

Triodos Bank Greenhouse Gas accounting methodology 2022

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1 Introduction

Background and objective

Triodos Bank's mission is to make money work for positive social, environmental and cultural change. To that end we believe profit doesn't need to be at the expense of the world's most pressing environmental problems. That's why we only finance sustainable organisations and enterprises transitioning to sustainable approaches, from organic food and farming businesses, to pioneering renewable energy enterprises, recycling companies and nature conservation projects.

Triodos Bank wants to finance the urgent need for a transition to a sustainable economy of the future, helping to create the conditions for people to live a better quality of life. As a bank in a new, more sustainable economy, this means helping to develop a society that lives within its environmental means; beneath a safe environmental ceiling and above a fair social floor. For us, that doesn't just mean avoiding financing companies that harm the environment or have a negative impact on people's lives. It means only and exclusively financing projects, people and business that positively benefit society, the environment and culture.

According to the International Panel on Climate Change's 2018 report, we need to keep the global increase in temperature from pre-industrial levels to under 1.5 degrees. To do that means urgently decarbonizing our economy. It means generating renewable energy, increasing the efficiency of energy supply, improving the reliability of renewable energy systems, and involving society more closely in this transition. Together this represents an enormous challenge and it's one that we, and others, play a role in, helping to finance the kind of change that's needed. And we cannot act as an industry, alone. The scale of the challenge requires urgent action from government, civil society, and business alike. It is both essential and possible.

Financial institutions, as investors in the economy, all have a crucial and constructive role to play in this transition; by no longer financing brown assets that emit greenhouse gas (GHG) emissions and contribute to global warming and instead, by focusing on assets that have a positive impact on people and the environment they depend on.

To understand if their contribution to the low or no carbon transition is on track, financial institutions first need to understand the impact of the decisions they make about where they choose to lend and invest. In particular, they need to know what impact their decisions will have on the environment. In this context, in 2015, at the landmark Paris Climate Conference, Triodos Bank co-signed the Dutch Carbon Pledge to measure and disclose its greenhouse gas emissions, and to ensure these emissions remained in line with the ambitions of the Paris Agreement.

The initiative launched the Partnership for Carbon Accounting Financials (PCAF), a collaboration between Dutch financial institutions which has evolved into the Global GHG Accounting and Reporting Standard for the Financial Industry. Widespread adoption of the global PCAF Standard will allow stakeholders to compare the GHG emissions of banks and other financial institutions. Triodos Bank played a catalytic role in these developments and is still actively taking part in the development and advocacy of the methodology. As one of the first banks to report in this way, we actively collaborate with our partners to encourage others to do the same.

In December 2022, PCAF launched the second version of the Global GHG Accounting and Reporting Standard for Financed Emissions. This version is an update of the Financed Emissions Standard published in 2020 and includes a new methodology for sovereign debt, and guidance on how to measure financed emissions related to GHG emission removals¹.

PCAF's approach is open source and collaborative. It aims to learn from, and contribute to, similar initiatives to be even more transparent about the GHG footprint of financial institution's loans and investments.

At the end of 2022 over 350 institutions worldwide, many of them GABV members, were committed to disclose or are already disclosing their greenhouse gas emissions following the PCAF Standard.

Triodos Bank reports the GHG emissions of its' portfolio since 2018. Our GHG accounting methodology has been aligned with the PCAF Standard for our Annual Report in 2022, and this methodology report describes how we are putting that work into practice.

¹ <https://carbonaccountingfinancials.com/en/newsitem/pcaf-launches-the-2nd-version-of-the-global-ghg-accounting-and-reporting-standard-for-the-financial-industry>

Triodos Bank wants to be net-zero as early as possible, at the latest by 2035. At the COP26 in November 2021, we disclosed our transition plan. Our ambition is that the greenhouse gas emissions of all Triodos Bank's loans and investments will be greatly reduced. The remaining emissions will be balanced or 'inset' by investing considerably in nature projects that remove greenhouse gases from the atmosphere. By following PCAFs' mapping of emissions per asset class, we identified current hotspots within our portfolio. This provided useful guidance when setting science-based targets following the Science Based Targets initiative (SBTi) and helps us navigate a long-term strategy that is in line with the Paris Agreement.

As a pan-European values-based bank, we also want to understand, monitor and help to steer on the basis of applying this approach internationally. We will share this experience inside and outside the PCAF group as part of a powerful, collective effort to demonstrate how a bank can keep its influence within a safe environmental ceiling, while playing a powerful role in keeping addressing the challenge of climate change.

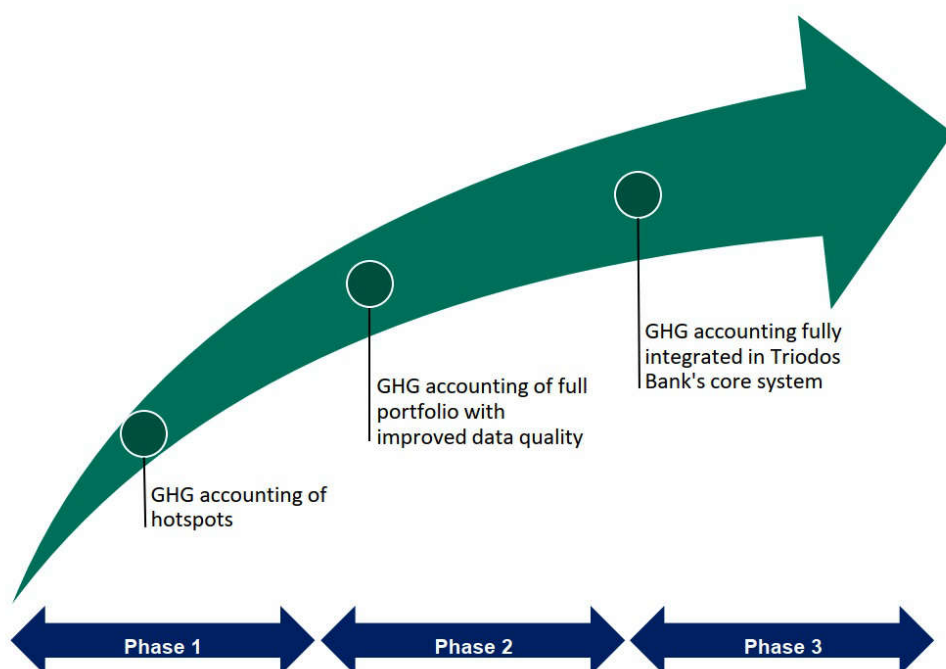
Approach

In alignment with the PCAF methodology, Triodos Bank is further developing on a robust and comprehensive GHG accounting approach that suits its portfolio and business. This approach is built on principles of consistency, transparency, prudence, and accuracy with a focus on data quality. As a result, Guidehouse, a management consultancy with extensive expertise in this area, and serving as PCAF's secretariat, helped Triodos Bank develop an implementation plan for GHG accounting in May 2018 to detail the approach, priorities, timeline and resource required for the roll-out. We have applied a phased approach (see below) to implement GHG accounting, starting with hotspots that covered around 68% of our direct loans and investments in 2018.

In phase 2 as of 2019, all other loans and direct investments are also covered within the scope of PCAF. For these assets and where no emissions can be determined with detailed higher quality data we make an estimate based on the outstanding amounts and the average emission per financed euro in that sector.

In 2022 we have also included the financed emissions of other loans and investments, for example those related to our Treasury activities. And related to our own operational emissions, we have added to the reporting scope the emissions from waste generated in operations and downstream leased assets.

As every year, the emission factors in 2022 have been updated with the most recently published source data. This was performed by Guidehouse and reviewed by Triodos Bank and the external auditor responsible for the review of the reported emissions in our Annual Report.



As part of phase 3, in 2022 we have integrated the GHG accounting in our central enterprise data warehouse for the business banking part of our portfolio. This will help us to monitor and steer on our financed emissions more frequently.

Structure of this document

In this document, we will provide a comprehensive description of the GHG accounting methodology - based on PCAF. We follow the same structure as reported in Triodos Bank's integrated annual report. In each chapter, specific data quality scores are presented which enable Triodos Bank to identify opportunities to improve data quality over time.

Next to describing the guiding principles for GHG accounting, we present the GHG accounting of Triodos Bank's own operations, such as employee commuting, business travel and paper use. These are all items that the organisation has footprinted for many years.

While much of this document is relatively technical, the purpose that underpins it is fundamental to the long-term health of the planet we depend on. It is also only a starting point. Triodos Bank looks forward to collaborating further with members of PCAF, and others, to develop a credible, harmonised and easily understood approach to align the GHG emissions of our loans and investments with the Paris Agreement.

For the GHG reporting of Triodos Bank in 2022, please refer to the sections "Climate impact of our loans and investments" and "Environmental report" in Triodos Bank's annual report at www.annual-report-triodos.com.

2 Definitions

Loans

In this report loans are defined as all loans and advances to customers within Triodos Bank. As of 2022 reporting we have also included the loans and advances to banks. Short term cash and bank loans are excluded in the PCAF reporting.

Investments

Investments are defined as all types of financial products managed by Triodos Investment Management, Triodos Regenerative Money Centre and Triodos Foundations. This includes equity, loans and bonds, but excludes liquidities and other assets held in the funds. As of 2022 reporting we have also included in our reporting scope the debt and investment securities managed by the Treasury department and the participations of Triodos Bank.

Treasury securities

Part of our balance sheet consists of assets used for treasury purposes, e.g. cash and cash equivalents, short term cash loans, etc. These short term assets are currently not considered in scope of PCAF.

Greenhouse Gases (GHG)

Greenhouse gases are defined as gases in the atmosphere that absorb and emit radiation. This process is the fundamental cause of the greenhouse effect. The GHG Protocol² recognises seven greenhouse gases: Carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃). In our methodology all emissions are converted to CO₂ equivalents, or CO₂e, using the conversion ratios determined by the Intergovernmental Panel on Climate Change (IPCC). A carbon dioxide equivalent (CO₂e) is a quantity that describes, for a given mixture and amount of greenhouse gas, the amount of CO₂ that would have the same global warming potential (GWP), when measured over a specified timescale (generally, 100 years).

Generated emissions

We consider generated emissions as the GHG emissions as they arise from various economic activities. This refers to carbon that is emitted into the atmosphere.

Sequestered, or absorbed emissions

Sequestered, or absorbed, emissions are GHG emissions stored in carbon sinks, such as trees, plants and soil etc. This refers to the actual removal of carbon from the atmosphere.

As informed by the GHG Protocol, plants and trees absorb carbon (as CO₂) from the atmosphere during photosynthesis. Before this carbon is put back into the atmosphere, it resides in one of several “carbon pools.” These pools include (a) above ground biomass (e.g., vegetation) in forests, farmland, and other terrestrial environments, (b) below ground biomass (e.g., roots), and (c) biomass-based products (e.g., wood products) both while in use and when stored in a landfill. Carbon can stay in pools for very long periods of times, which means an increase in the stock of sequestered carbon stored in these pools represents a net removal of carbon from the atmosphere.

² <http://www.ghgprotocol.org/>

Avoided emissions

Avoided emissions are emissions that are avoided outside of a company's scope 1, 2, and 3¹ inventories and require a project or product accounting methodology. Any estimates of avoided emissions must be reported separately from a company's scope 1, 2, and 3 emissions, rather than included or deducted from the scope 3 inventory.

For Triodos Bank, avoided emissions occur mainly when investing in renewable energy, it refers to GHG emissions that are avoided from fossil-fuel power generation due to renewable energy.

While avoided emissions play a very positive role, they do not remove existing carbon from the atmosphere. And it is important to note that our avoided emissions figures will, eventually, start to decline, even as the amount of energy generated by the renewable energy projects we finance increases. This is because the wider energy system is in the process of becoming less carbon-intensive overall. Energy from fossil-fuel sources will continue to decline while energy from renewable sources is increasing, creating a more sustainable energy system.

¹ Scope 1, 2 and 3 are explained in chapter 3

3 Guiding principles

In line with PCAF and GHG Protocol, the methodology per sector is constructed using the following basic accounting principles:

- Completeness
- Consistency
- Transparency
- Prudence
- Balance
- Accuracy

Each element ensures the methodology is robust and pragmatic for use now and for the future.

Completeness

In order to ensure completeness, the scope must be defined to determine the emissions accounted for in Triodos Bank's value chain. The GHG Protocol² standardises this by categorising direct and indirect emissions in three scopes (see Box 1 and Figure 1). Activities within the value chain of an organisation are direct or indirect depending on the consolidation approach chosen by an organisation.

GHG Protocol Scopes 1, 2, & 3

- **Scope 1:** All direct GHG emissions by Triodos Bank (natural gas in offices and fuel use by our car fleet)
- **Scope 2:** Indirect GHG emissions by Triodos Bank (purchased electricity)
- **Scope 3:** Other indirect emissions not covered in Scope 2; in total 15 categories within Scope 3 are defined, such as purchased good and services, business travel, employee commuting, end of life treatment of sold products, or in the case of Triodos Bank mostly emissions associated with loans and investments (i.e. Scope 3: category 15)

Box 1. GHG Protocol Scopes 1, 2, & 3

² The Greenhouse Gas (GHG) Protocol, developed by World Resources Institute (WRI) and World Business Council on Sustainable Development (WBCSD), sets the global standard for how to measure, manage, and report greenhouse gas emissions.

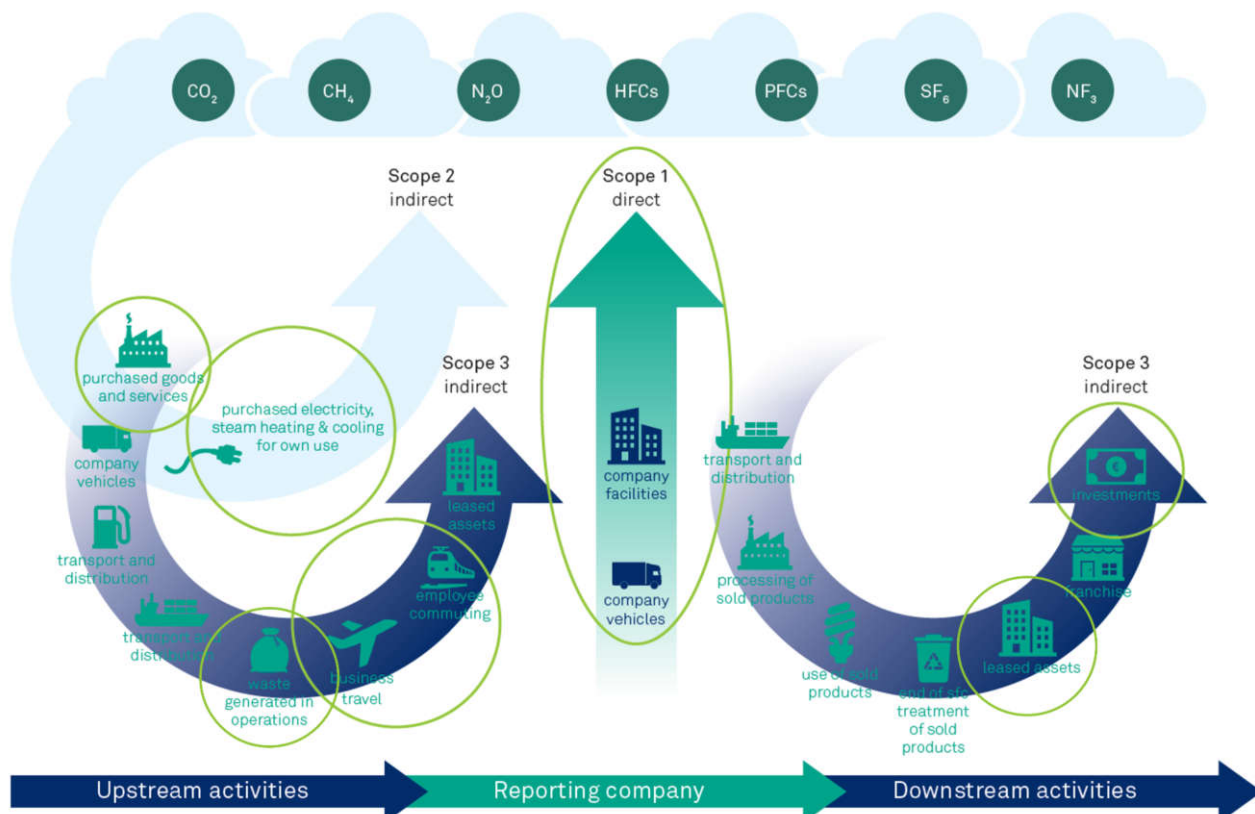


Figure 1. Covered (green) categories and scopes within GHG Protocol Scopes

We aim to be as complete as possible in our GHG accounting, covering all scopes of the GHG Protocol that are material to our GHG inventory. Next to Scope 1 and 2, we report on our emissions from employee commuting, business travel, paper use and waste (upstream Scope 3) and downstream Scope 3 emissions from leased assets. However, the main focus of this report is on our Scope 3 category: 15 Investments. These are our financed emissions and relate to our loans and investments portfolio.

Consistency

The methodology for Triodos Bank is consistent with internationally recognised standards (i.e. GHG Protocol Corporate Value Chain Accounting and Reporting Standard, World Resources Institute, WRI and World Business Council for Sustainable Development, WBCSD; 2004), the sector-led harmonised GHG accounting approach developed by the Dutch Partnership Carbon Accounting Financials and the Global GHG Accounting and Reporting Standard for the Financial Industry from PCAF (the Standard). Next to consistency with international standards and approaches, our methodology is consistent within the selected sectors, i.e. covering the relevant emissions from Scope 1 and 2 of our borrowing customer or investee in all cases.

Transparency

Being transparent is a core value and principle in everything we do. We aim to reflect this in our GHG accounting too, both with the applied methodology and its results in this report. In addition, we are committed to disclose our GHG footprint on an annual basis in our annual report.

Prudence

In our GHG accounting we strive to be prudent and use numbers that are conservative. If the methodology has limitations or good data is not available, we select the methodology or data that is most conservative to our knowledge. This means that when this situation occurs, we overestimate the generated emissions associated with our portfolio and underestimate the avoided or sequestered emissions. To improve the estimations of our financed emissions, we implement data quality scoring. Per sector, a data quality scorecard is applied. Knowing the potential of data quality improvement will enable us to take action to increase data quality and to improve the quality of our overall GHG footprint.

Figure 2 below is a general visualisation of how each sector’s data quality is scored. Each score, starting with score 1 as the highest quality of data and ending with score 5 as the lowest, corresponds to a particular type of data source which will vary depending on the sector in question.

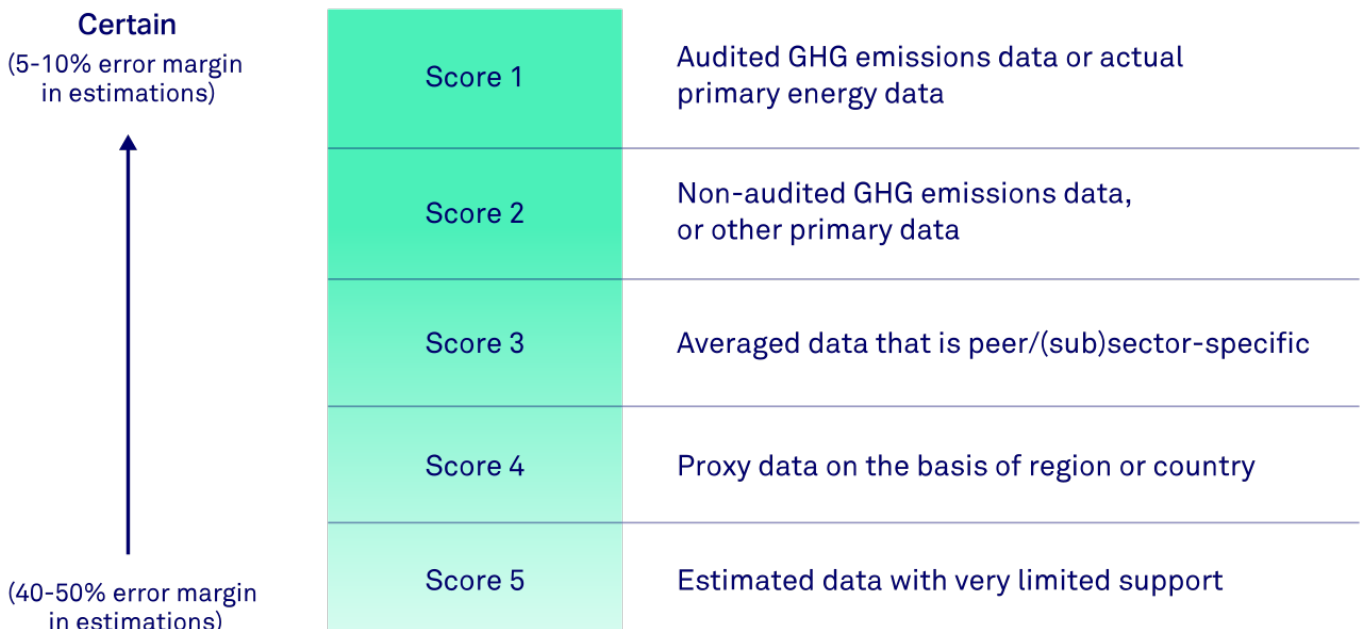


Figure 2: General data quality scoring

From the figure, it is apparent that the level of certainty is also an element that determines the accuracy of the overall GHG footprint.

As well as data quality and uncertainty associated with emission data, financial data on the revenue or total balance sheet of our clients also has different levels of quality, however these are not scored as these are already regularly improved due to legislative financial reporting requirements.

Balance

In line with the GHG Protocol and PCAF, Triodos Bank will account for its financed emissions based on proportional share. Attribution factors to attribute the emissions of our client to our share are defined per customer or project, or based on conservative averages per sector and country. This means that we calculate the emissions as they relate to the proportion of our finance in a project or on a customer's balance sheet. For example, if we are responsible for half of a project's finance, we report half of the emissions generated or avoided by that project. This attribution approach is a more accurate reflection of Triodos Bank's responsibility for the GHG emissions it finances and is consistent with the PCAF methodology.

Accuracy

We aim to be as accurate as possible in our GHG accounting. On the one hand, the methodology ensures accuracy by attributing Triodos Bank's share of the GHG footprint of our clients. On the other, the use of data quality scoring linked to a level of uncertainty enables us to improve data quality and improve the accuracy of our GHG footprint. Results will appear in our annual report and are subject to audit with limited assurance.

4 Emissions from own operations (Scope 1 & 2)

In this chapter, the GHG accounting approach is presented for the GHG emissions from Triodos Bank's Scope 1 and 2 operations in the various countries.

Scope

In line with the GHG Protocol Corporate Value Chain Accounting and Reporting Standard (WRI & WBCSD; 2004), Triodos Bank follows an operational approach to account for the emissions from our own operations, which means Triodos Bank accounts for all the emissions from operations in the various countries over which it has operational control. This includes:

- Scope 1 (direct): emissions arising from gas used to heat our offices and use of fossil fuel in our car fleet (company cars and lease cars).
- Scope 2 (indirect) emissions: emissions arising from purchased electricity and district heating.

Accounting approach and emission factors

Triodos Bank partners with the Climate Neutral Group (CNG) to calculate and compensate our GHG emissions from our own operations. The SmartTrackers tool is used to calculate our Scope 1 and 2 emissions. CNG determines on an annual basis the emission factors for the calculation of the amount of GHG emissions caused by Triodos Bank.

In order to calculate our Scope 1 and 2 emissions, we measure the use of natural gas and electricity for our offices and the energy use for our car fleet. This includes the total amount of natural gas (m³) split up into natural gas and green gas by offsetting (biogas, heating oil and district heating are not used currently). The total amount of electricity (kWh) is split up into grey, wind, hydro, sun, biomass, or a mix of green electricity. For the energy use for our car fleet, we measure consumption of diesel, petrol and electricity (LPG and biodiesel are not used).

Data quality scorecard, assumptions and limitations

Scope 1 and 2 emission data is collected by Local Environmental Managers in the various countries. They complete all data, including underlying evidence, in SmartTrackers. The Group Environmental Manager checks if the input of all data and evidence has been done correctly. After the completion of this phase all data is consolidated by the Finance department (using a four eyes principle). Finally, an external auditor reviews if all relevant data has been entered accurately and approves the outcome.

As we use mostly actual and primary data (i.e. actual data on our energy use in our offices, car fleet, and purchased electricity) to account for our Scope 1 and 2 emissions, this calculation is performed to the highest data quality level. If no actual data is available we use estimates.

5 Emissions from our upstream and downstream activities (Scope 3 category 1-14)

In this chapter we briefly discuss the scope and methodology that we apply to account for emissions from our activities upstream and downstream.

Scope

In line with the GHG Protocol Corporate Value Chain Accounting and Reporting Standard (WRI & WBCSD; 2004), Triodos Bank has also annually accounted for the following emissions:

- Procurement of paper (Scope 3 category 1),
- Waste (Scope 3 category 5),
- Business travel (Scope 3 category 6),
- Emissions related to our employee commuting (Scope 3 category 7) and
- Emissions related to downstream leased assets (Scope category 13).

Accounting approach and emission factors upstream activities

As with our Scope 1 and 2 emission calculations, Triodos Bank partners with Climate Neutral Group (CNG) to calculate and compensate for its emissions from above upstream activities (category 1-7). The SmartTrackers tool is used to calculate these Scope 3 upstream emissions. CNG uses emission factors for the calculation of the amount of GHG emissions caused by these upstream activities on an annual basis.

For paper procurement, we measure office paper and the paper we consume for printed materials (brochures, envelopes, etc). This data is specific to the countries where we operate and tracked by total use (kg).

The category waste generation in operations has been added to the reporting scope retroactively from 2020. This includes different types of waste, such as plastics, paper and cardboard, swill and industrial waste.

Regarding business travel, air travel is based on an emission factor per kilometre and measured based on routes indicated as linked between visited airports, determined by the IATA code. Travel by commuting and road transport are divided because environmental pollution associated with each is different. Cars are split up between diesel, petrol, LPG, unknown and electric. Public transport is divided between bus, train and underground. Data on employee commuting is collected through detailed internal reporting systems and surveys.

Data quality scorecard, assumptions and limitations upstream activities

As we use mostly actual and primary data (i.e. km travelled, transport type, paper) to account for these Scope 3 emissions, we believe this calculation is performed to the highest data quality level. If no actual data is available we use estimates.

Downstream activities

As of the 2022 reporting we have added the emissions related to our downstream leased assets (Scope 3 category 13). These are emissions related to the asset types investment property and repossessed property held-for-sale (note 8 and note 12 to the consolidated balance sheet). Triodos Bank sometimes repossesses assets which come from acquisition in public auctions. These assets are collaterals of an executed loan. A part of the repossessed assets however will not be sold immediately because Triodos Bank has opted to add value by renting out these assets and are therefore presented as investment property. The GHG emissions related to these properties are accounted for by following the same approach, emission factors and data quality as for other financed property in our loan and investment portfolio (Scope 3 category 15), see next chapters.

6 Emissions from Organic Farming (Scope 3 category 15: Investments)

In this chapter we present our GHG accounting methodology for our loans and investments in the sector organic farming.

Scope

All subsectors categorised under organic farming are within scope. These include:

Triodos Bank's Subsector
Dairy
Horticulture
Meat
Arable
Mixed
Fruit growing/farming
Poultry/egg production
Aquaculture
Other organic farming

Table 1. Triodos Bank's subsectors for organic farming

Accounting approach and emission factors

The generated emissions from our loans and investments in organic farming are assessed by combining the collected data (e.g. hectares of land, kilograms of produce) from our clients with supporting external references. For calculating the sequestered emissions related to fruit and nut trees in the organic farming sector, the same approach is used.

The methodology for calculating CO₂e based on hectare data is as follows:

$$\frac{\text{CO}_2\text{e}}{\text{Hectares}} \times \text{Total hectares} \times \frac{\text{Outstanding Triodos loans \& investments}}{\text{Balance sheet total}} = \text{CO}_2\text{e}$$

The methodology for calculating CO₂e based on kilogram data is as follows:

$$\frac{\text{CO}_2\text{e}}{\text{kilograms of produce}} \times \text{Total kilograms of produce} \times \frac{\text{Outstanding Triodos loans \& investments}}{\text{Balance sheet total}} = \text{CO}_2\text{e}$$

As we already collect data on hectares from our organic farming clients for impact reporting purposes, the emission intensity factor per hectare is calculated based on data from public databases like the Food and Agriculture Organisation of the United Nations (FAO) FAostat³ and for fruit and nut trees the studies of Aguilera, Guzmán and Alonso⁴. Often these public data sources provide average emission intensities for a crop or livestock. Where available, better quality data is used such as actual yield data. Because Triodos Bank only finances organic farming in this sector, these emission factors are adjusted based on studies that compare the emission intensity of organic versus conventional farming. The emission factors used include Scope 1 and 2 combined.

After emissions have been estimated per client, these emissions are attributed to Triodos Bank based on the ratio between our outstanding loan and the balance sheet total of the client recorded in our system.

³ <http://www.fao.org/faostat/en/#home>

⁴ Aguilera, E., Guzmán, G., & Alonso, A. (2015). Greenhouse gas emissions from conventional and organic cropping systems in Spain. I. Herbaceous crops. *Agronomy for Sustainable Development*, 35(2), 713-724: <https://link.springer.com/article/10.1007/s13593-014-0267-9>

Case Study: A look into calculating GHG emissions of organic farming

The FAO database¹ and report on *Organic Agriculture and Climate Change Mitigation* (2011)² were primarily used to calculate emission levels attributable to Triodos Bank. Because Triodos Bank data captures the impact of loans and investments by hectare of land use, a factor of GHG emissions per hectare is needed. To derive these factors, it is required to combine production, emissions, and yield data from FAO. A conversion such as the one below is used in deriving an emission intensity per hectare of land use.

$$\frac{\sum \text{Total production (tonnes)}_{\text{Arable crops}}}{\sum \text{Hectares}_{\text{Arable crops}}} \times \frac{\sum \text{CO}_2\text{e}_{\text{Arable crops}}}{\sum \text{Total production (tonnes)}_{\text{Arable crops}}} = \frac{\text{CO}_2\text{e}_{\text{Arable crops}}}{\text{Hectares}_{\text{Arable crops}}}$$

It is also possible to simply divide the total emissions from crops by the total hectares if this is known. However, many times the yield data (tonnes/ha) is presented without knowing the total amount of hectares used. It is therefore not possible to convert unless all three elements (total area, total production, total emissions) are known.

Secondly, in this case, area data for livestock (Triodos Bank’s subsectors Meat and Dairy) was only known per LSU (LSU = livestock unit equivalent to an adult cow). Eurostat livestock unit (LSU) coefficients³ were used to convert the specific type of animal (i.e. pig, goat, cow) per hectare because the FAO database had indicators based on LSU/hectare and yield (hg)/animal. In this way a similar GHG intensity factor was derived.

Finally, based on the FAO report, average emissions from organic farming per hectare are around 57% lower than conventional dairy farming. This percentage is used to convert the above GHG intensity factor for conventional farming to organic farming.

Box 2. Case study on organic farming

Data quality scorecard, assumptions and limitations

Emissions from organic farming can be calculated in different ways depending on the data availability and data quality. Based on the various data sources available and in line with PCAF, we have developed the data quality scorecard presented in Table 2.

Data quality score (highest to lowest)	Description
1	Audited GHG emission data from our clients, in accordance with the GHG Protocol
2	Primary data such as yield data collected by Triodos Bank client, converted to CO ₂ e emissions using verified emission factors specific to the emission source
3	<ul style="list-style-type: none"> Sector-specific physical-activity based source data, used to calculate GHG emissions with an approved GHG calculation tool¹, or comparable sector-specific and physical-activity based databases or tools issued by credible institutions such as the FAO Estimated carbon emissions based on hectares, type of farming and regions, using verified emission factors Non-audited or non-verified GHG emission data provided by our clients
4	Specific emission data from life cycle analysis (LCA) in specific regions that overlap with Triodos Bank loans and investments
5	Extended Environmental Input Output (EEIO) databases (i.e. EXIOBASE or GTAP) that provide sector-level data on emissions per revenue ² per country

¹ Such as the IFC Carbon Emissions Estimation Tool (IFC-CEET), Agence Française du Développement (AFD) Carbon calculation tool

² In EEIO databases gross output production (expressed in euro) can be used as a proxy for revenue. Gross output is defined as “the total value of sales by producing enterprises (their turnover) in an accounting period (e.g. a quarter or a year), before subtracting the value of intermediate goods used up in production”. Gross output production is “calculated by summing the intermediate and final sales” which matches well with the definition of “revenue”.

Table 2. Data quality scorecard for organic farming

¹ For instance, the FAO data base (<http://www.fao.org/faostat/en/#data>) and FAO report (see footnote 3) was used to derive emission intensities per hectare.

² See FAO (2011), *Organic Agriculture and Climate Change Mitigation*, http://www.fao.org/fileadmin/templates/organicag/pdf/11_12_2_RTOACC_23_webfiles.pdf

³ Such as the IFC Carbon Emissions Estimation Tool (IFC-CEET), Agence Française du Développement (AFD) Carbon calculation tool

In general, audited GHG emissions are the highest quality and the most desirable. As organic farmers are often smallholder farmers, audited data is not available. A client in the organic farming sector could also gather primary data that enables Triodos Bank to perform the calculations by using available GHG accounting tools, such as Cool Farm Tool⁴. For example, a client could report the number of cows, the milk yield, and the processes involved on the specific farm to effectively calculate an emission factor on a client basis. Triodos Bank would be able to store this information per client to perform optimal GHG accounting. Otherwise, due to the specific nature of organic farming techniques as they vary regionally and among clients, scientific literature and/or a combination of sectoral database approximations is used to derive an emission factor for Triodos Bank's subsectors.

⁴ <https://coolfarmtool.org/>

7 Sequestered emissions from Nature Development and Forestry (Scope 3 category 15: Investments)

In this chapter we present our methodology to account for the sequestered emissions from our loans and investments in the nature development and forestry subsectors. As these emissions follow a different accounting approach, we will account and report on them separately.

Scope

Triodos Bank's subsectors of forestry and nature development are within the scope of sequestered emissions.

Accounting approach and emission factors

Sequestered emissions of forestry are calculated by using data in the AFOLU USAID Carbon Calculator on emissions per hectares of different species and stages of forestry development including harvesting, thinning, and fertilizer usage. The emission factors used include Scope 1 and 2 combined.

For nature development the sequestered emissions are calculated by taking a sample mix of species found in cooler temperate climates. All rotational period emissions per hectare are averaged per species over a period of 30 years. Then, an average of these emission factors is calculated to approximate the mixed varieties of species found in nature development. The attribution factor (our financed share) is then multiplied by this figure in order to attribute the emissions to Triodos Bank's activity.

$$\text{Average} \frac{\text{CO}_2\text{e}}{\text{Hectare (ha)}}_{\text{per species of tree}} \times \text{Total hectares (ha)} \times \frac{\text{Outstanding Triodos loans \& investments}}{\text{Project Equity + Debt}} = \text{CO}_2\text{e}_{\text{sequestered}}$$

Sequestered emissions of grassland (incl. heathland) are also calculated using AFOLU USAID data and using a similar calculation:

$$\text{Average} \frac{\text{CO}_2\text{e}}{\text{Hectare (ha)}} \times \text{Total hectares (ha)} \times \frac{\text{Outstanding Triodos loans \& investments}}{\text{Project Equity + Debt}} = \text{CO}_2\text{e}_{\text{sequestered}}$$

Data quality scorecard, assumptions and limitations

The following data scoring is used to score and improve data quality on nature development and forestry over time.

Data quality (highest to lowest)	Description
1	<ul style="list-style-type: none"> Audited carbon sequestration data from the clients in nature development and forestry, in accordance with the GHG Protocol
2	<ul style="list-style-type: none"> Annual, actual incremental growth of the specific species of land/trees being financed in a known region Carbon sequestration data calculated by Triodos Bank or a third-party data provider, based on primary data and using verified emission (sequestration) factors specific to the sequestration source
3	<ul style="list-style-type: none"> Estimated carbon sequestered emissions based on hectares, species of land/trees and regions, using verified emission factors
4	<ul style="list-style-type: none"> Non-audited or non-verified GHG emission data provided by our clients <p>Estimated carbon sequestered emissions based on hectares and regions for unknown species of land/trees, using verified emission factors</p>
5	<p>Average, global sequestered emissions for any unknown species of land/trees using verified emission factors</p>

Table 3. Data quality scorecard for sequestered emissions in nature development and forestry

8 Emissions from Sustainable Commercial Property (Scope 3 category 15: Investments)

In this chapter, we present the methodology, scope, accounting approach and data quality scoring for our loans and investments in the sustainable commercial property sector.

Scope

The following subsectors categorised under the sustainable property sector are within scope. These include:

Triodos Subsector

Property development
Shared workspace/Offices
Private sustainable property¹
Other sustainable property

¹ Private sustainable property is explained in the next chapter together with residential mortgages

Table 4. Triodos subsectors for sustainable property

Accounting approach and emission factors

For a second year, the sustainable commercial property sector are accounted for using emission factors (tCO₂e/m²) from the PCAF European Building emission factor database, launched 14 February 2022¹. This publicly available database is based on data sources such as CRREM, GRASB and national Energy Performance Certificate (EPC) registers, and it offers emission and energy intensity factors per unit or floor area and per EPC label.

Compared to the methodology applied up to 2020, the PCAF Building emission factor database offers a more limited amount of non-residential building categories. Certain categories used in the previous methodology – such as ‘Education’ and ‘Holiday resort’ – are not included the PCAF building emission factor database. However, we believe that this can be justified by the use of more accurate sources and the increasing amount of granularity that can be offered due to the inclusion of EPC labels for each of these categories.

The emission factors in the PCAF database distinguish between the following building types, in line with the methodology of CRREM² and GRESB³:

¹ [PCAF Building emission factor database](#).

² Carbon Risk Real Estate Monitor (CRREM), a tool that provides the real estate industry with transparent, science-based decarbonization pathways aligned with the Paris Climate Goals.

³ Global Real Estate Sustainability Benchmark (GRESB), provides validated ESG performance data to financial markets.

Building type	Description
Retail - High street	Retail properties located on the high street, such as terraced properties located in the city center or other high-traffic pedestrian zones.
Retail - Shopping center	Enclosed centers for retail purposes consisting of multiple retail stores connected with internal walkways.
Retail - Strip Mall	Unenclosed retail space, such as strip center or strip mall, where buildings are usually stand-alone and situated side-by-side with their entrance facing a main street or carpark.
Office	Office properties including free-standing offices, office terraces, unattributed office buildings and office parks.
Industrial distribution warehouse	Unenclosed industrial properties, such as large halls in the outskirts, used for the purpose of storing, processing, and distribution of goods.
Hotel	Accommodation properties including hotels, motels, youth hostels, lodging, and resorts.
Healthcare	Properties used for primary healthcare, such as hospitals, clinics, physical therapy centers, mental health centers, rehabilitation or restorative care centers.
Leisure and sport facilities	Properties used for leisure and sports, such as sports club houses, gyms, sports stadia, indoor sports arenas, halls, swimming pools, theatre and auditoria.
Non-residential total	Non-residential total does not distinguish between building types but takes the country average of all non-residential buildings. This type is only available for the average energy label (baseline).

Table 5. Commercial building types in the PCAF building emission factor database

It is important to note that the emission factors in the PCAF Building emission factor database refer to the use phase of the building only and includes Scope 1 and 2 combined. The building's construction or demolition phase and its emissions are not covered.

The physical activity-based emission factors provided (tCO₂e/m²) can be extracted per energy label rating as shown on an Energy Performance Certificate (EPC) and is calculated by multiplying the energy consumption (intensity) per m² by a country- and building type-specific emission factor:

$$\text{EPC emission intensity [per m}^2\text{]}_{j,c} = \text{Emission intensity [per m}^2\text{]}_{j,c} \times \text{EPC energy intensity [per m}^2\text{]}$$

(with j = building type, c = country)

A more detailed description of how country-specific EPC-ratings were calculated can be found in the PCAF Building emission factor database methodology document⁴.

The total emissions are then calculated by multiplying the EPC emission intensity with the total number of square metres of the property (rentable floor space). Where no EPC-rating is available a Triodos Bank sector weighted average is used. To attribute the properties' emissions to Triodos Bank, an attribution factor is applied that divides the outstanding loan by the property value, or balance sheet total, of the customer.

$$\text{EPC emission intensity [per m}^2\text{]}_{j,c} \times \text{total m}^2 \times \frac{\text{Outstanding Triodos loans \& investments}}{\text{Property value or Balance sheet total}} = \text{CO}_2\text{e}$$

Average baseline

An average baseline from the PCAF Building emission factor database is added to the emission factor analysis. These baseline emission factors are a weighted average and are calculated based on EPC label distribution (%) per building type and country and the corresponding emission factor of those EPC labels.

The average baseline will be used to compare the impact in terms of 'avoided' emissions for our sustainable property portfolio. The avoided emissions from buildings will only be used to disclose as a separate KPI for buildings in our Green Bond impact report and is not used in our Annual Report.

⁴ [PCAF Building emission factor database.](#)

Data quality scorecard, assumptions and limitations

For sustainable property, we have developed a detailed data quality scorecard to identify data improvements and improve data quality over time. Table 6 describes the data quality scoring for sustainable property in more detail.

Data quality (highest to lowest)	Description
1	<ul style="list-style-type: none">Audited GHG emission data from our clients, in accordance with the GHG ProtocolActual energy consumption, converted to CO₂e emissions using verified emission factors specific to the type of energy consumed
2	Actual energy consumption, converted to CO ₂ e emissions using emission factors for energy from undefined energy source
3	<ul style="list-style-type: none">Estimated energy consumption based on energy performance/energy label and floor area, converted to CO₂e emissions using emission factors for energy from undefined energy sourceNon-audited or non-verified GHG emission data provided by our clients
4	Estimated energy consumption per type of property and floor area, converted to CO ₂ e emissions using emission factors for energy from undefined energy source
5	Average energy consumption per type of property in a country, converted to CO ₂ e emissions using emission factors for energy from undefined energy source

Table 6. Data quality scorecard for sustainable property.

9 Emissions from Residential mortgages and Residential real estate (Scope 3 category 15: Investments)

In this chapter, we present the developed methodology, including the scope, accounting approach and data quality scores, for the GHG accounting of the private residential mortgages sector and the residential sustainable property (real estate) sector.

Scope

All outstanding residential mortgages and residential sustainable property that are recorded in our system are within scope.

Accounting approach and emission factors

In order to calculate the GHG emissions attributed to the residential properties, emission factors (tCO₂e/m²) from the PCAF European Building emission factor database are used⁵, see also chapter 8. For the residential real estate in The Netherlands we have applied (in 2022 and in retrospective 2021) the GHG emission lookup table developed by the PCAF NL working group.

Following these emission factors of the PCAF European database and the PCAF NL working group, we distinguish the following building types:

Building type	Description
Single-family house (SFH)	Residential properties occupied by one household or family.
Multi-family house (MFH)	Larger residential properties occupied by more than one household or family.
Apartments	Smaller individual residential properties that are usually located in a apartment complex.

Table 7. Residential building types by the PCAF EU building emission factor database and the PCAF NL residential real estate emission factor lookup table.

We account for the use phase of of each house or apartment and include the Scope 1 and 2 emissions combined (i.e. the fossil fuel use to heat the house and purchased electricity and/or heat by the owner/user of the house = total energy consumption of the house). The construction or demolition phase and its emissions are not covered. Tenant activities related to electricity, heating and cooling is also included in these factors.

EPC rating-specific emission intensity expressed in tCO₂e per unit are used. These are emission factors per building type – either single- or multi-family house or an apartment – split into all available energy labels in the relevant countries (see the formula below). Where no EPC-rating is available a Triodos Bank country weighted average is used.

$$\text{EPC emission intensity [per \#]}_{j,c} = \text{Average building size}_{j,c} \times \text{EPC emission intensity [per m}^2\text{]}_{j,c}$$

(with j = building type, c = country)

The total emissions are then calculated by multiplying the EPC emission intensity with the number of houses. To attribute the emissions to Triodos Bank, an attribution factor is applied that divides the outstanding mortgage loan by the property value of the customer ('loan-to-value'), or for loans in the sustainable property sector divided by the property value or balance sheet total of the customer.

$$\text{EPC emission intensity}_{j,c} \times \# \text{ houses} \times \frac{\text{Outstanding Triodos loans}}{\text{Property value or Balance sheet total}} = \text{CO}_2\text{e}$$

⁵ [PCAF Building emission factor database.](#)

Average baseline

An average baseline from the PCAF Building emission factor database and the PCAF NL lookup table is added to the emission factor analysis. These baseline emission factors are a weighted average and are calculated based on EPC label distribution (%) per building type and country and the corresponding emission factor of those EPC labels. The average baseline will be used to compare the impact in terms of 'avoided' emissions for our residential mortgages and real estate portfolios. The avoided emissions from residential buildings will only be used to disclose as a separate KPI for residential buildings in our Green Bond impact report and is not used in our Annual Report.

Data quality scorecard, assumptions and limitation

In a similar way to sustainable commercial property, we have developed a detailed data quality scorecard for our private residential mortgages and residential sustainable property in Table 8 below.

Data quality (highest to lowest)	Description
1	Actual energy consumption, converted to CO ₂ e emissions using verified emission factors specific to the type of energy consumed
2	Actual energy consumption, converted to CO ₂ e emissions using emission factors for energy from undefined energy source
3	<ul style="list-style-type: none">Estimated energy consumption based on energy performance/energy label and floor area, converted to CO₂e emissions using emission factors for energy from undefined energy sourceAverage, actual energy consumption per postal code regions, converted to CO₂e emissions using emission factors for energy from undefined energy source
4	Estimated energy consumption based on energy labels and type of property, converted to CO ₂ e emissions using emission factors for energy from undefined energy source
5	Average energy consumption per type of property in a country, converted to CO ₂ e emissions using emission factors for energy from undefined energy source

Table 8. Data quality scorecard for residential mortgages

In 2022 we have increased the mortgages data quality score through application of the GHG emissions lookup table for residential real estate in the Netherlands. This PCAF NL emission factor table uses public energy consumption data from the Central Bureau of Statistics (CBS), together with energy label and type of real estate object. As a result, the data quality scoring for the Dutch part of the residential mortgage portfolio improved from 4.0 to 3.0.

10 Emissions from Health Care – Care for the Elderly (Scope 3 category 15: Investments)

In this chapter, we present the methodology, scope, accounting approach and data quality scoring for our loans and investments in the health care subsector: Care for the elderly.

Scope

Within the the Health care sector we distinguish the sector Care for the Elderly as this subsector is fully in scope for impact reporting (number of elderly people) which data is used for PCAF calculation. For other Triodos Bank subsectors within Health care we apply the high-level sector approach (see chapter 14) or when better data is available we apply the PCAF Building emission factor database for building type 'healthcare' (see chapter 8).

Accounting approach and emission factors

For the Elderly care sector the PCAF Building emission factor database is used. The emission factors are based on the building type 'multi-family house' (see chapter 9) and include Scope 1 and 2 combined. In 2021 reporting a combination of the emissions factors for 'multi-family house' and 'healthcare' was used, but when further analysing the data we concluded that the elderly care homes financed are in general more similar to a multi-family house than they are to the more carbon intensive healthcare sector.

An EPC rating-specific emission factor expressed in tCO₂e per floor area is calculated by multiplying a country- and building type-specific emission intensity with the EPC rating-specific energy intensity per m². Where no EPC-rating is available the average baseline (see chapter 8) is being used.

Because Triodos Bank generally does not record square metre data of the elderly care facilities financed, an average floor area per elderly person of 75m² is used to calculate the emission factor per elderly person (a data point that is available for impact reporting). This square metre number comes from the Dutch study 'Handreiking Kengetallen Benchmark Zorgvastgoed Bouwkostennota 2017'⁶.

Of course, where we were able to obtain square metre or energy consumption data for an elderly care facility directly, we used this as input to derive the GHG emissions.

$$\frac{\text{CO}_2\text{e}}{\text{Elderly person}} \times \text{Total number of elderly people} \times \frac{\text{Outstanding Triodos loans \& investments}}{\text{Balance sheet total}} = \text{CO}_2\text{e}$$

After the estimation of the total emissions per elderly care facility, these emissions are attributed to Triodos Bank based on the ratio between our outstanding loan and investment and the balance sheet total of the client, recorded in our system.

Data quality scorecard, assumptions and limitations

The following data scoring is used to score and improve data quality on care for elderly over time.

⁶ <https://www.zorgkennis.net/downloads/kennisbank/ZK-kennisbank-AcvZ--Bouwkostennota-2017-5277.pdf>

Data quality (highest to lowest)	Description
1	<ul style="list-style-type: none"> Audited GHG emission data from our clients, in accordance with the GHG Protocol Actual energy consumption of the care facility, converted to CO₂e emissions using verified emission factors specific to the type of energy consumed
2	Actual energy consumption for the care facility, converted to CO ₂ e emissions using emission factors for energy from undefined energy source
3	<ul style="list-style-type: none"> Estimated energy consumption based on energy performance/energy label and floor area, converted to CO₂e emissions using emission factors for energy from undefined energy source. The total floor area is derived from the number of elderly people in a care facility Non-audited or non-verified GHG emission data provided by our clients
4	Estimated energy consumption per type of care facility and floor area, converted to CO ₂ e emissions using emission factors for energy from an undefined energy source
5	Average energy consumption for a care facility in a country, converted to CO ₂ e emissions using emission factors for energy from an undefined energy source

Table 9. Data quality scorecard for care for elderly

11 Emissions from Social Housing (Scope 3 category 15: Investments)

In this chapter, we present the methodology, scope, accounting approach and data quality scoring for our loans and investments in the social housing sector.

Scope

All the subsectors categorised under the social housing sector are within scope. The subsectors include:

Triodos Subsector
Housing associations
Other social housing

Table 10. Triodos subsectors for Social housing

Accounting approach and emission factors

Also for this sector the PCAF Building emission factor database is used. The emission factors are based on the building type ‘single-family house’ (see chapter 9) and include Scope 1 and 2 combined. We assume an average of 84m² per social house to calculate the emission factors in this sector⁷. An EPC rating-specific emission factor has been applied in the 2022 calculations, and where no EPC rating was available, the average baseline line is being used (see chapter 8).

Emissions related to the social housing sector can be accounted for by multiplying the number of houses as reported per country with the corresponding emission factor, and attributing these emissions to Triodos Bank. The following formula is applied:

$$\frac{\text{CO}_2\text{e}}{\text{house}} \times \text{Total number of houses} \times \frac{\text{Outstanding Triodos loan \& investments}}{\text{Balance sheet total}} = \text{CO}_2\text{e}$$

Data quality scorecard, assumptions and limitations

The following data scoring is used to score and improve data quality on social housing over time.

Data quality (highest to lowest)	Description
1	<ul style="list-style-type: none"> Audited GHG emission data from our clients, in accordance with the GHG Protocol Actual energy consumption, converted to CO₂e emissions using verified emission factors specific to the type of energy consumed
2	Actual energy consumption, converted to CO ₂ e emissions using emission factors for energy from an undefined energy source
3	<ul style="list-style-type: none"> Estimated energy consumption based on energy performance/energy label and floor area per type of social house in a country, converted to CO₂e emissions using emission factors for energy from an undefined energy source Non-audited or non-verified GHG emission data provided by our clients
4	Estimated energy consumption per type of social house in a country and floor area, converted to CO ₂ e emissions using emission factors for energy from an undefined energy source
5	Average energy consumption per social house in a country, converted to CO ₂ e emissions using emission factors for energy from an undefined energy source

Table 11. Data quality scorecard for social housing

⁷ <https://zoek.officielebekendmakingen.nl/ah-tk-20172018-2199.html>

12 IEB funds: emissions from Listed equity and corporate bonds (Scope 3 category 15: Investments)

Triodos Bank operates several Impact Equities and Bonds funds (IEB). These funds contain equity and bond holdings in listed companies and sub-sovereigns. In this chapter we present the methodology that has been applied to calculate the emissions from the equity and bond holdings in our funds.

Scope

All listed equities, corporate bonds and sub-sovereign bonds in the IEB funds (see table below) are within scope. Sovereign bonds in the funds are included in the GHG methodology based upon the 'high-level sector approach' (see chapter 14).

Triodos Impact Equities and Bonds funds

Global Equities Impact Fund
Euro Bond Impact Fund
Sterling Bond Impact Fund
Impact Mixed Funds
Pioneer Impact Fund
Future Generation Fund

Table 12. Triodos Bank's IEB funds

Consistent with PCAF, cash and cash equivalents are excluded from the PCAF scope determination.

Accounting approach and emission factors

In line with PCAF, Triodos Bank accounts for Scope 1 and 2 emissions of the equity and bond holdings within the funds divided by the total enterprise value of each.

$$(\text{Scope 1 CO}_2\text{e} + \text{Scope 2 CO}_2\text{e}) \times \frac{\text{Market value of Triodos equity and debt}}{\text{Enterprise value}} = \text{CO}_2\text{e}$$

Emissions that represent Scope 1 and 2 of a given company can be taken from their reports if available. For large portfolios external data providers are often used such as CDP, Bloomberg Terminal, MSCI, Trucost and ISS-ESG. For 2022 annual reporting Triodos Bank has continued with the data provided by ISS-ESG.

The Scope 1 and 2 emissions of a company or sub-sovereign in our fund are attributed to Triodos Bank based on the market value of our equity and debt divided by the enterprise value, which is provided by ISS-ESG.

For the part of the equity and bond portfolio that are not covered by ISS-ESG we extrapolate the GHG emissions conform the covered part. These extrapolated emission estimations have a data quality score of 5 ('high-level sector approach', see chapter 14).

Data quality scorecard, assumptions and limitations

Table 13 below indicates our data quality scoring for the emission calculations for the IEB funds.

Data quality score (highest to lowest)	Description
1	Audited GHG emission data from the listed companies and sub-sovereigns in our fund, in accordance with the GHG Protocol
2	Non-audited GHG emission data or GHG emission data calculated by Triodos Bank or third-party data provider, based on primary data from the listed company or sub-sovereign and using verified emission factors specific to the emission source
3	Estimated GHG emissions based on peers of the listed company or sub-sovereign
4	Emission intensity factors (emissions per million euro invested) per sector from own system or peer financial institutions
5	Extended Environmental Input Output (EEIO) databases (i.e. EXIOBASE or GTAP) that provides sector-level data on emissions per revenue per sector and country

Table 13. Data quality scorecard for listed equity via SRI funds

Data providers with frameworks to collect and calculate GHG emissions of listed and non-listed companies are usually the most accessible way to move forward for funds with multiple companies. For funds of an institution like Triodos Bank that invest in emerging markets, data gaps need to be filled in as fewer companies in emerging markets disclose their Scope 1 and 2 emissions.

13 Other loans and investments

(Scope 3 category 15: Investments)

In this chapter we present the methodology, scope, accounting approach and data quality scoring for other loans and investments.

Scope

As of 2022 reporting we have included in our reporting scope the debt and investment securities managed by the Treasury department and the participations of Triodos Bank. The asset classes are debt securities including (sub)sovereign bonds, loans and advances to banks, and investment securities such as participating interests.

Consistent with PCAF, cash and cash equivalents and short term loans are excluded from the scope determination.

Accounting approach and emission factors

Triodos Bank accounts for Scope 1 and 2 emissions of the positions divided by the total enterprise value of each. Enterprise value can be proxied by using the Balance Sheet Total.

$$(\text{Scope 1 CO}_2\text{e} + \text{Scope 2 CO}_2\text{e}) \times \frac{\text{Market value of Triodos equity and debt}}{\text{Enterprise value}} = \text{CO}_2\text{e}$$

If no emission data is available, we use the high-level sector intensity averages (see chapter 14).

Data quality scorecard, assumptions and limitations

Table 14 below indicates our data quality scoring for the emission calculations for the other loans and investments.

Data quality (highest to lowest)	Description
1	<ul style="list-style-type: none"> Audited GHG emission in accordance with the GHG Protocol
2	<ul style="list-style-type: none"> Non-audited GHG emission data or GHG emission data calculated by Triodos Bank or third-party data provider, based on primary data from the company or sub-sovereign and using verified emission factors specific to the emission source
3	<ul style="list-style-type: none"> Averaged data that is peer/(sub) sector-specific Non-audited or non-verified GHG emission data reported by the company or sub-sovereign
4	<ul style="list-style-type: none"> Emission intensity factors (emissions per million euro invested) per sector from own system or peer financial institutions
5	<ul style="list-style-type: none"> Extended Environmental Input Output (EEIO) databases (i.e. EXIOBASE or GTAP) that provides sector-level data on emissions per revenue per sector and country

Table 14. Data quality scorecard for other loans and investments

14 The high-level sector approach (Scope 3 category 15: Investments)

In this chapter we present the methodology, scope, accounting approach and data quality scoring for our loans and investments for which no better data is currently available and GHG emissions are estimated with limited support.

Scope

The loans and investments in all asset classes except cash and cash equivalents and short term loans, for which no data with data quality score 1 to 4 is available.

Accounting approach and emission factors

Emissions related to the loans and investments with very limited data support can be accounted for by using high-level sector and country intensity averages of Scope 1 and 2 emissions over revenue (tCO₂e/EUR) and multiplying this by the asset turnover ratio (net turnover divided by total balance sheet). Then, these emissions can be attributed to Triodos Bank. The following formula is applied:

$$\frac{tCO_2e_{sector}}{Revenue (EUR)_{sector}} \times \frac{Revenue (EUR)_{sector}}{Balance\ sheet\ total_{sector}} \times \frac{Outstanding\ Triodos\ loan\ \&\ investments}{Balance\ sheet\ total} = CO_2e$$

Data quality scorecard, assumptions and limitations

The following data scoring is used to score and improve data quality on these sectors over time. Note that the scorecard is a general reflection of how data quality should be improved as the sectors vary among properties, investments and activities. In our annual report, all emission data for the clients and sectors that we estimate using the high-level sector intensity averages, are scored with a data quality level of 5. For countries where we do not yet have emission factor data available, we derive a proxy based on a similar country in the region for which the high-level sector average emission factor is available.

Data quality (highest to lowest)	Description
1	<ul style="list-style-type: none"> Audited GHG emission data or actual primary energy data, in accordance with the GHG Protocol Related to buildings: Actual energy consumption, converted to CO₂e emissions using verified emission factors specific to the type of energy consumed
2	<ul style="list-style-type: none"> Other primary data Related to buildings: Actual energy consumption, converted to CO₂e emissions using emission factors for energy from an undefined energy source
3	<ul style="list-style-type: none"> Averaged data that is peer/(sub) sector-specific Non-audited or non-verified GHG emission data provided by our clients
4	Proxy data on the basis of region or country
5	Estimated data with very limited support using sector average data from EXIOBASE and BACH financial data base (see Data sources section)

Table 15. Data quality scorecard for high-level sector approach

15 Avoided emissions from Renewable Energy (Scope 3 category 15: Investments)

In this chapter we present our methodology to assess the avoided emissions of our loans and investments in the renewable energy sector. In contrast to the other chapters, avoided emissions are calculated based on a different methodology which compares to a baseline. According to the GHG Protocol avoided emissions are not part of Scope 3 but should be reported separately.

Scope

All subsectors categorised under renewable energy are within scope. These include:

Triodos Bank's Subsector

- Wind
- Solar
- Hydro energy
- Biomass
- Heat and cold storage
- Other renewable energy

Table 16. Triodos Bank's subsectors for renewable energy

For the biomass, heat and cold storage, and other renewable energy subsectors, Triodos Bank has collected CO₂e or energy savings calculations from the project. These calculations are used in our accounting approach. For the wind, solar, and hydro energy subsectors, avoided emissions are calculated using the accounting approach below.

Accounting approach and emission factors

Avoided emissions of renewable energy are calculated by combining primary data collected by Triodos Bank with established emission factors based on the emission factor of the assets that are pushed out of the grid mix by introducing a new renewable asset. The methodology for calculation is as follows:

$$\frac{\text{CO}_2\text{e}}{\text{kWh (production)}} \times \text{Total production (kWh) of project} \times \frac{\text{Outstanding Triodos loan \& investments}}{\text{Project Equity + Debt}} = \text{CO}_2\text{e}_{\text{avoided}}$$

The emission factors (CO₂e per kWh production) are derived from the Operating Margin emission factor of the International Financial Institutions (IFI) dataset¹. The Operating Margin is based on emission factors from the power plants with the highest variable operating costs. These are the power plants that will be replaced first when utilising new renewable power sources. Hence, this factor provides a more realistic insight in the contribution of new renewable power sources and is consistent with PCAF and aligns with the Science Based Targets initiative (SBTi).

After the avoided emissions have been calculated per project, these emissions are attributed to Triodos Bank based on the ratio between our outstanding loans and investments and the total project equity and debt. If no data is available on the current total project equity and debt, assumptions are made based on the project administration at the time of loan or investment origination.

¹ <https://unfccc.int/climate-action/sectoral-engagement/ifis-harmonization-of-standards-for-ghg-accounting>

Data quality scorecard, assumptions and limitations

Accounting for avoided emissions from renewable energy is ideally calculated based on the actual electricity production in the year of reporting. Below in Table 18, several methods with different data quality levels can be applied if actual primary data is not available.

Data quality (highest to lowest)	Description
1	<ul style="list-style-type: none"> Audited or verified GHG emission data from the project, in accordance with the GHG Protocol and/or UNFCC or another credible certification scheme Actual annual production (kWh, MJ, kWhth) of the project Annual production (kWh) estimated by a third party based on P50/P90 assessment of potential production adjusted with the NL Windex factor¹
2	<ul style="list-style-type: none"> Average annual production of the project based on recent years data or previous year data (kWh, MJ, kWhth) Estimated annual production (kWh) based on P50/P90 assessment of potential production
3	Non-audited or non-verified project specific GHG data, calculated by an independent expert for which we cannot verify alignment with the GHG Protocol and/or UNFCC or another credible certification scheme
4	Estimated annual production (kWh) based on capacity (MW) of project combined with average load factors per country
5	Emission intensity factors (emissions avoided per million euro invested) per technology from own system or peer financial institutions

¹ The supply of wind for wind energy is reported in the so-called Windex. The Windex is only available for wind on land in The Netherlands. A Windex of 100 means that the supply of wind is equal to the average of all months in the period 1996-2005. This period is chosen because it is seen as a representative period for a long time series and also because a consistent time series of data is available for this period. More information on the Windex can be found at the CBS website on Wind energy; electricity production, capacity, and supply of wind, 2002-2019.

Table 17. Data quality scorecard for renewable energy

As suggested by PCAF, for renewable energy projects, it is customary to have outside experts calculate predictions in production by percentiles based on historic data. This may include wind measurements or hydraulic flows. The P50 value serves as a prediction of when production may exceed a probability of 50% in a given year; for P90 it is 90%². In line with PCAF, emission calculations based on P50 are preferred to P90, if no figures on the actual electricity production are available. Otherwise, emission calculations on a project basis, or other, factors such as capacity or a monetary sum, will support assumptions for the emission calculation.

² See PCAF (2017) report.

16 Glossary

AFD Agence Française du Développement

CNG Climate Neutral Group

CO₂e Carbon dioxide equivalent

GRESB Global Real Estate Sustainability Benchmark

CRREM Carbon Risk Real Estate Monitor

EEIO Extended Environmental Input Output

EF Emission factor

EPC Energy Performance Certificate

FAO Food and Agriculture Organisation of the United Nations

GHG Greenhouse gas

IEA International Energy Agency

IEB Triodos Impact Equities and Bonds funds

IFI International Financial Institutions

IFC-CEET IFC Carbon Emissions Estimation Tool

LEM Local Environmental Managers

LSU Live Stock Unit

LTV Loan-to-Value ratio

PCAF Partnership Carbon Accounting Financials

SBTi Science Based Targets initiative

WBCSD World Business Council for Sustainable Development

WRI World Resources Institute

17 Data sources

Triodos Bank's sector	External Sources
(Sustainable) property/ Residential mortgages/	<ul style="list-style-type: none"> • CRREM Global Pathways: www.CRREM.eu • National EPCs / National EPC registers/ databases (Electricity, derived heat, gas, solid fossil fuels, oil & petroleum products plus renewables & wastes) • Global Real Estate Sustainability Benchmark (GRESB): www.gresb.com • PCAF building emission factor database (December, 2022): https://building-db.carbonaccountingfinancials.com/PCAF_emission_factor_database.php?partitionpage=Mortgages • PCAF European building emission factor database methodology: https://building-db.carbonaccountingfinancials.com/docs/PCAF%20European%20building%20emission%20factor%20database_Methodology.pdf • PCAF NL emission factor table for residential real estate
Organic farming	<ul style="list-style-type: none"> • FAO Database: http://www.fao.org/faostat/en/#data • FAO definition of emission intensities: https://fenixservices.fao.org/faostat/static/documents/EI/EI_e.pdf • Knudsen et al. (2011): https://www.semanticscholar.org/paper/Environmental-assessment-of-organic-juice-imported-Knudsen-Almeida/2f97b923aabc8532ad17caeecd4bed23c2cfc53 • DEFRA 2005: http://library.uniteddiversity.coop/Food/DEFRA_Food_Miles_Report.pdf • Carlsson (1997): https://rosap.nsl.bts.gov/view/dot/4919 • FAO (2011): http://www.fao.org/fileadmin/templates/organicag/pdf/11_12_2_RTOACC_23_webfiles.pdf • EUROSTAT LSU Coefficients: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Livestock_unit_(LSU) • Aguilera, E., Guzmán, G., & Alonso, A. (2015). Greenhouse gas emissions from conventional and organic cropping systems in Spain. I. Herbaceous crops. <i>Agronomy for Sustainable Development</i>, 35(2), 713-724: https://link.springer.com/article/10.1007/s13593-014-0267-9 • FAO Forestry paper (2010), Impact of the global forest industry on atmospheric greenhouse gas, Paper 159: http://www.fao.org/docrep/012/i1580e/i1580e00.pdf • DEFRA UK 2019: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/865769/structure-jun2019final-uk-22jan20-rev_v2.pdf • DeStatis (2022): https://www.destatis.de/EN/Themes/Economic-Sectors-Enterprises/Agriculture-Forestry-Fisheries/Field-Crops-Grassland/Tables/arable-land-after-the-main-groups-and-crops.html • DeStatis (2022): https://www.destatis.de/EN/Themes/Economic-Sectors-Enterprises/Agriculture-Forestry-Fisheries/Fruit-Vegetables-Horticulture/Tables/2-4-areas-quantities-harvested.html • DeStatis (2019): https://www.destatis.de/EN/Themes/Economic-Sectors-Enterprises/Agriculture-Forestry-Fisheries/Land-Use/Tables/areas-new.html • FAO report (2002), Organic agriculture, environment, and food security. FAO UN, Rome. • FAO definition of crop residual emissions: http://fenixservices.fao.org/faostat/static/documents/GA/GA_e.pdf

Triodos Bank's sector	External Sources
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Renewable energy	<ul style="list-style-type: none"> Source IEA (2019). World energy balances. Calculated based on the methodology outlined in the report International comparison of fossil power efficiency DEFRA 2022 (UK government): https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022 Emissions factors heating for mortgages and buildings: https://www.co2emissiefactoren.nl/lijt-emissiefactoren/ USAID AFOLU Carbon Calculator: http://afolucarbon.org/dashboard/ AFOLU Tool manual from USAID: http://afolucarbon.org/static/documents/AFOLU-C-Calculator-Series_AR.pdf
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Elderly Care and Social Housing	<ul style="list-style-type: none"> Handreiking Kengetallen Benchmark Zorgvastgoed Bouwkostennota 2017: https://www.stichtingacvz.nl/uploads/media/files/Handreiking%20kengetallen%20Benchmark%20Zorgvastgoed%20Bouwkostennota%202017%20van%20Stichting%20AcvZ.pdf PCAF building emission factor database (December, 2022): https://building-db.carbonaccountingfinancials.com/PCAF_emission_factor_database.php?partitionpage=Mortgages
High-level sector approach	<ul style="list-style-type: none"> Exiobase v.3 (2015) BACH data base: https://www.bach.banque-france.fr/?lang=en EUROSTAT Government deficit/surplus, debt and associated data: https://ec.europa.eu/eurostat/en/web/products-datasets/-/GOV_10DD_EDPT1

Triodos Bank Greenhouse Gas accounting methodology

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