO_2e/m^2 was used.
Data quality estimate	3 In the PCAF European Building Emission Factor Database the data quality is indicated by a data quality score 3 (option 2a in Table 5-15 on page 98 of the report PCAF (2022)[64]

Factsheets per data source

Topic	Description
Data	Detailed information per mortgage
Data file	Kopie van NWB PCAF 2023 – Hypotheekdata NIBC – 2023-01-01 _ V2 (002).xlsx Kopie van Sound – 2024-01-01 portfolio sustainability characteristics v2.xlsx
Data Source	NWB Bank
Year	2022: Kopie van NWB PCAF 2023 – Hypotheekdata NIBC – 2023-01-01 _ V2 (002).xlsx 2023: Kopie van Sound – 2024-01-01 portfolio sustainability characteristics v2.xlsx
Last update	Not applicable
Date of download	Received by email at 23-10-2023 (2022 data) Received by email at 27-8-2024 (2023 data) Werkmap\ NHG pass-through RMBS NWB\i.Ontvangen emails
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Werkmap\NHG pass-through RMBS NWB\b. Ruwe data
Data quality	2 Data received by NWB bank at the level of each mortgage
Unit of measurement	Several units

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

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

Topic	Description
Data	Emission factors
Data file	PCAF_European_building_emission_factor_database_Mortgages.xlsx
Data Source	PCAF European building emission factor database
Year	2022 – 2023
Last update	Not applicable
Date of download	15-08-2024
Link to webpage	https://building-db.carbonaccountingfinancials.com/PCAF_emission_factor_database.php?partitionpage=Mortgages
Filters used to obtain the datafile	Source name: EPC Netherlands wetten.overheid.nl Regeling energieprestatie gebouwen, 2023, CRREM Global Pathways Year: 2022 & 2023 Emission factor unit: tCO_2e/m^2
Internal location	Werkmap\NHG pass-through RMBS NWB\b. Ruwe data
Data quality	3 Option 2a
Unit of measurement	tCO_2e/m^2
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Werkmap\ NHG pass-through RMBS NWB\a.Printscreens 240815 PCAF database Mortgages linksboven.png 240815 PCAF database Mortgages linkbsmidden.png 240815 PCAF database Mortgages linksonder.png 240815 PCAF database Mortgages rechtsboven.png 240815 PCAF database Mortgages rechtsmidden.png 240815 PCAF database Mortgages rechtsonder.png

List of the calculation sheets	Location
240826 Berekening Sound hypotheken NWB Bank.xlsx	Werkmap\NHG pass-through RMBS NWB\f3. Berekening NWB

12 Renewable electricity

12.1 Results renewable electricity

The renewable electricity sector is a small sector within NWB Bank's loan portfolio. It contains all wind and solar parks. The sector accounts for 1.7% of the bank's loan portfolio. GHG emissions are calculated for the production, installation, maintenance and dismantling of wind turbines and solar panels of the parks that were in operation in 2023.

This sector is very important for the energy transition and the reduction of greenhouse gas emissions. Investments in this sector will contribute to the greening of our national electricity grid. This chapter does not include avoided emissions, but only the financed GHG emissions from this sector during 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 calculated and reported on an annual basis in this report.

12.2 Coverage ratio and attribution

The GHG footprint for the production, installation, maintenance and dismantling of wind turbines and solar panels was calculated for 88.6% of the loan portfolio within the wind and solar energy sector in 2023. On average, 36% of the wind and solar energy sector's total balance sheet consists of a loan from NWB Bank. This means that NWB Bank is responsible for an average of 36% of the GHG emissions and avoided GHG emissions from the wind and solar energy sector of the parks in NWB's loan portfolio.

Table 12-1 Loan portfolio, coverage ratio and ratio loan portfolio versus total balance sheet for the wind and solar energy sector in 2023

Year	Total loan portfolio (million euro)	Percentage of all loans (%)	Loan portfolio (clients with GHG footprint) (million euro)	Coverage ratio of total loan portfolio (%)	Total balance sheet (clients with GHG footprint) (million euro)	Ratio loan portfolio / total balance sheet (clients with GHG footprint)
2023	994	1.7	881	88.6	2,421	0.36

12.2.1 Financed GHG emissions

Total GHG emissions for all wind parks and solar parks for production, installation, maintenance and dismantling were 15,160 tCO_2e for 2023. The gross financed avoided emissions were 697,976 tCO_2e for 2023.

Table 12-2 Absolute and relative financed GHG emissions for the production, installation, maintenance and dismantling of wind parks and solar parks

Source of emissions	Financed GHG emission (tonnes/year)	Relative financed GHG emission (tCO_2e/million euro)
	2023	**2023**
Wind parks: Production, installation, maintenance, dismantling	11,210	14.1
Solar parks: Production, installation, maintenance, dismantling	3,950	47.1

Table 12-3 Absolute and relative gross financed avoided GHG emissions of wind parks and solar parks

Source of emissions	Financed avoided GHG emission (tonnes/year)	Relative financed avoided GHG emission (tCO_2e/million euro)
	2023	**2023**
Wind parks	652,942	819
Solar parks	45,034	537

12.3 Renewable electricity sector approach

12.3.1 Scope 3

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 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 calculated and reported on an annual basis in this report.
Portfolio covered	The renewable electricity (wind and solar energy) coverage ratio for 2023 is 88.6%.
Data	Data on estimated actual energy production in 2023, types of wind turbines and total balance sheet were obtained from NWB bank. 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 scientific literature. For all solar panels, this information was not available and was taken from scientific literature.
Grid emission factors	Not applicable
Calculation steps	For wind parks and solar parks, the GHG emissions for production, installation, maintenance and dismantling were calculated using the renewable electricity production for 2023 from the file received from the bank. Only the parks in operation in 2023 were considered. This electricity production is taken from the verified annual production or project documentation (theoretical production P90) or it is calculated by multiplying the installed capacity by the production factor. The electricity production was multiplied by an emission factor that indicates how many emissions are released per kWh 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. For all solar panels, this information was not available and was taken from scientific literature. This resulted in the GHG emissions for production, installation, maintenance and dismantling. To calculate avoided GHG emissions, renewable electricity generation for 2023 was multiplied by the grey electricity emission factor (WTW).

	After calculating the (generated and 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 NWB Bank. The financed GHG emissions per client are added up to result in 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 in million euro of the clients for whom a GHG footprint was calculated in this report.
Avoided emissions	NWB Bank does not report on avoided emissions from financing wind and solar parks in this report. By 2035, NWB Bank aims to finance renewable energy production equivalent to the total fossil energy consumption of its loan portfolio. Further details of this ambition can be found in NWB Bank's annual reports.
Asset class specific considerations	For the wind and 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, the bank'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 wind parks and solar parks were aggregated.
Absolute vs. relative emissions	For the wind and solar energy sector, the total financed GHG emissions were calculated in tonnes. The relative financed GHG emissions in tCO_2e / mln euro were calculated by dividing the financed GHG emissions by the outstanding loan volume of the clients for whom 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 scientific literature was used to determine the best value to use. For all solar panels, this information was not available and was taken from scientific literature. The coverage ratio is based on being or not being operational in 2023. If parks were not operational in 2023, no GHG emissions were calculated.
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 subject to insurance. 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 and type of wind turbines
Data file	NWB_Duurzame energie.xlsx
Data Source	NWB Bank
Year	2023
Last update	Not applicable
Email received	PCAF – info zon + wind NWB.msg PCAF – LCA gegevens wind.msg
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable

Internal location	Werkmap\Wind- en zonneparken\NWB Bank\b. Ruwe data Werkmap\Wind- en zonneparken\NWB 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
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Total balance sheet
Data file	Kopie van NWB_Duurzame energie_met_passiva.xlsx
Data Source	NWB Bank
Year	2023
Last update	Not applicable
Email received	PCAF – passiva duurzame energie.msg
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Werkmap\Wind- en zonneparken\NWB Bank\i. Diversen\Ontvangen emails
Data quality	Score 1
Unit of measurement	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\NWB 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
250107_Berekening_Windparken_Zonneparken_NWB_2023.xlsx	Werkmap\Wind- en zonneparken\NWB Bank\f3. Berekening NWB

13 Other sectors

13.1 Other sectors

This chapter covers loans to various other sectors. The CO_2e footprint has been calculated for several different sectors but is presented as a total in this chapter. It includes credit institutions, other financial institutions, nonfinancial corporates, other public organisations and joint regulations. Clients range from banks to tennis clubs, football clubs, port companies, energy and waste management companies, public transport and security regions. It is therefore a very diverse group with a wide range of CO_2e footprints across clients. The other sectors represent a relatively small share within the bank's loan portfolio accounting for 4.4% of the total loan portfolio of NWB Bank in 2023.

13.1.1 Coverage ratio and attribution

The GHG footprint was calculated for 92.8% of the other sector loan portfolio in 2023. The coverage ratio decreased by 3.6% compared to last year. Between 2022 and 2023, the outstanding loan volume increased by 180 million euro. The loan portfolio of clients with a GHG footprint also increased by 84 million euro. For 2022 and 2023, the loan portfolio and the coverage ratio are shown in Table 13-1.

Total balance sheet data is unavailable for most clients in this sector and is not used in the calculation of attributable financed emissions. Economic-activity based emission factors produce an estimate of the emissions associated with the size of the outstanding loan. The total balance sheet and attribution ratio are therefore excluded from Table 13-1.

Table 13-1 Loan portfolio and coverage ratio for the other sectors in 2022 and 2023

NHG pass-through RMBS	Loan portfolio (million euro)	Percentage of all loans (%)	Loan portfolio with GHG footprint (million euro)	Coverage ratio of loan portfolio (%)	Total balance sheet (clients with GHG footprint)	Ratio loan portfolio/ total balance sheet (clients with GHG footprint)
2022	2,322	4.2	2,239	96.4	-	-
2023	2,502	4.3	2,323	92.8	-	-

13.1.2 Financed GHG emissions

The results of the GHG footprint of the outstanding NWB Bank loans to other organisations for 2022 and 2023 are shown in Table 13-2.

Table 13-2 Absolute and relative financed GHG emissions for other sectors in 2022 and 2023

Scope	Financed GHG emissions (tonnes/year)		Financed GHG emissions (%)		Relative financed GHG emissions (tCO_2/million euro)	
	2022	**2023**	**2022**	**2023**	**2022**	**2023**
Scope 1	127,924	134,046	51.9	52.3	57.1	57.7
Scope 2	19,878	21,886	8.1	8.5	8.9	9.4
Scope 3	98,834	100,374	40.1	39.2	44.1	43.2
Total	**246,635**	**256,266**	**100.0**	**100.0**	**110.2**	**110.3**

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

Between 2022 and 2023, absolute GHG emissions increased by 9,631 tons. Financed GHG emissions increased for all scopes. The loans to other sectors covered with a GHG footprint increased by 84 million euro (Table 13-1). The total relative financed GHG emissions increased by 0.1 tons per million euro. In conclusion, the financed GHG emissions increased, but the relative financed GHG emissions remained the same compared to last year. The scope 1 and 3 relative emissions in terms of exposure of this group are significantly higher when compared to other sectors. This difference is attributable to a relatively small amount of highly carbon intensive clients, who are responsible for the majority of this sector's financed emissions.

13.2 Other sectors approach

13.2.1 Scopes 1, 2 and 3

General factsheet

The general factsheet below applies to the majority of clients covered by other sectors.

Topic	Description
Scopes covered	For 'other sectors', scope 1, 2 and 3 are covered. Emissions in the upstream value chain are considered. Scopes 1 and 2 include the consumption of input fuels, natural gas, electricity, heat and steam. Scope 3 includes other upstream emissions.
Portfolio covered	The 'other sectors' coverage ratio for 2023 is 92.8%.
Data	For our work on 'other sectors', NWB Bank utilised sector average emission intensities from Exiobase for the EU-member state region. We have no information on clients' total balance sheet and therefore calculate an activity-based attributed emission value corresponding to the loan value at year-end. The used asset-based emission factors are constructed by PCAF, based on Exiobase input-output tables. Inflation rate data used for the adjustment of Exiobase factors are derived from the PCAF database of country-based inflation rates.
Grid emission factors	The emission factors for this sector's calculations differ from those used throughout the report. Rather than rely on 'CO2emissiefactoren.nl', a PCAF-designed emission factor is used that combines Exiobase emission factors with in-house development of asset-turnover ratios. Exiobase emission factors are based on a so-called 'Multi-Regional Environmentally Extended Supply-Use Tables'. The tables present the in- and outflow of goods and services across sectors and countries. Through the linkage of environmental data on GHG emissions, land use and energy consumption, it is possible to calculate the GHG emission impact of transactions; doing so yields a list of revenue-based emission

	factors, i.e. the emission associated with spending a particular amount in a sector of choice. In cases where revenue data is missing, 'Asset Turnover Ratio's' may be used. An ATR provides an estimate of the revenue associated with a particular amount of assets held in a sector of choice. PCAF constructed their ATRs from the S&P CapIQ database, in which asset and revenue data for a large number of companies are available.
Calculation steps	**Scope 1, 2 and 3** It remains elusive to calculate enterprise value or total equity and debt for a few 'other clients' of NWB Bank. To report the associated emissions of this part of the portfolio, NWB Bank turned to the PCAF methodology with data quality score '5'. Executing this calculation (option 3c) entails multiplying the outstanding amount per client by an emission factor in terms of GHG emissions per unit asset (tCO_2e / million euro) for the sector. $$\sum_{c,s} outstanding\ Amount_c \times Asset\ Turnover\ Ratio_s \frac{GHG\ Emissions_s}{Revenue_s}$$ 1. Calculating asset-based emission factor per scope PCAF performed several calculations to derive the relevant Asset Turnover Ratio and Emissions / revenue factor per Exiobase sector. Asset turnover ratios are calculated based on an average of S&P reported information on companies' assets and revenue, weighted for company assets (size). Emissions factors for GHG emission per unit of revenue were taken from the Exiobase database without further processing. Exiobase provides revenue-based emission intensities by estimating GHG emissions across sectors and regions based on economic transactions and environmental data. 2. Determining sector classification for clients To link clients to the relevant emission factor, NWB Bank devised an internal sector classification mapping to exiobase sector and subsector level. The classification was based on the NAICS mapping table proposed by PCAF or derived from Exiobase descriptions. Client's economic activity was determined through the internal, existing classification (NACE-code), or through publicly available Chamber of Commerce information (self-reported economic activity of the organisation). 3. Adjusting value outstanding for inflation In-line with PCAF's recommended methodology, loan value outstanding was adjusted for the relevant year's inflation factor. The inflation factor used was provided by PCAF. 4. Calculating financed emissions by scope The inflation-adjusted loan value outstanding was multiplied by the relevant PCAF-provided emissions factors for scope 1, 2 and 3, respectively.
Avoided emissions	Exiobase does not provide factors for avoided emissions. Due to its sector-based nature, avoided emissions from own electricity generation and usage is contained and therefore out of scope of calculation.
Asset class specific considerations	The PCAF methodology for asset class 'Business Loans and Unlisted Equity' is followed.
Attribution	Most of the asset class is calculated through asset-based emission factors. In doing so, the attribution is already contained. It is not possible to extrapolate clients' total emissions from the attributed emissions calculated through method 3c.
Absolute vs. relative emissions	The total financed GHG emissions were calculated in tonnes through summing the multiple of the asset-based emission intensity and the outstanding loan value per client. Relative financed emissions in tCO_2e / mln euro were calculated by dividing the financed emissions by the outstanding loan volume of the clients for whom a GHG footprint was available.
Limitations	A major limitation of applying asset-based emission factors to the NWB Bank loan portfolio consists of the particular client base considered. As the selection of clients is

	relatively irregular in terms of economic activity, their individual calculated emissions are unlikely to be estimated to a high degree of precision. GHG emission factors in the Exiobase database are updated irregularly and at significant intervals. Most recent data stems from 2019. Changes in (grid) emission intensities that occurred after this date are not factored in.
Data quality estimate	5 Only activity-based emission calculations are available for these clients. PCAF advises to aggregate at a sector average level due to data quality concerns at sub-sector level. 87% of the total loan portfolio in other sectors receives a data quality score 5.

The general factsheet below applies to a small number of clients in other sectors where annual report data are used to calculate the financed GHG emissions.

Topic	Description
Scopes covered	Scope 1 GHG emissions from buildings and transport. Scope 2 GHG emissions from electricity and heat consumption. For some organisations some business travel data was included in scope 3 GHG emissions.
Portfolio covered	The 'other sectors' coverage ratio for 2023 is 94.5%.
Data	The data were taken from the organisations'annual reports or from information provided by the organisations themselves.
Grid emission factors	Section 2.4 contains more information on emission factors. The following emission factors from Table 2-4 were used: - Petrol - Diesel - Propane - Natural gas - Grey energy - Car, unknown fuel & weight - Public transport in general (type of transport unknown) - Air travel < 700 km - Air travel 700-2500 km - Air travel >2500 km For district heating an emission factor from a specific large heat network was used
Calculation steps	Depending on the available data in the annual reports of the organisations the GHG emissions were taken directly from the annual reports or the energy consumption, fuel consumption and travel kilometres were taken from the annual reports and information provided by the organisations themselves to calculate the GHG emissions. The energy consumption, fuel consumption and travel kilometres were multiplied by the emission factor to result in $kgCO_2e$. The total $kgCO_2e$ was divided by 1,000 to result in tCO_2e. 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 other organisation's scope 1 and 2 GHG emissions are attributed to NWB Bank. 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 whom a GHG footprint was calculated in this report.
Avoided emissions	Avoided emissions are not considered in the calculations.
Asset class specific considerations	The approach for other organisations 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 bank'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 other organisations, 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 whom a GHG footprint was calculated in this report.
Limitations	When the GHG emissions were taken from the annual reports of the organisations, the calculation method was not completely clear. Therefore, it is not known whether 'Well to Wheel' or 'Tank to Wheel' emission factors were used to calculate the GHG emissions. For this report the 'Tank to Wheel' emission factors were used. When for the GHG emissions in the annual reports, 'Well to Wheel' emission factors were used, the results in current report are slightly overestimated. Not for all organisations scope 3 GHG emissions were included and for the organisations that had data on scope 3 GHG emissions this was only on business travel.
Data quality estimate	2 The GHG emissions of energy consumption, fuel consumption and travel kilometres data have been taken from the annual reports of the organisations themselves. It is not clear whether the data used has been audited, therefore data quality score is 2. 12% of the total loan portfolio in other sectors receives a data quality score 2.

Factsheets per data source

The general factsheet below applies to the majority of clients covered by other sectors.

Topic	Description
Data	Outstanding amount (EUR) & COC number per client for particular financial products (loans) for particular SIC codes (client type) & economic activity (NACE)
Data files	Not applicable
Data Source	DWHSQLPRD
Year	2023
Last update	02-01-2024
Date of download	30-10-2024
Link to webpage	Not applicable
Filters used to obtain the datafile	LOD: True; Process type: Prod; Prd Prdtype Concat: OHLE_UG, PPS_UG; Instrument Positie: True
Internal location	DWH
Data quality	1
Unit of measurement	0.01 EUR
Selections	SIC Codes not in scope PON & Telos
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Outstanding amount (EUR) & COC number per client for particular financial products (loans) for particular SIC codes (client type) & economic activity (NACE)
Data files	Not applicable
Data Source	DWHSQLPRD
Year	2022
Last update	02-01-2023
Date of download	07-11-2024
Link to webpage	Not applicable
Filters used to obtain the datafile	LOD: True; Process type: Prod; Prd Prdtype Concat: OHLE_UG, PPS_UG; Instrument Positie: True
Internal location	DWH
Data quality	1
Unit of measurement	0.01 EUR
Selections	SIC Codes not in scope PON & Telos
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

Topic	Description
Data	Client economic activity
Data files	Not applicable
Data Source	KVK-register
Year	2024
Last update	07-11-2024
Date of download	07-11-2024
Link to webpage	https://www.kvk.nl/zoeken/
Filters used to obtain the datafile	[Client] COC number
Internal location	Not applicable
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	Exiobase emission factors (DQS 5 S_R), Consumer Price Index (CPI)
Data files	PCAF_DB Financed emissions calculation worksheet 0424
Data Source	PCAF Database Financed Emissions worksheet
Year	2024
Last update	April 2024
Date of download	31-10-2024
Link to webpage	https://db.carbonaccountingfinancials.com/?info-pages=4
Filters used to obtain the datafile	Not applicable
Internal location	Not applicable
Data quality	2
Unit of measurement	Not applicable

Selections	Tabs; '4. NAICS', '9. Consumer Price Index (CPI)', '12. EXIOBASE Classification', '13. EF_Exiobase DQS5 S_R'
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

The factsheets below apply to a small number of clients in other sectors where annual report data are used to calculate the financed GHG emissions.

Topic	Description
Data	GHG emissions of energy consumption, fuel consumption and travel kilometres
Data file	Several annual reports
Data Source	Annual reports of the organisations and information provided by the organisations themselves
Year	2023
Last update	Not applicable
Date of download	19-8-2024
Link to webpage	Not applicable
Filters used to obtain the datafile	Not applicable
Internal location	Annual reports: Werkmap\Projecten NWB\g. Jaarverslagen Other information: Werkmap\Projecten NWB\b. Ruwe data
Data quality	2
Unit of measurement	Several
Selections	Not applicable
Data transformation	Not applicable
Data missing	Not applicable
Print screens	Not applicable

List of the calculation sheets	Location
240815 client_1.xlsx 240815 client_2.xlsx	Werkmap\Projecten NWB\f3. Berekening NWB

14 Total GHG footprint for 2018, 2022 and 2023

14.1 Coverage ratio of the GHG emission assessment

In summary, Table 14-1 shows the overview of the outstanding loan volume per sector and subsector and the coverage ratio for 2018, 2022 and 2023.

Table 14-1 Total outstanding loan volume of NWB Bank and part covered in the GHG assessment in 2018, 2022 and 2023[65]

Market segment	Sector	NACE Code	Total loan portfolio (million euro)			Coverage ratio by GHG footprint of total loan portfolio (%)		
			2018	**2022^**	**2023**	**2018**	**2022^**	**2023**
Social housing	Social housing associations	6820	30,265	31,015	32,591	97.1	97.6	99.7
Public sector	Municipalities	8410	6,583	6,445	5,901	100	100	100
	Provinces	8410	247	324	340	100	100	100
	Water authorities	8410	6,327	7,699	8,370	100	100	100
	Others		16	20	20	-	-	-
Healthcare	Healthcare	8600	2,119	1,871	1,925	89.4	94.6	99.3
Education	Educational institutions	8500	73	122	79	86.2	95.3	100
Networks & Utilities	Drinking water utilities#	3600	477	1,134	1,214	-	98.8	97.5
	Renewable electricity	3500	12	863	994	-	-	88.6
Financial counterparties	Credit institutions & other financial institutions	6400	116	350	316	-	-	-
	NHG pass-through RMBS*	6400	-	2,230	2,638	-	89.7	91.8
Other	Other sectors^^		1,409	2,322	2,502	-	96.4	92.8
Total			**47,644***	**54,395**	**56,890**	**93.4***	**95.6**	**98.3**

*The total loan portfolio of 2018 is without NHS pass-through RMBS.
^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 utilities, the reference year is not 2018, but 2020. Sector specific data is presented in chapter 9. Information shown in Table 14-1 is from 2018.
^^Other sectors include credit institutions, other financial institutions, nonfinancial corporates, other public organisations and joint regulations.

For 2023, the financed GHG emission estimates cover 98.3% of NWB Bank loans portfolio. The part of the loan portfolio covered with a GHG footprint has increased compared to 2022 (from 51,993 million euro in 2022 to 55,902 million euro in 2023; Table 14-2). The increase in coverage ratio is due to an increase in the coverage ratio within the social housing, healthcare and education sectors.

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

Total balance sheet data were estimated where they were missing in order to include these clients in these three sectors. A GHG footprint was included for wind parks and solar parks and the "other sectors" were added. For the majority of the group "other sectors", the data quality score is 5. The GHG footprint is now more complete, but a task remains to improve the data quality in the coming years. Although the coverage ratio for 2023 is 98.3%, not all sectors in Table 14-1 include scopes 1, 2 and 3 emissions (see Table 2-1). Where scope 3 emissions are included, they are not always complete, for instance, in sectors such as healthcare.

14.2 Financed GHG emissions of NWB Bank loan portfolio

The GHG footprint results for the total outstanding loans of NWB Bank in 2018, 2022 and 2023 are shown in Table 14-2.

Table 14-2 shows that for 98.3% of the loan portfolio, the total financed GHG emissions are 1,458,388 tCO_2e, the relative financed GHG emissions are 26.1 tCO_2e per million euro and the overall data quality score is 2.5 on a scale of 1 (best) to 5 (poor).

Table 14-2 Absolute and relative financed GHG emissions in 2018, 2022 and 2023

Market segment	Sector	NACE code	Loan portfolio (clients with GHG footprint) (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
Social housing	Social housing associations	6820	29,383	30,281	32,490	486,014	336,047	318,850	16.5	11.1	9.8	2.0
Public sector	Municipalities	8410	6,583	6,445	5,901	231,344	206,316	200,683	35.1	32.0	34.0	3.7
	Provinces	8410	247	324	341	17,483	11,149	8,814	70.9	34.4	25.9	4.0
	Water authorities	8410	6,327	7,699	8,370	762,026	558,614	508,463	120.4	72.6	60.7	2.8
Healthcare	Healthcare	8600	1,895	1,769	1,912	92,964	65,359	62,519	49.1	36.9	32.7	3.2
Education	Education	8500	63	117	79	271	1,376	1,087	4.3	11.8	13.8	3.0
Networks & Utilities	Drinking water utilities	3600	-	1,120	1,185	-	42,323	34,928	-	37.8	29.5	2.4
	Renewable electricity	3500	-	-	881	-	-	15,160	-	-	17.2	3.0
Financial counterparties	NHG pass-through RMBS	6400	-	1,999	2,422	-	44,767	51,618	-	22.4	21.3	3.0
Other	Other sectors^^		-	2,239	2,323	-	246,635	256,266	-	110.2	110.3	4.6
Total			**44,498**	**51,993**	**55,904**	**1,590,102**	**1,512,586**	**1,458,388**	**35.7**	**29.1**	**26.1**	**2.5**

^In the 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.
*Weighted average data quality score. More details about the data quality score can be found in section 2.3.
^^Other sectors include credit institutions, other financial institutions, nonfinancial corporates, other public organisations and joint regulations.

The absolute GHG emissions presented in Table 14-2 depend on the following factors:

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

Table 14-1 shows that total loan volume has increased over the years and Table 14-2 shows that the total loan volume with a GHG footprint has increased as well. In comparison to 2022 the coverage ratio has increased. Although the loan volume with a GHG footprint increased, the financed GHG emissions decreased by 54 $ktCO_2e$ between 2022 and 2023 (Table 14-2) and by 132 $ktCO_2e$ between 2018 and 2023. Financed GHG emissions are not comparable over time as the coverage ratio increased from 93.4% to 98.3% between 2018 and 2023. Relative financed GHG emissions provide more information. These relative emissions show whether GHG emissions per million euro increase, decrease or remain the same as the coverage ratio increases. Relative financed GHG emissions decreased by 3.0 tCO_2e per million euro between 2022 and 2023 and by 9.6 tCO_2e per million euro between 2018 and 2023. Which is a reduction of 26.9%. Not all sectors were included in the 2018 GHG footprint, such as drinking water utilities, NHG pass through RMBS and the “other sectors” and therefore the comparison over the years is not entirely fair.

The reduction of 54 $ktCO_2e$ (-3.6%) between 2022 and 2023 is due to a reduction in GHG emissions of 86 $ktCO_2e$ in the sectors of social housing, municipalities, provinces, water authorities, healthcare, education and drinking water utilities. The GHG emissions increased by 16 $ktCO_2e$ for the sectors NHG pass through RMBS and other sectors and increased due to the inclusion of the GHG emissions generated by the renewable electricity sector. The largest reductions in GHG emissions were seen in the water authorities and social housing sectors. For both sectors, the largest reduction was seen in scope 2 (electricity consumption). Water authorities’ scope 2 GHG emissions decreased because they replaced European green electricity contracts with Dutch green electricity contracts. Scope 2 emissions from social housing associations may have decreased due to an increase in the use of solar panels on social housing.
Per million euro, the “other sectors” and water authorities have the highest relative financed GHG emissions in 2023. Since 2018, the water authorities have shown the largest decrease in these relative GHG emissions. A small share of clients in the ‘other sector” group has a large GHG footprint. Further research should identify opportune mitigation efforts.

For the four sectors: social housing, municipalities, healthcare and education the financed GHG emissions for scope 1 natural gas consumption and scope 2 electricity consumption per financed m^2 are presented. The social housing sector has the lowest financed GHG emissions per financed m^2 (22 $kgCO_2e/m^2$; 2023) and the healthcare institutions have the highest (72 $kgCO_2e/m^2$; 2023). For all four sectors, financed GHG emissions per financed m^2 have decreased over time.

NWB Bank aims to significantly reduce its carbon footprint by 2030. The relative emissions (per outstanding balance) for the key sectors of water authorities, drinking water utilities, social housing associations, municipalities and healthcare institutions are to be reduced by 43% compared to the 2018 reference year (2020 reference year for drinking water utilities). For these five sectors, the relative financed emissions reduced by an average of 36.9% between 2023 and the reference year (2018, but 2020 for drinking water utilities).

Although it is not possible to make a fair comparison between years at the level of the total loan portfolio due to differences in coverage ratio, this report shows a decreasing trend in the GHG emissions of NWB Bank's loan portfolio, expressed in tCO_2e per million euro. NWB Bank's aim is to accelerate this reduction in the coming years. Targets have been set to reduce GHG emissions in the water authorities, drinking water utilities, social housing, municipalities and healthcare sectors. NWB Bank will support this by encouraging its clients to reduce GHG emissions by offering loans linked to sustainable development, among other things. In addition, NWB Bank aims to improve the completeness of the GHG footprint of its loan portfolio each year, ensuring that actions taken in the field are reflected in the footprint.

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. The rainfall affects, for example, the energy consumption of water authorities. Long term monitoring of the GHG footprint of the bank'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.

14.3 Fossil based energy use of NWB Bank loan portfolio

As introduced in section 1.2, NWB Bank monitors the fossil-based energy use of its loan portfolio, as to indicate the portfolio's status in the energy transition towards fossil-free energy. In summary, Table 14-3 shows the fossil-based energy use for heating and electricity and the total fossil-based energy use of the different sectors. Between 2022 and 2023, the total fossil heat consumption increased by 88,152 GJ. Total fossil electricity consumption decreased by 496,889 GJ. This results in a decrease in total energy consumption of 408,737 GJ. Fossil electricity consumption shows a nice decline, partly due to a positive development in the energy mix (more renewable electricity). Heat consumption includes both the non-sustainable part of district heating and natural gas consumption. Fossil heat consumption has increased for social housing associations, municipalities and healthcare institutions between 2022 and 2023. In the case of social housing associations and healthcare institutions, it is due to an increase in the coverage ratio between 2022 and 2023. In the case of municipalities, it is due to a new inventory of

property data carried out by the Kadaster[66], which led to an increase in the total area owned by municipalities.

Table 14-3 The heat consumption, electricity consumption and total energy consumption attributed to NWB Bank for 2022 and 2023

Market segment	Sector	NACE code	Heat consumption (GJ)	Electricity consumption (GJ)	Total energy consumption (GJ)	Heat consumption (GJ)	Electricity consumption (GJ)	Total energy consumption (GJ)
			2022			**2023**		
Social housing	Social housing associations	6820	3,877,389	665,060	4,542,449	3,946,333	592,972	4,539,305
Public sector	Municipalities	8410	515,309	113,268	628,577	580,452	116,450	696,902
	Provinces	8410	2,508	2,759	5,267	2,411	2,581	4,992
	Water authorities	8410	137,078	776,509	913,588	96,830	417,112	513,942
Healthcare	Healthcare	8600	665,699	107,624	773,323	666,886	90,724	757,611
Education	Education	8500	14,692	3,129	17,822	10,324	3,13	13,457
Networks	Drinking water utilities	3600	14,551	169,466	184,016	12,141	117,954	130,095
Total			**5,227,226**	**1,837,815**	**7,065,041**	**5,315,378**	**1,340,926**	**6,656,304**

To calculate the GHG emissions per sector, the consumption of natural gas, electricity and heat has been calculated or taken directly from the available source (e.g. Republiq). The bank's share of the total balance sheet per client is used to determine which part of the energy data NWB Bank is accountable for. If heat is used from a heating network (social housing associations and water authorities) only the non-sustainable part is shown in this table. For social housing associations, municipalities, provinces, healthcare institutions and education institutions it is not known whether, for example, electricity is purchased as green electricity from the Netherlands. For the calculations in this report, natural gas is assumed to be fossil and for electricity is assumed to be the Dutch energy mix (fossil and renewable).

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

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
Municipalities	1	Natural gas consumption
	1	Kilometres driven with cars owned by the municipal organisation
	2	Electricity consumption
	3	Purchased goods 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 goods and services that could significantly contribute to GHG emissions
Water authorities	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
Healthcare	1	Natural gas consumption
	2	Electricity consumption
	3	Emissions due to commuting
Drinking water utilities	1	CH4 and CO_2 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 utilities 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 utility outside the bank's loan portfolio
Education	1	Natural gas consumption
	2	Electricity consumption

Other sectors	1	
	2	
	3	
NHG pass-through RMBS	1&2	Energy consumption
Renewable electricity	3	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	Regio Alkmaar	9.23
SVP	Purmerend	26.49
HVC	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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