



**Accounting GHG emissions
and taking action:
harmonised approach for the
financial sector in the Netherlands**

PCAF The Netherlands, report 2019



PCAF
Partnership for
Carbon Accounting
Financials

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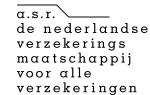
PCAF

Partnership for
Carbon Accounting
Financials

The Partnership for Carbon Accounting Financials, or PCAF, is an industry-led partnership to standardise carbon accounting for the financial sector. It was founded by a group of Dutch financial institutions that joined forces to improve carbon accounting in the financial sector and to create a harmonised carbon accounting approach. It has evolved into a global collaboration with more than 55 financial institutions worldwide representing 3.5 trillion dollars in assets. More information on the global partnership, including how to join, can be found on carbonaccountingfinancials.com

Through this report, the Dutch participants shares their findings with other interested parties to encourage others to adopt carbon accounting as a positive step towards a low carbon economy.

Today, PCAF Netherlands consists of the following participants:



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December 2019, The Netherlands



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About this report

Addressing the emergency of climate change is more pressing than ever. To limit global warming to 1.5°C above pre-industrial levels, all sectors of society need to decarbonise and collectively reach net zero emissions by 2050. The financial sector can facilitate the transition in line with the Paris Agreement.

Harmonised and transparent carbon accounting is an imperative first step in this direction. Measuring and disclosing the greenhouse gas (GHG) emissions associated with lending and investment activities of financial institutions is the foundation to creating transparency and accountability, and to enabling financial institutions to align their portfolio with the Paris Agreement.

Regulators are asking financial institutions to provide transparency on climate-related risks. Consumers are asking for their banks and insurers to contribute to sustainable development. Carbon accounting of loans and investments contributes to meeting these needs.

Comparability and transparency of carbon accounting requires uniform disclosure, following the same guidelines and methods and ideally using the same metrics.

Leading up to the Paris Agreement, 11 Dutch financial institutions joined forces to improve carbon accounting through the Partnership for Carbon Accounting Financials (PCAF). Its collaboration evolved into a global collaboration with more than 55 financial institutions worldwide representing US\$3.5 trillion in assets. Over the past 2 years, PCAF Netherlands launched two reports—providing a set of common principles and proposing harmonised guidelines for loans and investments along several different asset classes—and solicited feedback from the global financial community.

PCAF Netherlands consists of 17 participants and, as part of the global partnership, continues to develop methodologies and report on these efforts on an annual basis. This report serves as an update to their guidelines, extending methodologies to more asset classes and providing insight through lessons learned in implementation.

Going Global

Since its launch in 2015 as a Dutch initiative, PCAF has inspired others in the financial sector (including in the US and Canada) to develop a methodology for North America in January 2019. PCAF North America (PCAF NA) builds upon and tailors the PCAF NL methodology for the US and Canada, which differ in terminology, data availability, and the types of loan and investment activities specific to its authors.

Shortly after PCAF North America was launched, 28 members of the Global Alliance for Banking on Values (GABV) committed to a concerted, global effort among banking institutions to track and monitor the GHG impact of its portfolio of loans and investments within a period of 3 years, and ultimately ensure alignment with the Paris Agreement. This commitment of GABV banks triggered a globalization of PCAF, which was launched on 23rd of September 2019.

The PCAF global programme aims to rapidly and substantially extend the reach of carbon accounting in general, and PCAF in particular, over a three-year period.

The programme will develop a global PCAF standard, applicable by financial institutions wherever they are in the world, a network of regional technical support, and tools - such as a comprehensive, open source emissions database - to make the practical application of carbon accounting easier than ever.

Visit www.carbonaccountingfinancials.com for more information.

PCAF Netherlands methodologies cover:

1. Sovereign bonds
2. Listed equity
3. Project finance
4. Mortgages
5. Commercial real estate
6. Corporate debt: bonds
7. Corporate/SME loans
8. Indirect investments
9. Public loans

PCAF participants started experimenting with carbon accounting and disclosure of the results over the past years. Today, PCAF participants represent over €2 trillion of assets under management, many of whom already publicly disclose the associated carbon footprint.

Ultimately, carbon accounting is a means to an end. To help financial institutions align investment and lending portfolios with the global 1.5°C climate goal and support the transition to a low carbon world, several PCAF Netherlands participants contribute the Science Based Targets (SBT) for financials: developing target-setting methods and implementation guidance for financial institutions to set climate targets in line with the Paris Agreement for their investing and lending activities.

This is the third report published by PCAF Netherlands. Compared to previous years it covers more asset classes, describes new case studies, and reports on progress on methodology development, implementation, and reporting.



From the Netherlands since 2015...



...to North America in 2018...



...to global in 2019

Finance for climate is flowing at a greater pace than ever before, but it is not flowing fast enough to limit warming to well below 2°C. We see the climate crisis as one so significant we must call “all hands on deck”—and engage with banks and investors at all levels—from the largest institutional asset owners down to the people whose collective deposits represent untapped potential for financing climate change mitigation. We seek to activate climate solutions through innovative finance and the systemic decarbonization of capital. We recognized the pioneering financial institutions within the Partnership for Carbon Accounting Financials (PCAF) as a great example of such systemic change. PCAF serves as a unique approach for financial institutions to measure and disclose the climate impact of their loans and investments in order to enable them to decarbonize their portfolio - we are a proud sponsor of PCAF.



Marilyn Waite, William and Flora Hewlett Foundation

1 Introduction

As Climate Envoy, I sometimes say the Paris Agreement is my job description. No wonder I spend quite a bit of my time getting the financial sector behind its goals. After all, one of its three main objectives is to “make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.” As I am writing this, major donors are coming together to replenish the Green Climate Fund. The success of this exercise is an important indicator of political commitment of more developed countries to help others. It builds (or jeopardizes) trust.

Important as this is, the real impact will have to come from the real economy. Whereas the donor funds must add up to the promised \$100 billion in 2020, the finance flows add up to many trillions. Getting it right in that league will get us closer to a Paris-proof world.

In my preface to last year’s report I wrote about Dutch, Australian, and Chinese hammers all doing the same work: hitting a nail on its head. I said so with the conviction that the Dutch hammer, PCAF, is one of the best in the business. And to my best knowledge it was also the only. At the same time, hammer technology is by no means protected. You can copy without retaliation. During this year I have been a merchant for the PCAF hammer, but I refrained from being a preacher—setting aside an age-old Dutch diplomatic tradition. I advocated hammering.

A good example of this advocacy was the joint initiative of the Netherlands and Switzerland at the UN Climate Action Summit, in September 2019 in New York. Secretary-General António Guterres organised this Summit to accelerate climate action, and called for world leaders to do more. New and existing initiatives were clustered in nine action tracks. Switzerland and the Netherlands teamed up in the Finance Track, which is led by France, to enhance transparency and align private financial flows with the Paris Agreement. The Swiss Paris Agreement Capital Transaction Assessment (PACTA) and our own PCAF were presented as ready-to-use instruments. Several countries and institutions joined or showed interest.

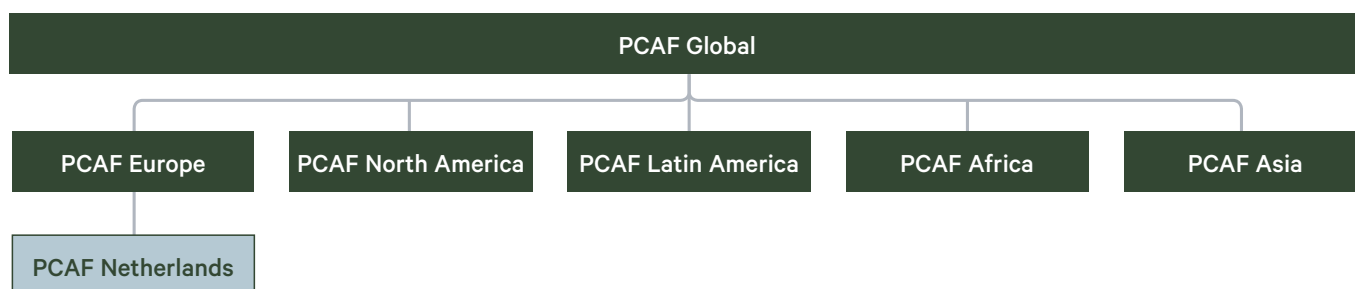
2020 will hopefully see more of this. As in any market transformation, pioneers and adventurers pave the way and others follow, sometimes with even better solutions. I think we are still in the early phases of the transformation; PCAF (and PACTA) pioneers are still needed to light the way ahead. But with the growing number of users, this light is getting brighter.

Marcel Beukeboom
Climate Envoy
Kingdom of the Netherlands



PCAF governance

ABN AMRO, Amalgamated Bank, ASN Bank, Global Alliance for Banking on Values (GABV), and Triodos Bank decided to launch a global initiative due to the increasing interest of global financial institutions in a transparent and harmonised assessment of the GHG emissions of their loans and investments. The globalisation of PCAF addresses banks and investors around the world.



This report is from the Dutch participants; PCAF Netherlands is facilitated by the ASN Bank with Piet Sprengers as Chair, Freek Geurts as Secretary, and Jeroen Loots as Project Manager. PCAF Netherlands consists of 12 working groups, chaired by different financial institutions:

- | | |
|--|---|
| 1. Listed Equity (Tim Balemans, MN) | 7. Real Estate (Tjeerd Krumpelman, ABN AMRO) |
| 2. Project Finance (Sam Nierop, FMO) | 8. Indirect Investments (Jos Gijssbers, a.s.r.) |
| 3. Sovereign Bonds (Kees Ouboter, ACTIAM) | 9. Public loans (Jan Klaassens, BNG Bank) |
| 4. Mortgages (Tjeerd Krumpelman, ABN AMRO) | 10. Science-Based Targets (Jan Raes, ABN AMRO) |
| 5. Corporate Debt (Thierry Oeljee, Achmea Investment Management) | 11. Reporting (James Niven, Triodos) |
| 6. Corporate/SME Loans (Josée van den Wijngaart, Triodos) | 12. Stakeholder Engagement (Bouke de Vries, Rabobank) |

PCAF Netherlands engages with a sounding board that consists of the following organisations: Aegon, APG, ING, the Dutch Association of Insurers and the Dutch Banking Association (NVB). PCAF Netherlands is part of the Dutch Sustainable Finance Platform, chaired by the Dutch Central Bank.¹

¹ The Sustainable Finance Platform is a cooperative venture of De Nederlandsche Bank (chair), the Dutch Banking Association, the Dutch



The PCAF NL team

Back row: Jeroen Loots (ASN Bank), Robin Willing (NIBC), Tim Balemans (MN), Sam Nierop (FMO), Mark Schenkel (Navigant), Sander Boleij (VanLanSchotKempen).

Middle row: Paul van der Weijden (ASN Bank), Colette Grosscurt (Actiam), James Niven (Triodos Bank), Marc Jan Kroes. (NWB Bank), Kees Ouboter (Actiam), Tjeerd Krumpelman (ABN AMRO), Catalina Hemmink (ABN AMRO)

Front row: Freek Geurts (ASN Bank), Jan Klaassens (BNG Bank), Jan Raes (ABNAMRO), Piet Sprengers (ASN Bank), Josée van den Wijngaart (Triodos Bank), Jos Gijsbers (ASR).

Not shown on this photo: Bouke de Vries (Rabobank), Alexandra Dumitru (Rabobank), Thierry Oeljee (Achmea Investment Management), Sylvia van Waveren (Robeco), Danny Dekker (VanLanschootKempen), Albert van Leeuwen (FMO), Mikkel Kallesoe (FMO), Sharon Bloemendal-Visser (de Volksbank).

Photo: Jos van de Tempel

Association of Insurers, the Federation of the Dutch Pension Funds, the Dutch Fund and Asset Management Association, the Netherlands Authority for the Financial Markets, the Ministry of Finance, the Ministry of Infrastructure and the Environment, and the Sustainable Finance Lab. The aim of this platform, set up by DNB in 2016, is to promote and encourage a dialogue on sustainable finance in the financial sector.

1.3 Purpose, scope, and structure of this document

PCAF's work is open source. PCAF welcomes external suggestions and recommendations to improve the methodology it has developed. This document is intended to provide an overview of the work executed by PCAF Netherlands. It provides insight into what the next steps should be in terms of methodology development and what gaps in methodology or data have emerged. The report provides an overview of carbon accounting methodologies per asset class and is a step towards harmonised accounting methods for these asset classes.

Chapter 2 gives an overview of PCAF's journey. It provides an account of how PCAF was founded, where it stands today, and what its next steps will be. This is supported by views from a regulatory, legislative and more global harmonisation perspective. Chapter 3 contains more technical content on accounting guidelines and lessons learned during implementation. Chapter 4 provides an account of the next steps for PCAF Netherlands.

Carbon Footprinting is an important tool that helps identifying part of the climate risk an investor is exposed to. PCAF provides investors with methodologies for different asset classes that can easily be adapted for carbon footprinting purposes. The platform aims to harmonize disclosure and reporting of carbon footprints which contributes to comparability amongst investors and a common understanding of what the footprint actually constitutes. The strength of the platform for us is that we have the opportunity to learn from others regarding developments in carbon footprinting and at the same time we are part of setting the standards.

Martijn Scholten, CIO MN

“PCAF is tried and tested in the Netherlands, providing value to financial institutions, their clients, and other climate initiatives. Now, PCAF is going global. Our experience in the Netherlands is that measuring and tracking climate impact drives concrete action and change. At ABN AMRO, PCAF helped us understand that our nearly 800,000 residential mortgages are one of the areas that have the highest carbon impact. With that knowledge, we now promote mortgages that incentivize customers to take energy efficiency measures. Climate action like that is not only good for business - but is a duty to our clients, the planet, and to future generations.”

Kees van Dijkhuizen, CEO ABN AMRO

A blue-tinted photograph of a highway interchange. In the foreground, a cyclist is riding on a paved path, slightly blurred. To the right, a multi-lane highway curves through a green landscape. Several cars are visible on the road. In the background, a city skyline is visible under a clear sky. The overall scene is captured from an elevated perspective.

2 The PCAF journey: viewpoints on carbon accounting for financials

2.1 The role for sustainable finance in the transition to a carbon neutral economy



The financial sector's disclosure of climate-related information is key for the greening of the financial system. It is essential for the functioning of the pricing mechanisms for climate-related risks and it enables market players to seize the associated opportunities. The discipline of public disclosure of climate-related information can lead to improved risk management. The PCAF method contributes to better disclosure by the financial sector by offering a method to measure the carbon impact of portfolios and to set targets. This means it offers a conduit for the redeployment of capital to green activities.

Frank Elderson is executive director supervision at De Nederlandsche Bank, the Dutch financial regulator

2.2 Journey from carbon accounting of investments to reducing financed emissions



In the early 2010s, a group of pioneering financial institutions in the Netherlands started their journey towards carbon accounting of their investments.

In the months leading up to the COP21 in December 2015, several Dutch institutions met and committed to climate action to support the outcome of an ambitious Paris Agreement. This resulted in the Dutch Carbon Pledge. This is essentially how PCAF was founded: several financials committing to disclosing their carbon footprint and subsequently setting emission targets in line with the Paris Agreement.

In December 2017, PCAF Netherlands published its first report describing harmonised carbon accounting principles and methodologies for five major asset classes and solicited feedback from the international financial and accounting communities. In 2018, the second updated version was published. Now we are pleased to publish the third report with additional asset classes, improved method descriptions, and lessons learned from implementation.

During 2018 and 2019, PCAF has evolved enormously. What started as a Dutch initiative has, through Amalgamated Bank and the Global Alliance for Banking on Values (GABV), expanded to North America and then rapidly became a global partnership. PCAF Netherlands became one of the regional partnerships in a global organisation. We feel very proud that several Dutch financial institutions played a key role in this development.

Today, participants of PCAF Netherlands have almost €2 trillion of Assets under Management (AUM). PCAF Global, with over 55 participants worldwide at the time of writing, covers over €3.5 trillion AUM.

This growth in participants means methods will be extended to regional-specific asset classes and directions for data use and availability. Per asset class, PCAF Global will run into different issues, ranging from different scopes to accounting for limited data availability. For PCAF, hurdles and uncertainties are no reason to delay action. This is not different for PCAF Netherlands with its regional focus. Rather, this PCAF Netherlands report is an effort to overcome these hurdles and reduce uncertainties. We hope to move carbon accounting for financials forward internationally by sharing lessons learned.

The relevance of our efforts is growing. With climate action higher on the international agenda, the financial sector needs to be equipped with tools to measure and disclose their footprint and know how to act to reduce this footprint in the real economy. There is increasing pressure from the regulators to provide transparency on climate-related risk exposure. Harmonised accounting will enable us to both report on exposure and to urgently steer our portfolios towards a resilient, low carbon future.

Carbon accounting is a means to an end. It is the first step to manage climate risks and reduce adverse climate impact. To take these steps, an investor needs to understand where in their portfolio climate impact is greatest, where reduction will be most material, and where to develop appropriate targets. I see three main levers to reduce emissions: reduce emissions from existing assets, avoid emissions by investing in green technology such as renewables, and realise negative emissions. PCAF methodologies should evolve to describe all three to allow financials to reduce their footprint in line with the Paris Agreement.

Work remains to get there. Implementation of PCAF guidelines by its participants creates the necessary innovations for increased footprint accuracy, target setting, and effective strategies.

Other international developments have the same goals as we do. The Taskforce for Climate-related Financial Disclosure (TCFD) is a great fit with our work: where TCFD describes metrics to disclose impact and risk for sectors, PCAF allows harmonised accounting for the financial sector at the detailed level of asset classes. It is important to ensure coordination and aim for consistency with these developments if we all want to ensure methodologies will be more widely adopted and harmonised. In Chapter 3 of this report, we explore several international initiatives and how they can align with PCAF guidelines.

Several PCAF Netherlands participants have contributed to the development of SBTs for financials¹ through road testing several asset classes. Selected results are presented in this report. Our goal is to contribute to the development target-setting methodologies for our portfolios that are demonstrably in line with the Paris Agreement and that will lead to effective strategies that have real impact.

PCAF remains open to new participants that want to join our partnership in developing the methodologies and/or the implementation. We invite financials from all over the world and from all categories to join our bottom-up initiative. Please look at our website for more information.

Together, we can both improve our work and create the necessary momentum in our sector to combat climate change.

Piet Sprengers is manager Sustainability Strategy and Policy at ASN Bank and chair of PCAF

2.3 Carbon disclosure for financials: commitments in the Dutch Climate Agreement



As one of the largest pension service providers in the world, APG positions itself as a long-term responsible investor. Sustainability is an integral part of our investment proposition. What does that mean? It means that for every investment decision we make, ESG criteria like human rights, corporate governance and climate change weigh in alongside the more traditional indicators such as cost, risk and return. Goal is to identify leading and lagging companies, engage with them, and achieve meaningful change.

Our belief in the importance of a sustainable world triggered us to be closely involved in the development of the Dutch Climate Agreement in 2019. The Climate Agreement gives substance to the government's goal of reducing greenhouse gas emissions by 49% in 2030 compared to 1990. More precisely, APG presided the Financing Task Force which focused on the contribution by the Dutch financial sector.

The commitment of the Dutch financial sector, as agreed in the Climate Agreement, involves that 1) the Dutch financial sector will take part in the funding of the energy transition, 2) the parties will report about the carbon footprint of their relevant financing and investments as of 2020 and 3) by 2022 at the latest, the parties will announce their plans of action including reduction targets for 2030. In the meantime, APG's carbon footprint of equity investments decreased already by 28% in 2018 against the reference year 2015.

But let me be clear. Laudable carbon reduction intentions are meaningless without solid, trustworthy carbon accounting which allows for transparency as well as accountability. "Carbon reduction intentions are good, but control is better", one could paraphrase a famous proverb from the accountancy profession.

And exactly here, in developing harmonized disclosure guidelines and methods covering all asset class categories, PCAF plays a crucial role. As one of its founding members, APG is proud to see how PCAF expanded into initiative with global support. With the consequences of climate change becoming increasingly visible around us, responsible investing intentions in cadence with robust carbon accounting is needed more than ever.

Gerard van Olphen is Chair Financing Task Force Dutch Climate Agreement and CEO APG Group N.V.

2.4 Carbon disclosure for financials: ahead of EU legislation?



Under the banner of sustainable finance, EU legislators are finally giving serious thought as to how to implement the Paris Agreement in the financial sector. Sustainability in the financial sector is a hot topic and legislative measures are underway, but given the climate and environmental urgency, things move too slowly. PCAF's strong suit is that financial institutions started before they were obliged to do so. This shows legislators that policies on sustainable investments are feasible and actually work. This may persuade those with doubts to speed up the legislative work and advance towards better and more comprehensive disclosure.

PCAF's example hopefully moves the needle in the sustainable finance discourse: enthusiasm is on the rise to define and promote green investments. But I sense less enthusiasm around defining and discouraging brown investments. Thanks to

initiatives such as PCAF, we finally receive better insight into total emissions and can widen the debate beyond just green investments. Ultimately, sustainable finance will only work if we define green investments and highlight those investments that are prone to (carbon-related) risk and need to be avoided. Only then can we speak of a financial sector that is truly Paris-proof.

Bas Eickhout is Member of the European Parliament and Rapporteur Taxonomy sustainable investments

2.5 Carbon disclosure for financials: CDP perspective



The financial sector is critical as it controls the capital that can shift the economy to align with the low carbon transition.

The financial sector is the sector that can play one of the most fundamental role of all economic sectors in ensuring that we manage climate risk. That is primarily because it can enable mitigation actions; it can provide the capital to invest in mitigating technologies and activities and it can increase the cost of capital for those investments that have an adverse impact on climate. It can also play a critical role in the adaptation to climate impacts that we will have to manage across society.

TCFD was groundbreaking. It showed that the financial sector is as accountable for climate risks as the other sectors. Up to that point, much of the financial industry behaved passively; holding no accountability or responsibility for their scope 3 emissions and the role they play in society in how their investments fuel or do not fuel climate change.

The sector can and should have a much more active role. Even the smallest institution has incredible influence on how capital flows.

Acting on climate change is in the self-interest of the financial sector. The health of the full economy matters more to the financial sector than any sector in the real economy, it is fundamentally impacted by how climate change will evolve. But will the sector combat climate change on its own? No. It will need supporting regulation and it will need support in the real economy and real economy policy.

CDP supports financial decisionmakers in steering on carbon. CDP was founded on the principle that asset owners, shareholders, and asset managers can drive change in the real economy through disclosure, data, and actions of actors in the real economy. It is built on the principle of financial systemic change. That has not necessarily worked perfectly. We have learned a lot on the inertia of the sector, and there is as much short-term thinking as in other sectors. That is why our annual cycle of interventions into the market as part of the disclosure process is important; we act as an industrial-sized engagement machine for investors and other big buyers.

Financial institutions can disclose their climate change related performance to us, but we have not, to date, focused in on their scope 3. We are closing that loop in many ways:

1. We will expand our sector-specific questionnaires to include financial institutions to cover their financed emissions in loan and investment portfolios

CDP: Carbon Disclosure Project

CDP is a nonprofit charity that runs the global disclosure system for investors, companies, cities, states, and regions to manage their environmental impacts. Over the past 15 years, CDP has created a system that has resulted in unparalleled engagement on environmental issues worldwide. Their vision is for a thriving economy that works for both people and planet.

and activities such as underwriting and insurance.

2. We are part of the SBT for Financial institutions. The financial sector will have their own roadmap. Setting SBTs will be one of the things we will assess against and incentivise through scoring.

3. We are continuously growing our dataset and data granularity to allow even more targeted steering and scoring.

4. We have investor research services that do fundamental research for investors on physical risks and transition risks in certain sectors.

5. We provide a global platform for cities, states, and regions to measure, manage, and disclose their environmental impacts and their adaptation activities. We match this data to data from investors to allow matchmaking, catalysing increased capital flows to these jurisdictions.

6. We created an index, Climetrics, a holistic assessment of a fund's activities related to climate change. It focusses on EU funds and will expand to Japan and US funds.

PCAF can support financials in meeting external demand for disclosure and action

Carbon accounting for financials allows them to take ownership. You need a way to account for your impact on the real economy and an accounting framework is required for that. What I like about PCAF is its flexibility. It is open source and there is enough guidance there right now for financials to get started. It is comprehensive; it covers many different asset classes and knows how to start with imperfect data and how to work on increasing data accuracy. As of now it is not a turnkey solution, but it allows financial institutions to start on their journey measuring and lowering financed emissions.

This journey becomes more and more relevant because so many international initiatives have started requesting this disclosure from financial institutions such as the TCFD, UNEP FI, and the Principles for Responsible Banking. Increasingly, we see governmental initiatives that either already or are on their way to making such disclosure mandatory, such as in the EU or in China.

PCAF can develop even further

Compared to 2018, PCAF has grown internationally. This is important for PCAF to gain influence. I believe that increasing methodology coverage to new asset classes and other activities of the financial sector can further build the momentum for carbon accounting for financials. It will become increasingly important for financial institutions to demonstrate how their work on climate change affects change in the real economy. Banks that have signed up to use PCAF have also signed up to taking action, this is a welcome next step. CDP is happy to engage with PCAF to help support its development

Nicolette Bartlett is CDP's Global Director of Climate Change

2.6 PCAF Netherlands engagement with stakeholders

2019 has been an intensive year of engagement on the PCAF methodology. Participants of the PCAF network have discussed the carbon accounting approach with the Ministry of Economic Affairs and Climate, the Ministry of Finance and with members of the Dutch Parliament, among others. They also spoke with the Dutch Task Force on Financing, with NGOs, representative business organisations, and participated in the sustainable financing platform of the Dutch Central Bank (DNB). In this platform, financial institutions share developments in a broad range of sustainability-related topics including measuring climate risks and carbon accounting.

Reference to PCAF in financial sector's climate commitment

One of the most tangible results of these discussions is the reference to PCAF in the Dutch Climate Commitment of the financial sector. This Commitment is an important part of the Dutch Climate Agreement which sets out the Dutch

government's climate goals. PCAF participants have contributed to this commitment by providing a methodology to calculate the GHG emissions of their portfolios. This will be done annually up to 2050, starting in the financial year 2020 at the latest. The financial institutions also committed to announce their climate goals and strategy to help their clients reduce their footprint. This should be done before 2022. The PCAF method offers tools for this, with instructions for calculating and publishing the footprint. Various PCAF participants have already published their footprints and others are in the process of doing so.

Comparison of PCAF to other methods and exchange of experiences

PCAF is one of a few front-running climate measurement methodologies. Some of these assess the impact of business and civil society on the climate and others assess the impact of the climate on companies and the economy. These approaches are still developing in what is a relatively new field for the financial industry, creating opportunities to learn from each other and improve. Discussions were held in 2019 with practitioners and consultants working on these approaches. There are concrete opportunities to build on the complementary nature of the best of these initiatives and we plan to explore them further in 2020. Umbrella organisations of financial institutions play a role in this and some have reported on these different approaches. For example, the Dutch Banking Association has uploaded information on its website on this topic.²

Half-yearly Climate Conference

In 2019, PCAF participants also participated in a biannual climate risk work conference organised by the Dutch financial sector. The June edition was organised by the Insurers Federation³ and focused on multidisciplinary collaboration. Improving the measurement methods can only be achieved through cooperation between (financial) institutions. For example, insurers work together with KNMI, universities, technical agencies, and government programs on measuring climate impact and estimating the consequences for the financial sector.

Insurers stated that, although there is still much uncertainty about the total impact of climate change on our society, they already notice the consequences of climate change for non-life insurance policies. Claim burdens have increased and are expected to continue to increase if the sector does not act now on mitigation and adaptation. Examples of concrete measures in the insurance sector include increasing sustainable and climate-proof investments, keeping risks insurable, working on raising awareness, and stimulating prevention measures.

The next Climate Conference will be organised at the end of 2019 by the Dutch pension funds.

International outreach

In 2019, PCAF Netherlands played a prominent role in extending PCAF's reach internationally. They presented the method to European Parliament participants in Brussels and at multiple events hosted or co-hosted by PCAF participants. For example, Triodos Bank hosted events in Germany, Spain, Belgium, and Canada, where 28 banks from the Global Alliance for Banking on Values signed a Climate Change Commitment to account for their GHG emissions within 3 years. The US was the venue for the creation of a new North American Chapter of PCAF led by Amalgamated Bank, which launched in 2018 and delivered its first report in 2019. A worldwide PCAF programme was created to support the global expansion of PCAF. This initiative was formally launched during the Climate Week in New York. Visit www.carbonaccountingfinancials.com for more information.

² NVB, "Nederlandse banken maken klimaatimpact beter meetbaar", <https://www.nvb.nl/nieuws/nederlandse-banken-maken-klimaatimpact-beter-meetbaar/>

³ Verbond van Verzekeraars, "Werkconferentie Klimaatimpact Financiële Sector", <https://www.verzekeraars.nl/academy/activiteitenoverzicht/werkconferentie-klimaatimpact-financiële-sector>

We fully support this initiative as it is part of the road towards a low carbon economy.

Lars Dijkstra, CIO Kempen

Given the commitment of ASR Nederland to contribute to the goals of the Paris Agreement, we've included Climate Change and Energy Transition in our corporate strategy for insurance underwriting and asset management. Therefore a.s.r. is committed to measure the carbon footprint for at least 95% of the internally managed investment portfolio for the own account in 2021 and to set targets for the long term decarbonization pathway. The PCAF partnership has delivered essential tools for carbon accounting and Science Based Targets road testing to a.s.r. and other financial institutions, to build climate resilient investment portfolios and to maximize their enabling potential to transform towards a low-carbon world.

Jack Julicher, CEO a.s.r. asset management

Achmea Investment Management is aware of the important role that the investment community plays in combatting climate change and achieving the ambitious objectives of the energy transition. We accept our responsibility to engage with the companies that we invest in and are committed to support measures to enable clarity about the footprint of our investments. Our participation in PCAF has been a valuable opportunity to learn and at the same time be at the forefront of carbon footprinting for financial institutions.

Rogier Krens, CIO Achmea Investment Management



3 Technical report

3.1 State of implementation: refinement and lessons learned

The GHG Protocol is the leading standard on carbon accounting, and was developed by the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD). We used the layout and structure of the GHG Protocol as a guideline to increase the accessibility and legibility of this report. To make it easy to find relevant topics for interested financial institutions, we provide results per asset class and present the findings in tables. PCAF remains a work in progress. Any methodological and data gaps will be addressed as our work progresses.

The 2019 technical report provides an update to last year's accounting methodologies and lessons learned during the implementation of these methodologies. It serves as a new version of last year's report and can be read separately. This document contains accounting guidance for the following asset classes: sovereign bonds, listed equity, project finance, mortgages, commercial real estate, indirect investments, corporate debt, public loans, and corporate loans. This chapter starts with an overview of international initiatives related to carbon accounting of loans and investments to set the scene and provide some context. The reasons for calculating the carbon footprint of these asset classes are also explored in more detail. The following section describes the principles that underpin this type of carbon accounting. The final section details methodologies arising from these principles per asset class. This is done in accordance with the thematic working group order of PCAF.

With climate change at centre stage of the international agenda, there are a great number of related activities that look to measure, disclose and reduce the environmental impact of financial activities. Table 1 provides an overview of the relationship with PCAF methodologies. PCAF's work remains open source. PCAF actively welcomes external suggestions and recommendations to improve the methodology it has developed.

“With the long-term goal of being able to track and set targets for emissions reduction, Amalgamated Bank is part of the Steering Committee of the international Partnership for Carbon Accounting Financials. PCAF marks an important milestone in enabling our industry to actively combat the effects of climate change. In order for banks to reduce their impact on global warming, we need to be able to measure what that impact actually is. We recognize the Dutch founders for initiating the open-sourced methodology that PCAF provides as a major step forward. Amalgamated Bank is proud to be a part of this first-of-its-kind partnership and we hope to be joined by many more banks in this endeavor.”

Keith Mestrich, CEO Amalgamated Bank

Table 1: Inventory of international initiatives related to carbon accounting of investments

● For banks ● For Investors

Initiative	Coordinator	What it is about	Coverage (e.g., sector, asset class, region)	Current status (as of Oct 31, 2019)
● Collective Commitment on Climate Action	UNEP FI	Pledges to align portfolio with Paris Agreement, engage with stakeholders on climate neutrality, and disclose progress within 1 year.	Global	33 banks with US\$13 trillion of assets signed up
● Climate Action in Financial Institutions	Institute for Climate Economics (I4CE)	A collaborative platform for implementing the five voluntary Principles for Mainstreaming Climate Action, sharing best practices, and collaborating on innovative approaches.	Global	34 development banks and 10 commercial banks signed up
● United Nations-convened Net-Zero Asset Owner Alliance	UNEP FI, PRI, AIGCC, CDP, Ceres, IGCC, IIGCC	Commitment to transit investment portfolios' GHG emissions to net zero by 2050 through engaging corporates and policymakers on actions.	Global	Led by 12 asset owners with over US\$2 trillion asset under management (AUM)
● Investor Agenda	UNEP FI, PRI, IGCC, IIGCC, CDP, Ceres, AIGCC	An NGO-led initiative to provide investors a set of climate actions in investment, corporate engagement, investor disclosure, and policy advocacy with the aim of keeping global warming within 1.5°C.	Global	More than 250–nearly 800 investors are acting in line with the four focus areas.
● Partnership for Carbon Accounting Financials (PCAF)	Navigant	An open and industry-led collaboration to measure and disclose portfolio GHG emissions.	Global with regional teams; nine asset classes with regional variation	56 financial institutions with US\$3.5 trillion assets signed up
● Taskforce Climate-related Financial Disclosure (TCFD)	FSB	A disclosure framework for climate-related financial risk through four pillars – governance, strategy, risk management, metrics and targets.	Global	867 organisations signed up to be TCFD supporters.

● ●	Paris Agreement Capital Transition Assessment (PACTA)	2 degrees investing initiative	Framework to measure alignment of financial markets with climate goals and scenarios with a 5-year time horizon.	Global with 5 regional splits; 5 asset classes; 8 sectors	Used to over 700 financial institutions globally
● ●	Poseidon Principles	Poseidon Principles Association	An assessment and disclosure framework for climate alignment for ship finance portfolios.	Global; shipping sector	12 banks with approximately US\$100 billion in shipping finance signed up
●	IIGCC Paris Aligned Investment Initiative	IIGCC	An initiative to develop concepts, assess methodologies and test portfolios for the alignment with Paris Agreement.	Global; 4 asset classes	Over 40 investors with more than €11 trillion AUM participate
● ●	UNEP FI TCFD-pilots	UNEP FI	Implementing TCFD, focus on scenario analysis, developing pilot analytical tool and indicators for both transition and physical risks.	Global	16 global banks, 20 asset managers and owners
● ●	Science Based Target for Financials	SBTi	Under the SBTi framework, launched project to help financial institutions align their lending and investment portfolios with the ambition of the Paris Agreement.	Global; 4 asset classes; up to 9 sectors	More than 40 financial institutions publicly committed to set targets; framework to be published in 2020
●	Climate Action 100+	PRI, IIGCC, Ceres, AIGCC	An investor initiative showcasing growth and influence of the world's largest emitters and mobilise corporate action on climate change.	Global; 161 listed companies	More than 370 investors with more than US\$35 trillion in AUM have signed on
● ●	CDP Financial Services Sector Disclosures	CDP	Extend questionnaires to focus on financing and investing initiatives. Investors receive CDP access to climate change data, deforestation, and water security to engage, make decisions, and reduce risks.	Global	Over 525 investors with assets of US\$96 trillion; over 7,000 companies with 50% of global market capitalisation

For us, as an asset manager, we see great added value for our clients from the harmonized methodology proposed by PCAF. It serves as an important next step for Robeco to operationalize the TCFD recommendations and enhance our and our clients' awareness of our investments' resilience to climate change-related risks

Peter Ferket, Head of Investments, Robeco

3.2 Business goals

Before exploring the methods and key assumptions in more detail, an assessment should be made of the objectives financial institutions could have for determining the carbon footprint of their assets. PCAF identifies the following objectives for carbon accounting:

	Risk Management and Steering	Value creation
Internal (steering purpose)	<p>Risks management: A high carbon footprint could imply a potentially high risk in an increasingly decarbonised economy.</p> <p>Steering: Meaningful carbon footprint data enables institutions to understand, monitor and steer more intentionally on impact goals within and between sectors.</p>	<p>Active ownership: At a granular level, relative carbon footprint data are indicators of (carbon) efficiency of a given organisation, sovereign or asset when compared with their peer group, or over time. Data acts as supporting material for engaging with investees on their carbon footprint.</p>
External (reporting purpose only)	<p>Stakeholder management: Clients and beneficiaries increasingly demand that their savings are managed in a way that is resilient to climate change. They may withdraw money (if they can) and entrust their savings with another financial institution if they feel that climate risks are not managed properly.</p>	<p>Broader responsibility, long-term stability, and impact management: By reducing the carbon footprint, financial institutions reduce the likelihood and impact of climate change and contribute to a better world by taking effective measures to keep global warming within safe levels. Insight in the carbon footprint is a prerequisite to this type of target-setting.</p>

These objectives may sometimes determine the choice of metrics used. For instance, if an organisation's main objective is to generate a positive impact, accuracy and completeness are important. For strategies aimed at external reporting, simplicity and comparability may dominate. A financial institution that steers on its carbon footprint may wish to keep external factors, such as asset prices, constant. An alternative approach could be that a financial institution announces intentions and manages expectations by explaining that external factors are out of its control. Additionally, a financial institution that wants to assess its climate-related risks can use the carbon footprint data and metrics differently. In relation to policy regulations on emission reductions and carbon pricing per sector, for instance.

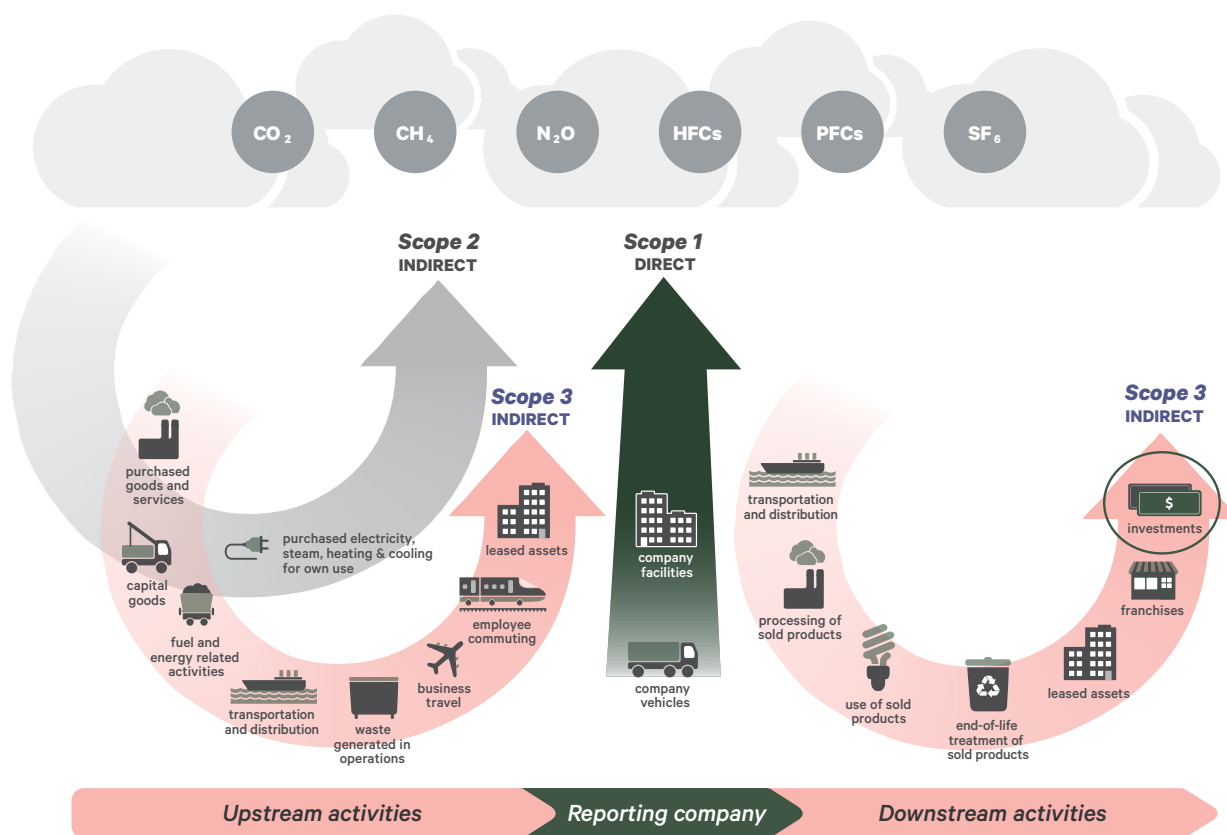
PCAF participants support the ultimate objective that financial institutions should use their influence (through asset allocation and active ownership) to accelerate the transition to a low carbon economy.

3.3 Principles of carbon accounting for financials

3.3.1 GHG Protocol

The GHG Protocol is the basis for carbon accounting, as explained in Chapter 1. This protocol defines three distinct different scopes that all entities may report separately, see Figure 2. In the next section, these scopes are used from the perspective of the reporting of a financial institution. In the next chapter, where asset classes are detailed further, these asset classes are part of the financial institution scope 3 category 15 (Investments) or financed emissions. In the carbon footprint methodology description per asset class, scope 1, 2, and 3 refer to the scopes from the viewpoint of the investee, being a project, company, person, or a government

Figure 1. The scope definitions from the GHG Protocol (Image from GHG Protocol)..



3.3.2 Overarching principles

This section lists common sets of basic design and accounting principles for carbon accounting for financial institutions, regardless of the type of investment. These principles will provide guidance on how to account for and report on financed emissions/avoided emissions by a financial institution. To distil a set of overarching principles, PCAF participants rely on work already done on this topic.

To define basic design and accounting principles, PCAF participants made a practical selection from principles for carbon accounting that are already available and combined them with generally accepted accounting principles.

3.3.2.1 Recognition

According to the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard, the carbon footprint of any financial institution should include:

- Scope 1 of the reporting financial institution: All direct GHG emissions.
- Scope 2 of the reporting financial institution: Indirect emissions from the consumption of purchased electricity, heat, or steam.
- Scope 3 categories that are relevant or material for the reporting financial institution. Scope 3 covers other indirect emissions such as the extraction and production of purchased materials and fuels, outsourced activities, business travel, waste disposal, etc.

Scope 3 category 15 (Investment) is highly relevant for financial institutions and the focus of this report.

3.3.2.2 Presentation and disclosure

Reporting on the results of PCAF assessments is crucial so external stakeholders and financial institutions using the methodology have a clear, comparable view of how their work contributes to the Paris Climate Goals.

The following reporting requirements aim to make it relatively easy for institutions to start assessing and disclosing the GHG emissions of their loans and investments while still delivering meaningful results. With that in mind, PCAF developed this reporting proposal to complement existing frameworks, such as TCFD and IFRS, rather than create a new framework. Our goal is to develop best practice that can be applied by financial institutions using PCAF wherever they are in the world. It builds on strong examples of existing reporting, and work on disclosure by the PCAF North American chapter.

All institutions that commit to using the PCAF methodology must fulfil the following requirements when disclosing PCAF assessments publicly. They describe a minimum disclosure for PCAF assessments with room for institutions to report well beyond this level.

Overall reporting guidelines

- Purpose: Meet the specific carbon footprint goals of the financial institution; for instance, because the financial institution is working towards a specific carbon footprint target or to monitor the effectiveness of its wider strategic goals in this area.
- Frequency: At least disclose annually, in line with the financial reporting cycle.
- Form of reporting: In publicly available reports such as (semi) annual reports, website.
- Past performance: Disclose the carbon footprint of multiple comparable time periods (e.g., years).

Absolute emissions and emissions per unit outstanding

- Disclosure of total generated emissions data is mandatory for scope 1 and 2. Disclosure of emissions intensity data for scope 1 and 2 is voluntary. For scope 3 emissions, disclosure of total generated data is mandatory when relevant and material (i.e., recommended by the methodology). Disclosure of scope 3 emissions intensity data is voluntary. Institutions should explain if they are not able to provide this information because of data availability, for example.

Absolute, avoided, and sequestered emissions

- Where emissions are material, disclose absolute, avoided, and sequestered emissions separately. Avoided emissions should be reported separately from scope 1, 2, and/or 3 emissions⁴ because they do not absorb emissions. Explain if an institution is not able to provide this information because of availability of data, for example.

Asset classes covered

- Disclose the scope of loans and investments covered by the methodology (e.g., a funds' total outstanding loans and/or investments/equity by asset class noting any limitations or exclusions). Aggregate data to summarise the total absolute

⁴ GHG protocol states: Any estimates of avoided emissions must be reported separately from a company's scope 1, scope 2, and scope 3 emissions, rather than included or deducted from the scope 3 inventory (Greenhouse Gas Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard, Supplement to the GHG Protocol Corporate Accounting and Reporting Standard)

emissions of all the asset classes/funds covered, as well as providing absolute emissions data at an asset class/fund level.

- In addition to the basic reporting requirements, institutions are encouraged to publish additional information that is relevant to specific asset classes. For instance, the energy label distribution for mortgage portfolios (see ASN Bank example in the Mortgages section of this report).

Data quality

- Accuracy. Ensure the carbon footprint appropriately reflects the GHG emissions of the financial institution and serves the decision-making needs of both internal and external users.
- Publish the existing PCAF hierarchy of data quality table (Appendix 1). The table is a guide to disclose data quality scores in total and per asset class. Institutions should include an explanation of how data quality is assessed acknowledging that it will improve over time. Where relevant, provide more precise definitions per asset class (see Appendix 1). Over time and where possible, data should be audited to at least a level of limited assurance. Institutions should disclose whether data is audited and to what level.

Methodology

- Disclose methodology, calculations, timeframe, and data sources used, including if this refers to estimations or reported data.

3.3.2.3 Measurement

PCAF recommends measuring the carbon footprint according to these general principles:

Gases and units:

- The seven GHGs listed in the Kyoto protocol are measured: carbon dioxide (CO₂); methane (CH₄); nitrous oxide (N₂O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃). These seven gases can be expressed in carbon dioxide equivalents (CO₂e).
- Absolute emissions are expressed in metric tonnes of carbon dioxide equivalents: tCO₂e.
- Relative emissions are expressed in metric tonnes of carbon dioxide equivalents per million Euro invested: tCO₂e/M€.

Attribution:

- Follow the money is a key principle for carbon accounting of financial assets, i.e. the money should be followed as far as possible to understand and account for the carbon impact in the real economy.
- In principle scope 1, 2 and relevant categories of scope 3 of the investee should be included in the carbon footprint. When deviating from this (e.g. when scope 3 is not relevant), it should be made clear why.
- Influence of the financial institutions on steering the investment, if the influence is bigger, also the proportional share for accounting the footprint to the investment is larger.
- The denominator, i.e. the financial value of the asset that, in relation to the investment, determine the proportional share for accounting the carbon footprint, should include all financial flows (i.e. equity and debt) to the investee as much as possible. When deviating from this, it should be made clear why.

These overarching principles were applied consistently to design and agree upon the carbon accounting methodology per asset class.

3.3.3 General limitations

3.3.3.1 Double counting

Double counting occurs when GHG emission or emission reduction is counted more than once towards attaining mitigation pledges or financial pledges for the purpose of mitigating climate change.

Apart from the double counting that intrinsically occurs between the different scopes, double counting can take place at five levels:

- Between financial institutions
- Co-financing of the same entity or activity
- Between transactions within the same financial institutions
- Across different asset classes
- Within the same asset class

PCAF recognises that double counting of GHG emissions cannot be avoided completely, but it should be avoided as much as possible. Double counting between co-financing institutions and between transactions within the same asset class of a financial institution may be avoided by appropriate attribution rules.

3.3.3.2 Flow versus stock

When measuring GHG emissions we use a flow variable to assess how much GHG is emitted over a specific period, typically during a year. However, when we determine the contribution of the investor to these emissions, we consider an investor's portfolio (stock) at a specific point in time. This can give the wrong information about what an investor actually contributed during the whole year.

For example, if an investor owns 100% of company X during the entire year but sells all his shares on December 30, the calculation on December 31 would not show the shares of company X anymore and the influence the investor exerted on the company during the year is not expressed correctly in the carbon footprint. A solution could be to include the number of days in the attribution factor, as in this example, a factor of 364/365. This would provide a more balanced opinion about the investor's contribution. This is more data intensive and complex, however.

In the formulas in Chapter 4, it should be noted that the subscript t (time) has different meanings for emissions (flow) and portfolio value (stock).

3.3.4 Avoided emissions

In this context, avoided emissions are investments in, for example, renewable energy projects or energy efficiency products leading to lower GHG emissions elsewhere in the economy. Reporting on avoided emissions is a way to quantify and demonstrate a positive contribution to preventing climate change.

For the financial sector, which provides finance for projects and products that lead to avoided emissions, quantifying this effect could be interesting. Avoided emissions are most relevant for project finance, where there is a direct link between the involvement of the financial institution and a reduction in GHG emissions. It is important to quantify and report avoided emissions separately from actual emissions. Otherwise, financial institutions could cherry pick, that is, only focus on the positive impact of a portfolio and purposefully ignore negative impacts.

In calculating these avoided emissions, it is important to select the right baseline (i.e., average product or technology on the market) and to be conservative to limit the chance of overstating avoided emissions. This baseline represents emissions that would have occurred if the project had not been implemented. The difference between emissions from the baseline and emissions from the project are avoided emissions.

3.3.5 Principles for emissions data

An important element of carbon accounting is the quality of data on emissions of loans and investments. Different asset classes present unique challenges and opportunities with respect to emissions data. This section provides some overarching principles about the quality and preferred hierarchy of emissions data, with more detailed guidance provided on specific asset classes in Section 3.4.


High quality emissions data is defined as follows:

- Emissions data is consistent, both across entities and across time
- Emissions data reflects the underlying emissions generating activities of the entity and are not impacted by unrelated factors
- Emissions data is accompanied by a relevant level of assurance

It is possible that emissions data does not meet all the criteria listed above, and that this is dependent on the specific properties of the loan and investment, such as: type of loan/investment, the sector or market best practice.

To comply with PCAF's reporting guidance, participating institutions are asked to publish the existing PCAF hierarchy of data quality table below. The table is a guide to disclose data quality scores in total and per asset class. Institutions should include an explanation of how data quality is assessed acknowledging that it will improve over time. Where relevant, provide more precise definitions per asset class (see Appendix B). Over time data should, where possible, be audited to at least a level of limited assurance. Institutions should disclose whether data is audited and to what level.

Generic data quality table

<p style="text-align: center;">Certain (5-10% error margin in estimations)</p>  <p style="text-align: center;">Uncertain (40-50% error margin in estimations)</p>	Score 1	Audited GHG emissions data or actual primary energy data
	Score 2	Non-audited GHG emissions data, or other primary data
	Score 3	Averaged data that is peer/(sub)-sectorspecific
	Score 4	Proxy data on the basis of region or country
	Score 5	Estimated data with very limited support

We welcome this report as a further development of the measurement of the carbon footprint of banks' balance sheets. To meet the Dutch Climate Agreement and the Paris goals it is required that our clients and society at large halve the emissions by 2030 compared to 1990 levels. PCAF can help to make the challenge visible and to monitor progress.

Wiebe Draijer, Chairman of the Managing Board Rabobank

3.4 Asset class methodologies

This section covers the methodologies as detailed by the working groups of PCAF. All methodologies reflect the overarching principles outlined in the previous section. This work can be read as a standalone publication, fully replacing the 2018 input. Any changes to this previous version are not made explicit. The asset classes covered are:

1. Sovereign bonds
2. Listed equity
3. Project finance
4. Mortgages
5. Commercial real estate
6. Corporate debt
7. Corporate/SME loans
8. Indirect investments
9. Public loans

All sections below use the same form of table for clarity and to enable a direct comparison between asset classes. Empty parts of a table indicate that no decision has been made yet or that the item is not relevant for this asset class. Each asset class also lists a calculation example. These examples have merits and limitations. Alternative approaches are possible.

	Outcome
Scopes covered	Decision on minimum requirements.
Portfolio coverage	Decision on minimum requirements.
Attribution	How is the investor's share of the total emissions of the investee attributed?
Data	What data to use? What data considerations are important for this decision?
Absolute vs. relative emissions	What type of emission metric needs to be presented and how should the reporting institution arrive at this?
Avoided emissions	A description of how to account for avoided emissions when applicable.
Asset class specific considerations	Room for additional, asset class specific considerations.
Limitations	The limitations of the proposed methodology are discussed.

3.4.1 Sovereign bonds

Topic	Outcome
Scopes covered	<p>According to the follow the money principle, scopes 1, 2, and scope 3 purchased goods and services of the government are covered. PCAF considers a sovereign bond to be a debt security issued by a central government to support government spending. As such, the emissions caused by a sovereign bond lead to emissions caused by the central government's own operations, predominantly by how the government finances other sectors within the country.</p> <p>No clear guidance yet exists on minimum requirements. Calculate and report the different scopes separately. For steering and risk mapping purposes it is useful to see what steps of the governmental spending are most exposed to carbon emissions. For reporting purposes, the separation of scopes is necessary to allow separate government decision makers to draw informed conclusions.</p>
Portfolio coverage	All bonds should be covered.
Attribution	Attribution is proportional to the exposure of the financial institutions (i.e., the sum invested in a sovereign bond) in relation to the government debt plus equity. As government equity is often not disclosed and a financial institution cannot invest in government equity, PCAF proposed to use only government debt as a denominator.
Data	Eurostat provides up-to-date and credible input-output and emission tables, which have been used to calculate the carbon footprint of European sovereign bonds. However, for many non-European bonds, it is more difficult to find reliable and accurate data sources. Ideally, the calculation would be based on uniform global input-output tables coupled with emission sources for the economic sectors per country.
Absolute vs. relative emissions	$(1) \sum_{\text{asset } \in \text{portfolio}} \frac{\text{exposure}_t}{\text{denominator}_t} \text{emissions}_{t-\text{delay}}$ $(2) \frac{\text{absolute footprint}_t}{\text{AuM}_t}$ <p>In equation (1), the variable emissions refer to the emissions of a portfolio asset in period t. In this case, these are the emissions of sovereign bonds, hence of governments (scope 1, 2, and 3). The exposure is the amount of euros invested in a specific sovereign bond. The denominator (government debt) is the value that defines what part of CO₂e emissions can be attributed to the portfolio or as the value that normalises the CO₂e emissions. Countries can be compared by their normalised CO₂e which cancels out the size bias of a country. The delay mentioned arises from a typical delay in emissions reporting by governments. A way to go about this is to use valid estimates. Under ideal circumstances, the delay in data reported should be zero.</p>
Avoided emissions	Green bonds issued by a government could lead to avoided emissions. How this should be accounted for depends on the type of ring-fenced asset classes.

3.4.1.1 Class specific considerations

Comparability with listed equity in mixed funds The decision on the denominator, like the decision on scope, is dependent on the purpose of carbon accounting. Because there is an advantage in comparing the GHG emissions of sovereign bonds with the GHG emissions of other classes, the choice of denominator is important. For steering on carbon in mixed funds that include sovereigns and other assets or bonds, PCAF participants want to keep the denominators of different asset classes as similar as possible. In an ideal scenario, the government debt plus equity would be used as denominator, describing the government balance. PCAF participants urge governments to be more transparent about their data as governmental equity is often not disclosed.

State-owned companies State-owned companies are not included in this analysis. Their emissions could be attributed to scope 3 of government but it is not certain if state-owned companies are already taken into account in the money flows of economic input-output tables. There is also no publicly available database with state-owned enterprises per country. Including state-owned enterprises is recommended but requires governments to disclose this information.

Energy imports and exports in I/O tables Input-output tables do not account for energy imports and exports.

3.4.1.2 Limitations

Government debt as denominator Central government debt is chosen as denominator as this is the entire stock of direct government fixed-term contractual obligations to others outstanding on a particular date. Moreover, the information on government debt is readily available in databases for practically all governments. However, the absolute level of a country's debt influences the indicator and makes comparison between countries difficult. If government debt is low, a large proportion of emissions is allocated to a sovereign bond. A bond may therefore have high emissions despite the fact that the government itself has an emphasis on energy efficiency and renewable energy and may have effectively realised energy efficiency measures. The reverse is also true: this metric implies a positive bias to high debt governments. If government equity is also considered in the denominator, we expect the problem would be less prevalent. However, data on government equity is not readily available.

3.4.1.3 Calculation example

Description of example

actiam



In 2015, ACTIAM started out by setting a long-term target to reduce climate change in line with the IPCC projections; a 25% reduction by 2025 and a 40% reduction by 2040 (since 2010). To track progress on this target, ACTIAM started to calculate a carbon footprint of all its equity funds in 2016. These funds contain global listed equity large cap companies (around 3,000) and cover ~€9 billion in assets. In its annual report of 2016, ACTIAM covered other asset categories like sovereign bonds and corporate bonds. In 2017, ACTIAM managed to give insight in the carbon footprint of all funds (~€55 billion calculated). With these numbers, ACTIAM could track the performance of its funds in relation to the target it had set on CO₂-emission reduction.

Kees Ouboter (Responsible Investment Officer):

“A very important development in calculating the carbon footprint was the collaboration with other financial institutions in PCAF. The method development in the working groups of sovereign and corporate bonds helped ACTIAM in calculating the footprint of the non-equity portfolios.”

For the asset class sovereigns, data availability and quality is a challenge. Since carbon emission data for countries is not available for recent years, it is necessary to make assumptions on the trends in the carbon emission of countries to estimate the carbon emissions of current bond holdings. The indicator of government debt is somewhat limited since it leaves out the equity stake governments have in carbon emissions. For the sovereign bond asset class, the results will have more uncertainty. However, in mixed portfolios (with corporates and sovereigns) the sovereign carbon footprint is relatively immaterial compared with the corporate contribution.

ACTIAM has several plans to improve its performance on its target. Among others, contributing to developments on carbon scope 3 emissions, which are material in some sectors, and improving the data quality for sovereigns. Since carbon accounting is a backward-looking indicator, ACTIAM uses the carbon footprint as non-financial performance indicator. To measure the financial risk associated with carbon emissions forward-looking analyses are also required. The current carbon footprint can serve as a first step in this analysis.

In this example, we show the carbon footprint calculation for investments in a Dutch sovereign bond. This calculation is used to calculate the carbon footprint of the ACTIAM funds that contain sovereign bonds (as described in the case study and is reported in the annual report of ACTIAM investment funds). ACTIAM used the PCAF method to calculate the sovereign bonds contribution to the total financed carbon footprint scope 1 and 2 of ACTIAM investment funds.

Used data

Central Government Debt, 2015, derived from Eurostat table: Government deficit/surplus, debt and associated data [gov_10dd_edpt1]

Share of government spending per NACE activity, 2014, derived from Eurostat table: Symmetric input-output table at basic prices (industry by industry) [naio_10_cp1750]

GHG emission account per NACE activity, 2014, derived from Eurostat table: GHG/Air emissions accounts by industry and households (NACE Rev. 2) [env_ac_ainah_r2]

Gross Domestic Product (GDP), derived from Eurostat table: GDP and main components (output, expenditure and income) [nama_10_gdp]

The central government of the Netherlands had a debt of €409.8 billion in 2015. The direct emissions of the Dutch government are extracted directly from Eurostat by summing the emissions of economic activity (NACE) category O (public administration and defence; compulsory social security).

The following table shows the direct emissions of the Dutch government:

Direct emissions by the Dutch government	
Carbon dioxide (tCO ₂)	1,637,881
Methane (tCO ₂ e)	182,727
Nitrous oxide (tCO ₂ e)	28,358
Hydrofluorocarbons (tCO ₂ e)	-
Perfluorocarbons (tCO ₂ e)	-
Sulphur hexafluoride (tCO ₂ e)	-
Total direct emissions in tCO ₂ e	1,848,966

The indirect emissions for energy use (scope 2) are calculated by following government expenses to the energy sector and determining the financed emissions accordingly. The financed emissions in NACE category D (electricity, gas, steam, and air conditioning supply), are composed of scope 2 emissions of the central government.

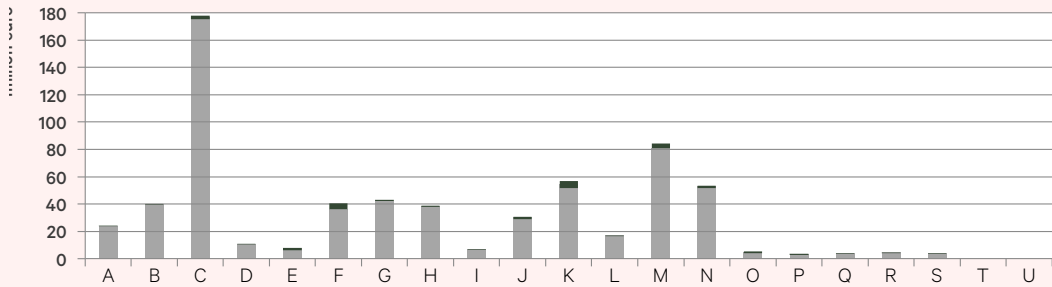
$$\frac{740.000 \text{ million}}{69.000 \text{ million}} \times 8,30 = 8,9t$$

On 30 June, 2017, ACTIAM owned, through the Obligatiepool, €98 million of Dutch sovereign bonds. The attributed carbon footprint of Dutch government bonds to ACTIAM's Obligatiepool is 872 tonnes CO₂e.

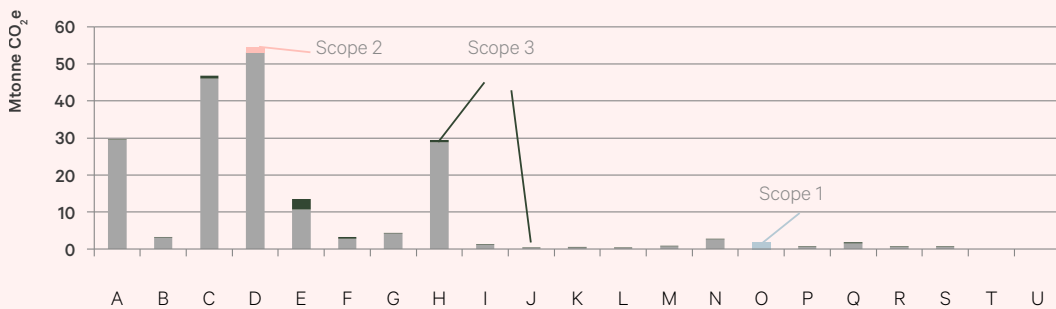
ACTIAM decided to leave out the scope 3 calculations for government bonds to keep consistency with the other asset classes where ACTIAM could not include scope 3 due to a lack of data availability and reliability. Reference the case study that follows for an example where these scope 3 emissions are included, consistent with PCAF guidelines for this asset class.

3.4.1.4 Case Study: de Volksbank sovereign bonds carbon accounting

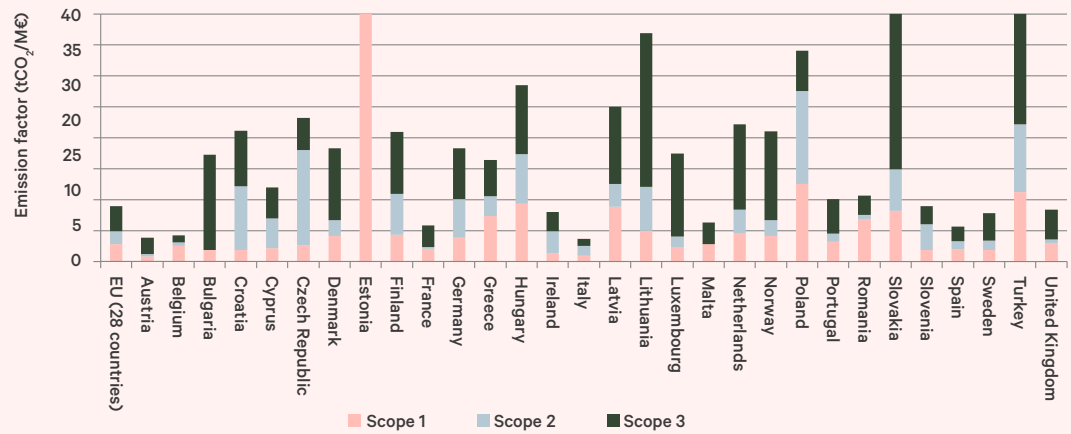
The government share of sector emissions can be approximated by taking the total expenses within a sector and seeing what share the government amounts in the total expenses within each sector.



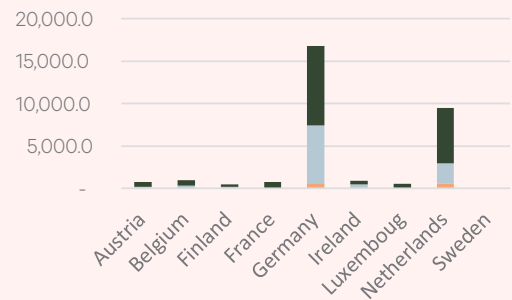
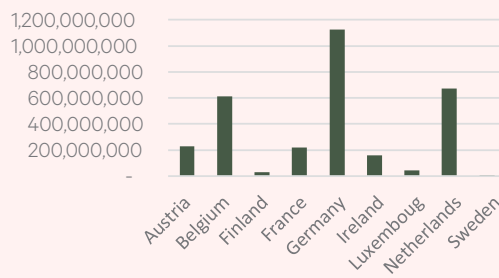
By multiplying the share of the government with the sector emissions we can derive the government share of the sector emissions. NACE category O represents scope 1 emissions. The financed emissions in sector D are scope 2 emissions, and the sum of the financed emissions within all remaining sectors make up scope 3 emissions.



This can be done for all European countries using Eurostat. By dividing the scope 1, 2, and 3 emissions of a sovereign by the central government debt, we can calculate the emissions per million euro for each sovereign bond.



De Volksbank has €31 billion in sovereign bonds per Q2 2019 in nine different countries. Scope 3 is also taken into account by de Volksbank as it better reflects the nature of the sovereign bond than just scope 1 and 2. An emission factor was available for nine countries through the calculation with Eurostat data; one country lacked this data and the emission factor for EU (28 countries) was used to reflect a European average. The total scope 1, 2, and 3 emissions for the sovereign bonds were 29.4 ktonne CO₂e-emissions.



3.4.1.5 2019 update of Working Group Sovereign bonds

Implementation

In 2019, the participants of the PCAF working group sovereign bonds worked on the implementation of the method for sovereign bonds. The working group aimed to overcome certain challenges in implementation. The most important areas of attention were missing carbon and financial data, the reliability of government debt as denominator for CO₂ emissions, and calculation of the (sub-)asset class sub-sovereigns.

Practicalities and insights

1) Missing data and estimation techniques

To calculate the carbon footprint of a sovereign bond, one encounters several types of missing data. First, timeseries data can be unavailable, for example, in government emission data the last 2 years of emission data is often missing, plus data may not be available for several consecutive years. Data gathering is time consuming for governments and therefore the CO₂-emission data is often not up-to-date. Recent year government emission data needs to be estimated. To conduct the estimation, it is good practice to use an indicator that is most related to the economic production of a country and therefore the carbon emissions, namely the GDP. This is in line with the estimations that can be done for companies by using sales (which is also an indicator related to production).

Example:

The government of Romania had a reported carbon emissions scope 1 of 453,170 tonnes in 2014. To estimate the carbon emissions scope 1 of Romania in 2017 the ratio between the GDP of Romania in 2014 of €150,358 million and in 2017 of €169,772 million was used. This results in a carbon emissions scope 1 estimation of 511,683 tonnes in 2017.

Another type of data that can be missing is cross-sectional data. By using Eurostat for input data, CO₂ emissions data of certain countries (especially outside of the European Union) can be missing. To address this, it is possible to use alternative datasets like the World Input Output Data (WIOD) that cover more countries. Another option is to estimate the missing data points (in line with the estimation method that is done for companies). It is recommended to use the carbon intensity CO₂ emissions/GDP of a region or continent that is similar to the country for which data is missing. Still this can have limitations if data of countries with a similar profile is highly limited. In that case, the estimations will significantly over- or underestimate the CO₂ emissions of a country. Thus, improvement on data quality and availability is required.

Example: for a certain year, the carbon emissions data for Ireland in the period 2010-2014 was missing from the input data of Eurostat. Where the estimation is based on the average carbon/debt figures of a group of European countries.

2) Calculating the footprint for sub-sovereigns

Sub-sovereigns is a (sub-)asset class of entities that like sovereigns give out bonds. To calculate the carbon footprint for this (sub-)asset class one ideally uses data on the CO₂-emissions and debt of the specific entities. Since this is not often the case it is advised to use the CO₂ emissions/government debt of the related sub-sovereign.

Agenda for 2020

The working group gives priority to finding and combining multiple, and new, databases to face the challenges in terms of data availability and quality. Especially the coverage of countries outside of Europe are a point of attention is this search. While other data sources are unavailable the group will investigate how the reliability of the outcomes can be improved. The working group will for example investigate whether including a proxy for the equity stake of countries can improve the estimation of carbon intensity for sovereigns.

3.4.2 Listed equity

Topic	Outcome
Scopes covered	Scope 1 and scope 2 minimum. Scope 3 if available and relevant. Report scope 1, 2, and 3 separately. The reason to measure these scopes separately, even though this will require greater effort, is that scope 1 eliminates double counting and measures direct impact, also of a potential carbon tax. The reason to not include scope 3 as a mandatory requirement is that this would require better accounting and disclosure. To date, the comparability, coverage, transparency, and reliability of scope 3 data is insufficient.
Portfolio coverage	Ideally, 100% of the portfolio should be covered. At least the majority of the portfolio should be covered and an indication should be provided for a pathway to full coverage.
	Provide an explanation of which product type (futures, ETFs, fund of funds, external mandates, prefs) were included or excluded and what the main method was for estimating missing data. Cash positions can be considered as having zero emissions. Short positions can be ignored.
Attribution	<p>PCAF proposes that emissions are proportionally attributed to the providers of the company's total capital. To prevent double counting from this perspective, emissions are attributed proportionally to the exposure divided by the sum of enterprise value (total debt and equity).</p> <p>In case a financial institution only invests in equity and undertakes carbon accounting from a risk perspective, emissions can also be attributed to the total market capitalisation (market value of all of a company's outstanding shares) of this company. This follows the so-called ownership approach and is aligned with financial reporting and consolidation rules. It also aligns voting rights and rules for reporting substantial interest in listed companies.</p>
Data	<p>Due to the potentially large universe of listed equity portfolios, the data source will likely be a designated data vendor. PCAF does not recommend a preferred data vendor. We see differences in carbon emissions data between different data providers. It is encouraged to use the most recent available data and to mention the data source, reporting period, or time stamp of these data.</p> <p>Data vendors collect emissions data as reported by listed companies themselves, either through a standardised framework such as CDP or through a company's own disclosures in official filings and (environmental) reports. Disclosure through CDP has the advantage that the disclosed data are accompanied by additional information on the scope and methodology used. PCAF has a preference for data reported by companies, given that the data fully covers the emissions generating activities of the company.</p> <p>Not all companies disclose data on their emissions. Reporting in emerging markets lags behind developed markets. To maximise the coverage of emissions data, the remaining gaps are often filled with estimates. Preferably, estimation models used are consistent and reflect the underlying emissions generating activities of the entity. Production-based models are preferred over revenue-based models from a consistency point of view as they are less sensitive to exchange rate or commodity price fluctuations. Production-based models are especially useful for carbon intensive industries like utilities, materials, energy and industrials. Revenue-based models (e.g., intensity-based or environmental input-output models) have the advantage of requiring less detailed data.</p>
Absolute vs. relative emissions	As a minimum, PCAF suggests to disclose both absolute and relative emissions. For relative emissions, we propose to divide the absolute carbon footprint with the total assets under management.
Avoided emissions	Avoided emissions are not appropriate for this asset class

3.4.2.1 Asset class specific considerations

Aggregation of output A financial institution may choose an appropriate level of aggregation of outputs; for instance, should the overall portfolio footprint be reported, or is aggregation at more homogenous sub-levels more relevant, for instance advanced and emerging markets?

Challenges in steering carbon footprint In addition, PCAF will further investigate the challenges linked to steering a carbon footprint and describe the metrics currently in use by investors as emerging practice.⁵

3.4.2.2 Limitations

Market price fluctuations When using market value as denominator it is important to realise that assets under management change as a result of a fluctuating market price. An objective to reduce a relative footprint by a certain percentage becomes a moving target under the influence of this fluctuation.⁶

Company identifiers For larger portfolios, it is important to have unique company identifiers in order to combine information from various sources. Examples of such identifiers include SEDOLs, ISINs, CUSIPs, Bloomberg Tickers. For large portfolios, matching external data sources can be a challenge when for example two companies merge; the company identifiers will be adjusted immediately while carbon data providers might only update such information on an annual basis.

The strength of PCAF lies in the number of parties that have committed and the fact that they use scientific methods to provide insight into the climate impact of their financing and investments. Insights are needed to take the necessary steps to action. The financial sector is capable of making a big difference and thus contribute greatly to the Dutch climate goals. At ASN Bank we've discovered that big and ambitious goals are achievable. Every person and organization can make a difference. Combined these actions will make a difference. That is exactly what happened this year. PCAF, started in the Netherlands has become a global partnership. As climate change is not limited to national borders, we are glad to see PCAF also reached out globally. We owe it to future generations to take action, so let's do it.

Arie Koornneef, director ASN Bank

⁵ ABP/APG use normalised invested value. This is a metric that corrects for market fluctuations but does account for capital allocations. The metric is calculated as the number of participation that a client has in the fund multiplied by the price of a participation in a reference year. It represents the invested value at this year's market price levels. The advantage of the metric is that achieving the target becomes independent of market volatility. Disadvantage is that the normal economic growth is also neutralised which makes the target more ambitious in case of economic growth.

⁶ A possibility to overcome this would be to use normalised assets under management, whereby prices are held constant over the target period. Such adjustments should be made transparent.

3.4.2.3 Calculation example

Description of example

The absolute footprint of an investment in a company is calculated by multiplying the total emissions by the proportional share in the company. The absolute footprint of a portfolio of companies is calculated as the sum over all footprints over time period t.

$$(1) \text{ absolute footprint}_t = \sum_{\text{company} \in \text{portfolio}} \frac{\text{invested value}_t}{\text{enterprise value}_t} \text{emissions}_t$$

$$(2) \text{ relative footprint}_t = \frac{\text{absolute footprint}_t}{\text{AuM}_t}$$

When using market capitalisation as denominator instead of enterprise value the absolute footprint is calculated as follows:

$$(1) \text{ absolute footprint}_t = \sum_{\text{company} \in \text{portfolio}} \frac{\text{invested value}_t}{\text{marketcap}_t} \text{emissions}_t$$

Used data

The information required for these calculations is:

Emissions: can be taken from company reports if available but for large portfolios external data providers are often used. Examples of data sources include CDP, Bloomberg, MSCI, Trucost, and Southpole. In the choice of data source, asset managers will have to compare the various options (for example on coverage, data quality, transparency, service, costs, etc.).

Market capitalisation, total borrowings, customer deposits: this information is widely available in commercial market intelligence tools and commercial providers of financial data that are used by investors.

Invested value: this information is normally available in the internal systems used by investors for portfolio management and performance monitoring.

Calculation and results

Company	Market cap	Total Borrowings	Customer Deposits	Enterprise value	Invested	Total emissions
A	37.5 billion	14.5 billion	0	52 billion	100 million in a-shares and 50 million in b-shares	500 tonnes CO ₂ e
B	18 billion	4 billion	0	22 billion	90 million	400 tonnes CO ₂ e
Cash					5 million	
Total invested					245 million	

Using enterprise value as denominator:

Total emissions company * (invested value / (market cap + total borrowings + customer deposits))

For company B: $400 * (90\text{mln} / (18\text{bln}+4\text{bln}+0\text{bln})) = 400 * 0.41\% = 1.64$ tonnes CO₂e

For company A: $500 * (150\text{mln} / (37.5\text{bln}+14.5\text{bln}-0\text{bln})) = 500 * 0.29\% = 1.44$ tonnes CO₂e

For cash no emissions are attributed

Total absolute carbon footprint = $1.64+1.44 = 3.08$ tonnes CO₂e

The relative carbon footprint is calculated by dividing the absolute carbon footprint over the invested value (per million).

Total relative carbon footprint = absolute footprint / invested value per million invested

Total relative carbon footprint = $3.08 \text{ tonnes CO}_2\text{e} / 240 = 12.8$ kg CO₂e per million invested

Using only market cap as denominator:

Total emissions company * (invested value / market cap)

For company B: $400 * (90\text{mln} / 18\text{bln}) = 400 * 0.5\% = 2$ tonnes CO₂e

For company A: $500 * (150\text{mln} / 37.5\text{bln}) = 500 * 0.4\% = 2$ tonnes CO₂e

For cash no emissions are attributed

Total absolute carbon footprint = $2+2 = 4$ tonnes CO₂e

The relative carbon footprint is calculated by dividing the absolute carbon footprint over the invested value (per million).

Total relative carbon footprint = absolute footprint / invested value per million invested

Total relative carbon footprint = $4 \text{ tonnes CO}_2\text{e} / 240 = 16.7$ kg CO₂e per million invested

Make sure to use:

- Emissions (GHG) data and company revenue (for carbon intensity) of the same year.
- Enterprise or Market Cap value and portfolio composition data from the same cut-off date (e.g. end of reporting period).

For example, when calculating the carbon footprint per end 2018, you will probably use:

- 2017 company GHG emissions data, and end-2017 company revenues.
- 31 dec. 2018 EV / Market Cap, and portfolio composition data.

3.4.2.4

Case Study: Accounting for Scope 3 of Investees

MN Services, Robeco, and Triodos Investment Management jointly contributed to this case study. All these institutions have been using the PCAF methodology for at least over 1 year now. Within the working group we concluded that the methodology to calculate the carbon footprint for listed equities is relatively straightforward, particularly as compared to other often more complex asset classes.

One of the topics on the agenda for 2019 was to improve data quality and consistency, specifically regarding scope 3 data. At this stage it is not mandatory to report on scope 3 data. Our intention although is to report on this broader metric once data quality for the metric has improved.

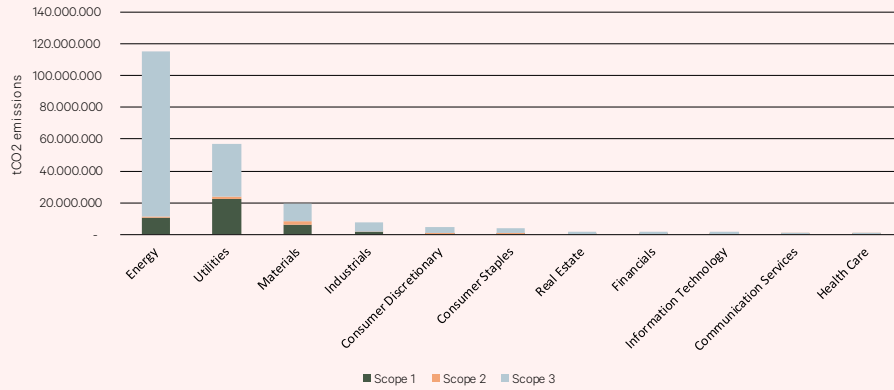
In this case study, we would like to show the relevance of scope 3 data. Furthermore, we give our recommendation on how to improve the data quality of this metric.

Scope 3 data consists of all other indirect emissions, which are based on the following 15 categories:

#Scope 3 emissions categories	
1	Purchased goods and services
2	Capital goods
3	Fuel and energy
4	Upstream transportation and distribution
5	Waste generated in operations
6	Business travel
7	Employee commuting
8	Upstream leased assets
9	Downstream transportation and distribution
10	Processing of sold products ¹¹ Use of sold products
12	End-of-life treatment of sold products
13	Downstream leased assets
14	Franchises
15	Investments

- The disclosure of either one of these categories depends on the materiality of that specific category and is subject to each company to decide upon individually.
- As scope 3 data refers to all other indirect emissions this is often beyond the scope of companies, hence it is difficult to report on.
- Carbon emission data providers currently estimate scope 3 emissions based on peer group averages. The use of data providers, however, is not yet consistent.

Carbon Footprint (Scope 1,2 & 3) for Sectors of FTSE All Developed

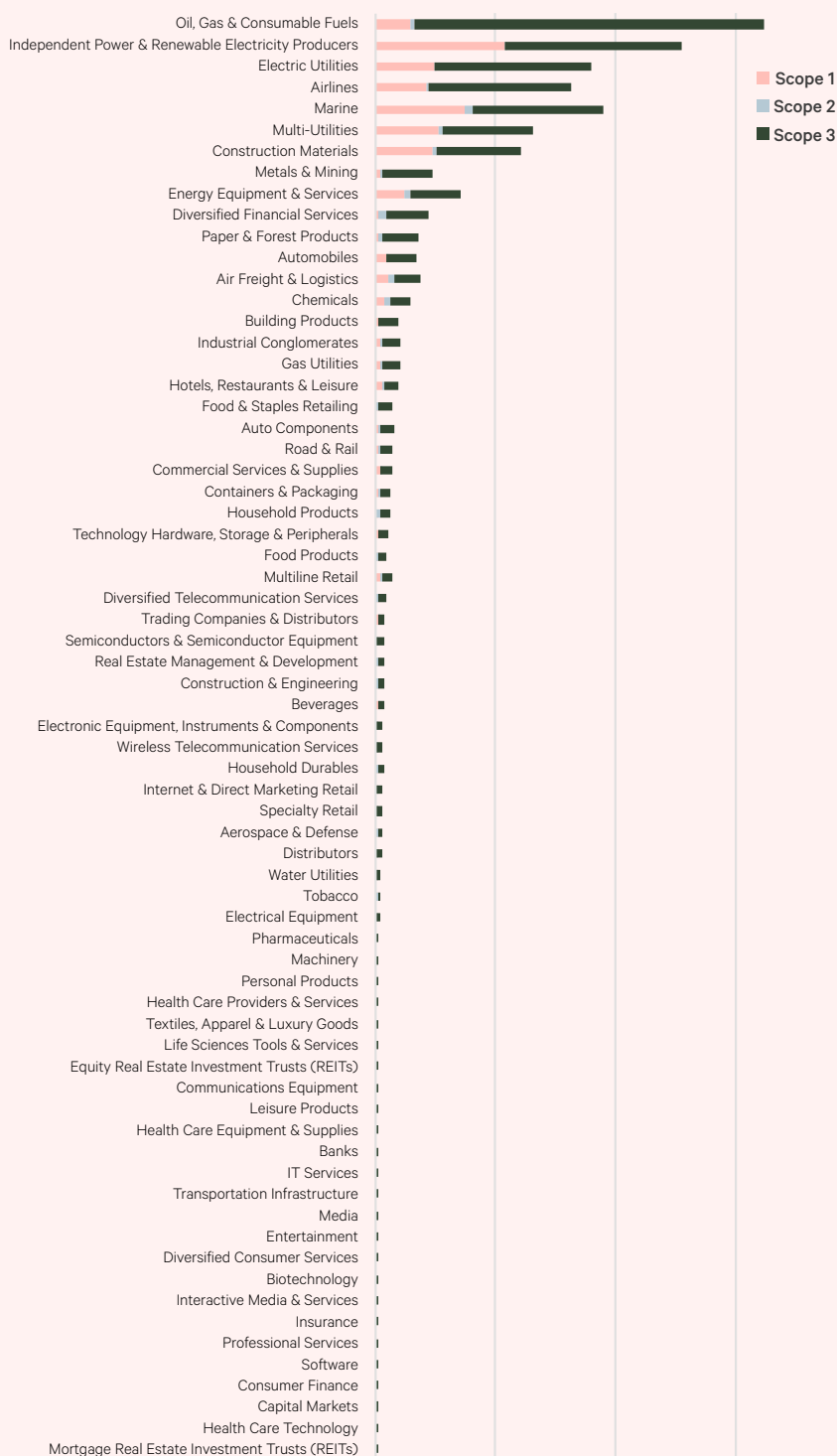


Source: ISS Oekom research AG

The figure shows large differences in greenhouse gas emissions between sectors. The energy and utility sectors, not surprisingly, have the largest carbon footprint.

The figure below, which is on an industry level, shows a similar trend. Companies that operate an asset light business model such as software and service often have a low carbon footprint, while companies operating in either the oil & gas, utilities, or airline industries have a significantly higher footprint.

Carbon Footprint (Scope 1,2 & 3) for Industries in FTSE All World Developed



Source: ISS Oekom research AG

Business models are an important driver for the differences in carbon emissions. More consistency in the disclosure of scope 3 emissions of companies operating in the same sub-industry is needed.

Recommendation:

- Companies operating in a similar sub-industry (GICS level 4) should disclose scope 3 emissions in a similar way.
 - We call upon all platform members to engage with companies to improve their disclosure of scope 3 data.
 - Data providers should have a more consistent methodology to calculate scope 3 data.
-

The PCAF initiative helps us to understand the carbon footprint of our loans and investments so we can monitor portfolios over time and steer on the basis of credible data. We used the methodology extensively in our 2018 reporting and are building on this work in 2019.

We believe PCAF can play an important role helping to change finance and shift the industry so it's fit for a positive, low carbon future. That's why we have worked with our partners in the Global Alliance for Banking on Values, a network of independent sustainable banks from across the world, to extend the reach of PCAF globally. 30 of the network's members committed to start assessing the carbon emissions of their loans and investments during 2019. As you will read in this report, that work has contributed to an even more ambitious programme of global change with the launch of a PCAF global programme.

It's time for carbon accounting to become business as usual in financial institutions. PCAF provides an easy way to get started, regardless of the size or location of your organisation. We urge others to take the opportunity that PCAF presents, to share your learning from doing so and together we can play our part in the urgent effort to transition to a sustainable, low carbon future.

Jellie Banga, COO, Triodos Bank

3.4.2.5 2019 update of Working Group Listed Equity

Implementation

In 2019, the participants of the PCAF working group on listed equities, worked on the implementation of the guidelines, exchanged views, experience, and practices and looked into the alignment of PCAF and TCFD. This year the WG worked on two topics as part of the 2019 agenda as set in the previous (2018) report:

1. Data quality and consistency

Open dialogue with data providers on their methods for data and estimates, to contribute to standardisation and be aware of new developments

2. Alignment equity and corporate credits

How can we move quickly from carbon accounting listed equity to corporate credits?

Practicalities and insights

1. Data quality and consistency

In order to set up a decent methodology to measure the carbon footprint of investment portfolios data quality and consistency is paramount.

Scope 1 and 2 (or direct and indirect) carbon emissions are relatively easy to track as these are sourced from companies and often captured in their own environmental management systems (EMS) of which the data has been audited and validated by external parties.

The challenges regarding the data quality and consistency relates more to scope 3 (or other indirect emissions) data.

Challenges

Below are some of the challenges we face:

- Double counting. The scope 3 emissions of one company could be the scope 1 (or direct) emissions of another company.
- The disclosure of scope 3 data is currently not set by specific standards, so it is up to companies themselves what and what not to disclose and what to include as “other indirect emissions.” This makes it more difficult to compare companies and industries.
- The disclosure of companies of their scope 3 emissions is perhaps a more aspirational target for PCAF. Perhaps as PCAF we could make a recommendation for each industry what to include in scope 3, but that is still up for discussion.
- Data quality is still at stake. One of the carbon emissions data providers pointed out that a small Italian bank had the highest scope 3 emission in the world, which is highly unlikely.
- Within the workgroup Listed Equities of PCAF, we continue to monitor the developments of other relevant parties such as TCFD and SASB and several carbon emission data providers. Through engagement, we continue to ask for more disclosure by companies of relevant scope 3 data.

Recommendation

- a) As platform participants we will engage with companies and encourage them to improve the disclosure of scope 3 data
- b) In order to have more consistency in terms of reporting on scope 3 data we encourage platform participants in their contacts with ESG data providers to ask for a more consistent methodology in measuring scope 3 data.

2. Alignment equity and corporate credits

There are multiple ways for measuring the carbon footprint of an equities portfolio. This can be done by taking your share of the market capitalisation of a company, the share of the enterprise value of a company, or the share of the revenue of a company. Investors measure in different ways. The advantage of taking the enterprise value of a measure of the carbon footprint is that this measure can be used in both listed equities and corporate bonds. In the PCAF methodology for listed equities and corporate bonds the enterprise value is the key metric in calculating the carbon footprint.

Challenges

There are also many challenges with this measure however. Some of these challenges are outlined below:

- There is no clear and uniform definition of the enterprise value: as long as definitions are not uniformly used, comparison between footprints of investors becomes difficult.
 - A missing enterprise value: sometimes financial data service providers do not have an enterprise value for a company. Also, the elements of an enterprise value can be missing. Not all data providers namely include the enterprise value (both equity and debt components of an issuer's capital). A possible solution here could be a currency adjusted enterprise value.
 - A negative enterprise value: This would create a negative attribution factor, which is not possible. In the previous PCAF methodology report a negative enterprise value is already noted as an issue: the enterprise value was negative in the case of several financial institutions. This required further adaptations in some cases to prevent tilts in the results that are unwished.
- An enterprise value that is less than the invested value by a financial institution: the result of this situation is an attribution factor of over 100%, which is undesirable.

Recommendation:

The difficulty of choosing and aligning a measure for listed equities and one for corporate bonds, is that there is no complete measure, and definitions of measures are not uniform. In aligning the measurement of equities and bonds, enterprise value could be the most promising, but challenges as stated above need to be tackled. The PCAF working groups of listed equities and corporate bonds started with describing these challenges and will focus on tackling these impediments next year.

Agenda for 2020

1. Data quality and consistency. Further engaging with ESG data providers to use a consistent methodology in measuring scope 3 data (and encourage companies to improve their disclosure of scope 3 data)
2. From equity to corporate credits: Both working groups could develop a uniform measure of footprinting for both asset classes
3. Challenges in steering towards low carbon portfolios: further investigation of challenges linked to steering a carbon footprint of a portfolio and the alignment with a (below) 2 degrees reduction pathway

3.4.3 Project finance

Topic	Outcome
Scopes covered	Scope 1 and scope 2 minimum. Scope 3 if relevant.
Portfolio coverage	Ideally, 100% of the project portfolio should be covered. The coverage of the project portfolio should be clearly indicated. The coverage of security types should also be stated clearly.

Attribution The attribution for project finance is defined as the outstanding amount divided by the project size or total balance sheet.

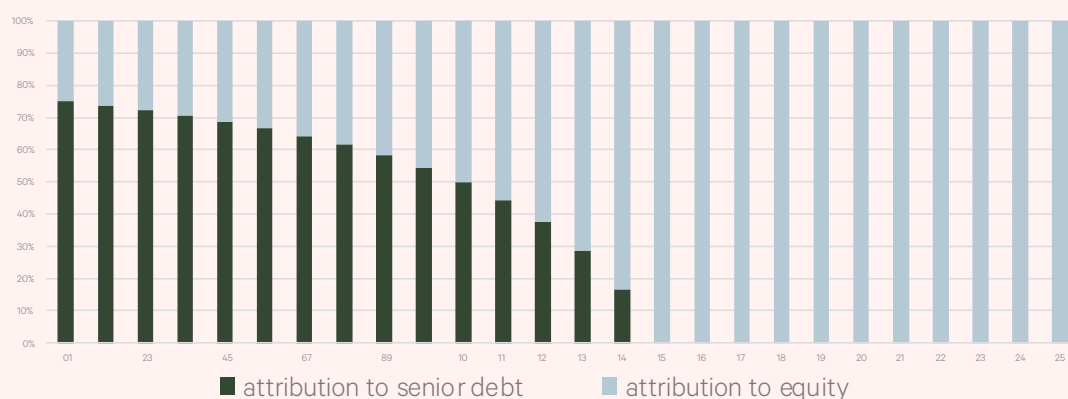
$$\text{attribution factor} = \frac{\text{outstanding financing (debt + equity)}}{\text{total project size or total balance sheet}}$$

At the start of the project, the project size is the total financing available for the project, i.e., total debt plus equity to realise the project. It is expected that in subsequent years projects will report annually on their financials including balance sheet information (i.e., the total assets or total debt plus equity within the project). The total balance sheet can then be used as the attribution factor.

The outstanding amount is the amount of debt and/or equity provided by the individual financier. Guarantees have no attribution, until they are called and turned into a loan.

This attribution rule has been changed compared to the 2018 PCAF report. Alternative attribution rules have been tested in the past year and the above methodology has been found to be the most practical. In addition, using total balance sheet value harmonises the attribution rules among asset classes, which also use the total capital or total balance sheet.

The attribution rule is illustrated by the figure below, where initially most of the (avoided) emissions from the project are attributed to debt, but as debt is repaid more and more of the impact become attributable to the equity providers.



Data

Within the due diligence and monitoring of a project finance transaction, the availability of project-specific data is generally good. As a result, higher quality GHG data can be obtained than would be available through generic input/output models, without adding an unrealistic amount of additional work to the process. Therefore, it is proposed that GHG data for project finance should not be based on generic input-output models, but on project-specific source data.

Project finance is being applied to a broad range of sectors, activities, project sizes, and geographies, and there is not one broadly accepted and universally applicable set of source data and calculations available. One can however distinguish a hierarchy of preference, providing guidance in selecting the highest quality level within the limitations of availability.

Project-specific independently validated GHG data ranks highest in quality and consistency but will not always be available. The next best level of data quality and consistency that can be obtained in a practical way, is to calculate the GHG emissions from relevant non-GHG source data provided by the client (like the consumption of electricity, of fuels and of certain sector-specific raw materials), using credible standardised calculation tools. Only if neither of these options work, it is acceptable to use non-validated GHG data provided by the client or to use data from sector average input/output models.

The following hierarchy of preference is proposed:

1. Project-specific GHG data, validated by independent expert in accordance with the GHG Protocol and/or UNFCCC or another credible certification scheme.
2. GHG data calculated from verifiable non-GHG source data, using pre-approved calculation tools (such as the IFC-CEET or the AFD carbon tool for industry or power production, FAO EX-ACT tool for agriculture).
3. Client provided GHG data, not validated by independent expert in accordance with the GHG Protocol and/or UNFCCC or another credible certification scheme, or sector average input/output model-based GHG data.

When estimating the expected carbon footprint of a project at the time the investment is made (when the project is not yet operational), it is essential that the methodology provides guidance on the way the annual production is estimated (conservative/neutral/aggressive scenario). For renewable energy projects it is customary to have experts calculate percentile production predictions based on an analysis of historic resource data (wind, irradiation, hydraulic flow etc.). The P50 value is the predicted annual production for which there is a 50% probability that it will be exceeded in a given year. The P90 value is the predicted value that has a probability of 90% of being exceeded in a given year (the 1 year P90), or of being exceeded in an average year over a 10 year period (the 10 year P90). The WG proposes to use the P50 predicted production.

Absolute vs. relative emissions

In this context, relative emissions are not the emissions per unit of production, but per monetary unit of finance. Standard approach should be reporting absolute and relative emissions. PCAF states that the methodology depends on the goal, e.g., monitoring and communication purposes or steering portfolios against a carbon target.

- Avoided emissions** Avoided emissions are the emissions that the financed project emits less than would have been emitted in the absence of the project. For energy efficiency projects this is emission reduction caused by the project; for renewable energy projects, this is the difference between the project emissions and the emissions from the production of the same amount of electricity in the most likely alternative scenario in the absence of the project. The latter is expressed in a grid emission factor (tCO₂e/MWh), from which the emission factor of the project subtracted to arrive at the avoided emission per MWh produced. PCAF proposes the following hierarchy of preferred sources for the baseline emission factors:
1. Project-specific analysis, such as UNFCCC validated reports (CDM or otherwise)
 2. Emission factors and calculation methodology from the IFI Approaches to GHG Accounting for Renewable Energy Projects and for Energy Efficiency Projects. Since the previous PCAF report, the IFI GHG TWG has published a new set of default grid factors.⁷The calculation approach has been revised based on the IEA's projected CO₂ emission intensities of countries/regions.

Although the number of technological opportunities (like electrification of mobility) for reducing carbon emissions is growing, the urgency to address climate change is still rising as confirmed by the latest IPCC report, which calls for more ambition to reach a global 1,5°C scenario. In light of this, ACTIAM has set the target to reduce the carbon emissions of its assets under management with 40% in 2040 compared to 2010. Carbon footprint reduction of our assets is calculated and reported in line with the PCAF methodology.

At the same time, sector-wide action is required to reach the reduction in carbon emissions we need to achieve. By collaborating with PCAF members on standardization and internationalization of carbon footprinting methodologies, we are convinced more action and change will come about. Still, to ensure next steps are being made, I strongly encourage PCAF's collaboration with the Science-Based Target Initiative to develop forward-looking climate risk metrics. This way, investment decisions will be more future-proof and engagements with investees can be further optimized. Ultimately, by joint efforts, the financial sector can play an instrumental role in the alignment with a 1,5°C scenario.

-Hans van Houwelingen, CEO ACTIAM

⁷ <https://unfccc.int/climate-action/sectoral-engagement/ifi-harmonization-of-standards-for-ghg-accounting/ifi-twg-list-of-methodologies>

3.4.3.1 Asset class specific considerations

Life cycle emissions Life cycle emissions, such as manufacturing, transporting, and installing equipment, can be accounted for to incentivise more efficient production in the future. Life cycle emissions can be included when estimating the expected carbon footprint of a project at the time the investment is made. PCAF will investigate accounting for the emissions from the construction and decommissioning of projects for renewable energy projects. PCAF foresees using an agreed estimation model. These emissions could be neglected when they are below 5%; a de minimis threshold often used by the GHG Protocol.

Accounting timeframe The most commonly adopted accounting principle for GHG emission and other ESG data is to account for and report on the actual emissions that have taken place in the portfolio during the most recently completed reporting period (usually a calendar year). This approach is also proposed for project finance. However, project finance inherently relates to an activity that will only start after development, construction and commissioning have been completed, which is often years later, and may even be after the institution having provided the project finance is no longer exposed because it has been sold or otherwise refinanced. In order to be able to account for the impacts of investment decisions in the year that these investments are being made, several (development) finance institutions calculate and report on estimated future (ex ante) annual GHG emissions for all new investments in a given year. PCAF proposes that the methodology provides for both ex ante (estimated) and ex post (actual) emissions.

Boundary setting The boundaries (both for the GHG emission calculation and for the attribution) are set around the project; if the project is not fully greenfield (i.e., a newly build project) this means that only the financed extensions are included and the emissions and financials related to the existing activities and/or installations are not considered.

3.4.3.2 Limitations

Emission data Although in project finance the availability of relevant project-specific data is high relative to some of the other asset classes, expert GHG emission reports, specific to the project will often not be available. Instead, the emission data will be based on project-specific source data, being calculated into emission data using sector- and country specific factors.

Life cycle emissions It is proposed to neglect life cycle emissions if these are smaller than 5% of total lifetime (avoided) emissions. If bigger than 5% these emissions should be accounted for, but in most cases, this must be based on generic model-based data. PCAF proposes to account and report for the emissions related to (for example) construction only in the years in which they occur, so only during the construction period. In case the life cycle emissions may not be neglected, it is not agreed yet how to attribute them over the reporting years.

3.4.3.2

Case Study: Triodos Bank Project finance carbon accounting

Triodos Bank



“Triodos Bank acts as a catalyst for the transition to a sustainable economy where people, the environment they depend on, and the culture that sustains them are valued,” says Itske Lulof, Director Energy and Climate at Triodos Bank. “To that end Triodos Bank only finances companies that contribute to a sustainable society. This approach includes an active role in sustainable energy where the bank’s policy is not to finance fossil fuels and exclusively to finance renewable energy and energy efficiency initiatives.”

Triodos Bank has played this role since the mid-1980s and has financed more renewable energy initiatives in Europe than any other financial institution, for the last 4 years. Active in the Netherlands, Belgium, France, UK, Spain, and Germany, this has led to finance for projects like Greensky, the largest onshore wind park in Belgium. The power it produces is directly injected into the rail network and supplies 170 trains daily.

For several years, its finance has also extended to renewable energy projects in emerging markets too, such as hydro projects in Nepal, Ecuador; wind in Kenya; and solar in Mongolia.

Assessing the carbon emissions of loans and investments in the sustainable energy sector (the bank itself is both carbon neutral and uses 100% renewable energy in its buildings) can be relatively straightforward compared to other sustainable sectors it finances, because these projects report on the energy they generate. However, in practice, delivering good quality data can be challenging. In 2018 Triodos Bank started to use an attribution approach, accounting for the proportion of carbon emissions of a project given Triodos’ stake in it. In 2018 this meant Triodos Bank and Triodos Investment Management financing attributed to avoided emissions of about 0.9 million tonnes CO₂. The financed projects in total contributed to the avoidance of over 2.9 million tonnes of CO₂ emissions (2017: 2.4 million tonnes).

PCAF demands, and we welcome, an attribution approach, equating the proportion of finance with the actual emissions avoided. Triodos Bank implemented this in its 2018 annual report.

PCAF also favours P50 projections, which more closely reflect actual energy production, rather than P90 projections which are more conservative and used to underpin financial judgements of projects. The criteria for avoided emissions have also developed during the year, using existing best practice, and will require more granular assessments of Triodos Bank projects.

Implementing PCAF built on changes made in the organisation in 2017 and 2018. For example, we used updated emission factors for all countries we invest in and limited the number of external sources.

Approaches differ within countries in which Triodos Bank is active, balancing data accuracy, data availability, and efficient data processing. Some branches apply yearly P90 projections, other use P50 or use as much actual energy production data per project and combine that with monthly P90 projections for the missing months and apply national wind indexes. We continue to try and optimize this approach.

2019 update of Working Group Project Finance

Attribution	<p>As indicated in the 2018 PCAF report, alternative attribution rules have been tested in the past year. Based on the analysis, a new attribution rule has been proposed that is more practical and consistent with other asset classes, which also use the total capital or total balance sheet.</p> <p>There is still an open question whether in the attribution the outstanding amount can be the amount on the balance sheet of the bank or the balance sheet of the client. This makes a difference when it comes to write-offs and the inclusion of fair value. This consideration will be further researched in 2020.</p>
Practicalities and insights	<p>With regard to the accounting of avoided GHG emissions for project finance, the International Finance Institutes Technical Working Group for GHG Accounting Harmonisation (IFI GHG TWG) remains the most important peer initiative. Particularly, their work on electricity grid emission factors (the baseline to compare power projects with) is of importance for renewable energy finance. Since the previous PCAF report, the IFI GHG TWG has published a new set of default grid factors.⁸The calculation approach has been revised based on the IEA's projected CO₂ emission intensities of countries/regions.</p>
Agenda for 2020	<p>In 2020, the PCAF project finance WG will continue to improve and refine the GHG accounting methodology. The most important topics to cover will be:</p> <ul style="list-style-type: none"> Developing a methodology to calculate sequestration/negative emissions, such as for forestry Reviewing the significance of life cycle emissions and developing guidance on this Providing guidance on the definition of outstanding amount

⁸ <https://unfccc.int/climate-action/sectoral-engagement/ifis-harmonization-of-standards-for-ghg-accounting/ifi-twg-list-of-methodologies>

3.4.4 Mortgages

Topic	Outcome
Scopes covered	Energy use of financed buildings (scope 1 and 2).
Portfolio coverage	100% of the on-balance mortgages.
Attribution	As the financial institution is often the only provider of a mortgage, it is proposed to fully attribute the emissions to the provider of the mortgage. Even if the loan-to-value is relatively low. Mortgages are one of the few asset classes where a financial institution can directly engage with its customers and take responsibility for a societal challenge. The energetic characteristics of the financed properties are taken into account in investment decisions regardless of the size of the mortgages. PCAF is not in favour of using the loan-to-value (LTV) ratio as this leads to emissions fluctuating with property value.
Data	<p>The data availability on the energy consumption of properties has improved considerably due to policy regulations within the built environment (like EPC norms and energy labels). Within the Netherlands, the available data are usually averaged over a number of households in the same peer group to anonymise the data. Various sources are available, dividing energy consumption by energy label, type of household/sector, and type of property. When applying these data on a large number of financed properties it is possible to get a reasonable approximation of the CO₂e emissions.</p> <p>Based on the data available, the following data hierarchy is proposed:</p> <ol style="list-style-type: none"> 1. Actual energy consumption from a grid operator, converted to CO₂e emissions using verified emission factors specific to the type of energy consumed. 2. Actual energy consumption from a grid operator, converted to CO₂e emissions using grid emission factors for energy from undefined fuel source. 3. Average energy consumption per postal code regions, converted to CO₂e emissions using grid emission factors for energy from undefined fuel source. 4. Average energy consumption sector and/or energy label specific, converted to CO₂e emissions using general grid emission factors. <p>PCAF suggests working with actual data on the energy consumption of the properties, if available. For the Netherlands, PCAF is in contact with the national association of grid operators, Netbeheer Nederland, to provide actual energy consumption data.</p>
Grid emission factors	<p>The consumed gas and electricity on household level can be converted to CO₂e emissions using grid emission factors. Within the Netherlands, www.co2emissiefactoren.nl gives a list of widely accepted and uniform grid emission factors.</p> <p>PCAF has chosen to use the grid emission factor related to direct emissions, expressed under column TTW value on www.co2emissiefactoren.nl. Whenever the origin of the consumed electricity is unknown, the emission factor for electricity from undefined energy source should be used. The factor for electricity is updated regularly to reflect changes in the Dutch electricity mix.</p> <p>For 2019 measurements this leads to the following emission factors: 0.361 kg CO₂/kWh for electricity, and 1.791 kg CO₂/m³ for natural gas.</p>
Absolute vs. relative emissions	The methodology results in absolute emissions per household/building. This information can be further specified and translated into relative emissions based on preferred disclosure on the portfolio.
Avoided emissions	A mortgage on a house that is climate-positive, i.e., generating more energy than it consumes, could be seen as avoided emissions. However, this is not covered in this report.

3.4.4.1 Asset class specific considerations

Obtaining data on energy consumption Actual consumption data, made anonymous, but specific for a certain mortgage portfolio is preferred. The actual energy consumption will be more accurate than working with the average energy consumption per energy label.

Off-balance mortgages and subsidiaries The scope of this methodology is on on-balance mortgages, therefore off-balance are not included. If relevant, additional metrics can be included to disclose on off-balance mortgages.

Distinguishing between private and corporate mortgage No distinction is made between private or corporate mortgages.

3.4.4.2 Limitations

Result dependent of data quality Many assumptions must be made in order to calculate the emissions of mortgages as data are often difficult to retrieve due to privacy reasons. Even though the calculation method does not differ greatly, the data sources used can yield different results, for instance when average consumption data are replaced by actual consumption data coming from grid operators.

Furthermore, if actual consumption data are used, it is not clear if all the energy consumption is applicable solely for the house or for instance also for an electric car. The actual energy consumption data can be further refined using the type of electricity used.

Country specific assumptions Some country specific adjustments need to be made to make the calculation applicable for a certain country. The Dutch energy label, for instance, is the result of a European directive and differs from ways to categorise energy efficiency of houses in other EU countries and countries outside of Europe. Country specific adjustments need to be considered depending on the data availability and standards in each country.

Double counting As 100% of the emissions per mortgage is attributed to the mortgage provider, it is possible that in some cases houses with mortgages at multiple providers get double counted.

3.4.4.3 Case Study: ABN AMRO mortgages carbon accounting



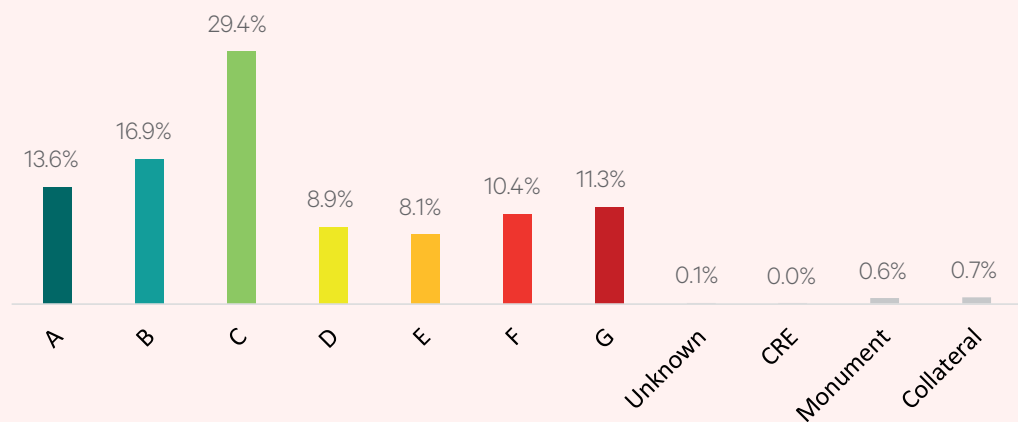
In 2017, ABN AMRO launched its bank-wide Mission 2030 ambition to ensure that all of the homes and offices the bank has financed or will finance, have an average energy label A by 2030. The properties the bank uses will on average have an energy label A by 2023 already. Mission 2030 has been expanded in 2019 by adding 'Paris-Proof' targets to the emissions of its own offices.

"Executing our Mission 2030 isn't about excluding homes and offices with a carbon intensive energy label, but it is about helping our new and existing customers to make their real estate energy efficient," says Tjeerd Krumpelman, Head of Advisory, Reporting & Engagement.

ABN AMRO provides over 790,000 mortgages in the Netherlands, through its brands ABN AMRO, Florius, and Moneyou. The mortgage portfolio consists of about €150 billion of assets on ABN AMRO's balance sheet, which represents a Dutch market share of approximately 20%. ABN AMRO can have a substantial impact by taking responsibility to climate mitigation. On a monthly basis, the RVO (Netherlands Enterprise Agency) energy label database is matched to addresses in the mortgage portfolio of ABN AMRO. The final labels have grown from 21% in 2017 to 25% Q3 2019. If there is no final energy label present, a provisional label is linked to a house.

There is a small portion of the mortgage portfolio for which no energy label exists, such as monuments, recreation homes, buildings that do not use energy to regulate the climate (such as barns or garages), (agricultural) business premises intended for storage or processing and some other exceptions.

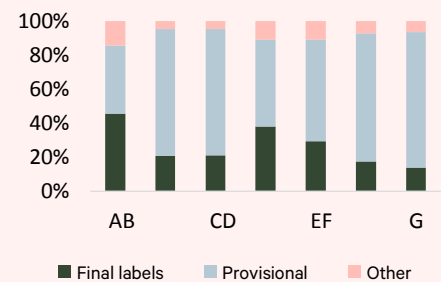
Distribution of energy labels in portfolio Q3 2019



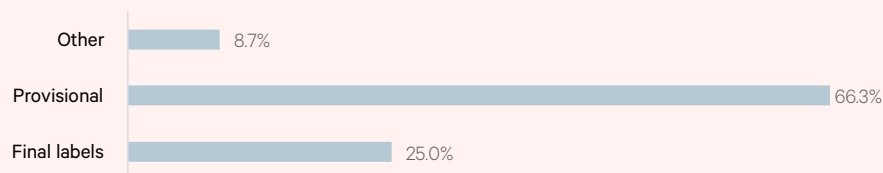
Provisional versus final labels

Provisional labels have been issued by our government and are known to be conservative. In practice, there is less incentive for a customer to convert a provisional label into a final label. Labels need to become final when a customer moves to a new house. Even with energy saving measures taken, a customer does not always make the label final. Nevertheless, there was a strong growth in final labels to 25%. This was due to many house movements in our portfolio and due to cooperation with third parties when our customers realised energy saving measures.

Final and provisional labels Q3 2019



Final & Provisional labels in portfolio Q3 2019



Trends in 2018 up to and including Q3 2019

Our average energy label in the mortgage portfolio remains D (Q3 2019). In terms of inflow, A and C labels saw a significant increase. The reason for an increase in A labels was the inflow of newly built homes supported by initiatives for energy efficient homes. Customers from less good labels who have improved and upgraded their homes affected the C label inflow. In total numbers only the A labels have increased in 2018 and 2019. All other labels have decreased. Just like most other financial institutions and housing corporations, the C label remains the largest label. A reason for this is a strong inflow combined with label migrations. Customers in houses with less efficient labels do not always upgrade to an A or B label, but seem to make smaller steps, which leads to C label often being their final label.

Business proposition for mortgage customers

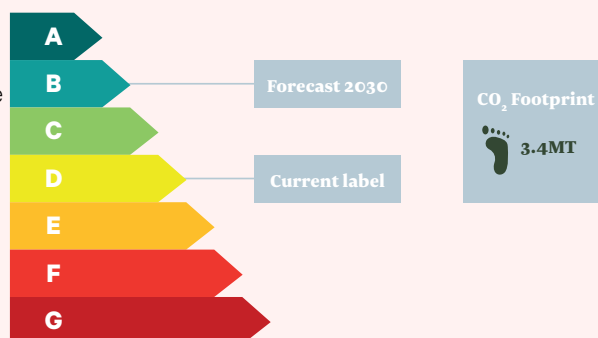
By partnering with De Energiebespaarders, ABN AMRO launched a new proposition to engage our mortgage customers to take energy-efficient measures. This not only gives homeowners an instant overview of specific measures via the Energy Saving Check, but also helps them with the actual execution of these energy-efficient measures. With a broad risk policy our mortgage customers also have the opportunity to finance these measures. Since the launch of our Mission 2030 until September 2019, more than 21,000 customers have performed the Energy Saving Check. In addition to mentioned developments in last year's report, we have launched a new mortgage product for ABN AMRO (May 2019) and Florius (April 2019). With this product, customers can finance energy saving measures with favourable conditions and attractive interest rates.

ABN AMRO still is constantly experimenting in teams to develop new propositions and explore ways in which we can activate customers in this area. At this moment we are developing a renewed mortgage discount in this area that we will introduce in Q4 2019.

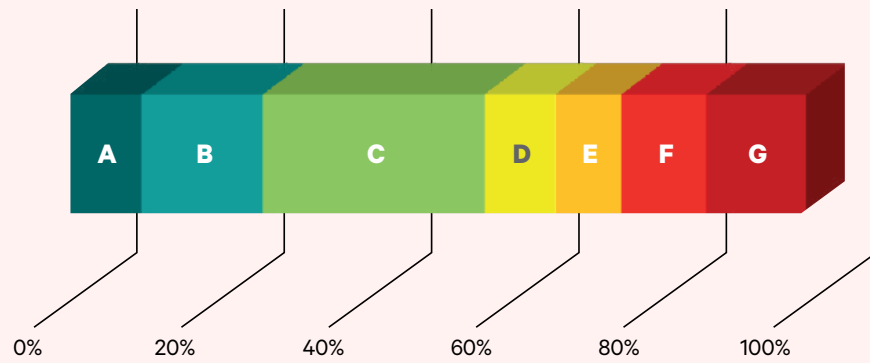
What do our mortgage customers do?

We see that customers take energy saving measures and simultaneously, there is also potential to make larger label jumps. For customers this is often driven by savings in monthly costs for, for example, energy consumption and more comfort. More and more customers are also realising that a better energy label possibly leads to a higher value of their home. Yet, these arguments do not create an urgency to act immediately. Up until now, many customers are waiting for a declaration from the Dutch government regarding gasless living in 2030. We expect more insulation measures in the coming years, due to a revived subsidy by our government. Preferably, customers use their own savings instead of a loan.

ABN AMRO Mortgages Core KPI Q3 2019



CO₂ emission per energy-label Q3 2019 using PCAF methodology



Looking forward

We are fully committed to all kinds of ways to make our customers and society more sustainable. We actively and proactively improve the average label of the portfolio. In our most recent forecast and assumptions, in 2020 we hope to achieve the average label C in our portfolio. Our current forecast model will be refined in Q4 2019.

	2018	2019	2020
Estimated average Portfolio Label forecast	D	D	C

3.4.4.4

Case Study: Volksbank mortgages carbon accounting

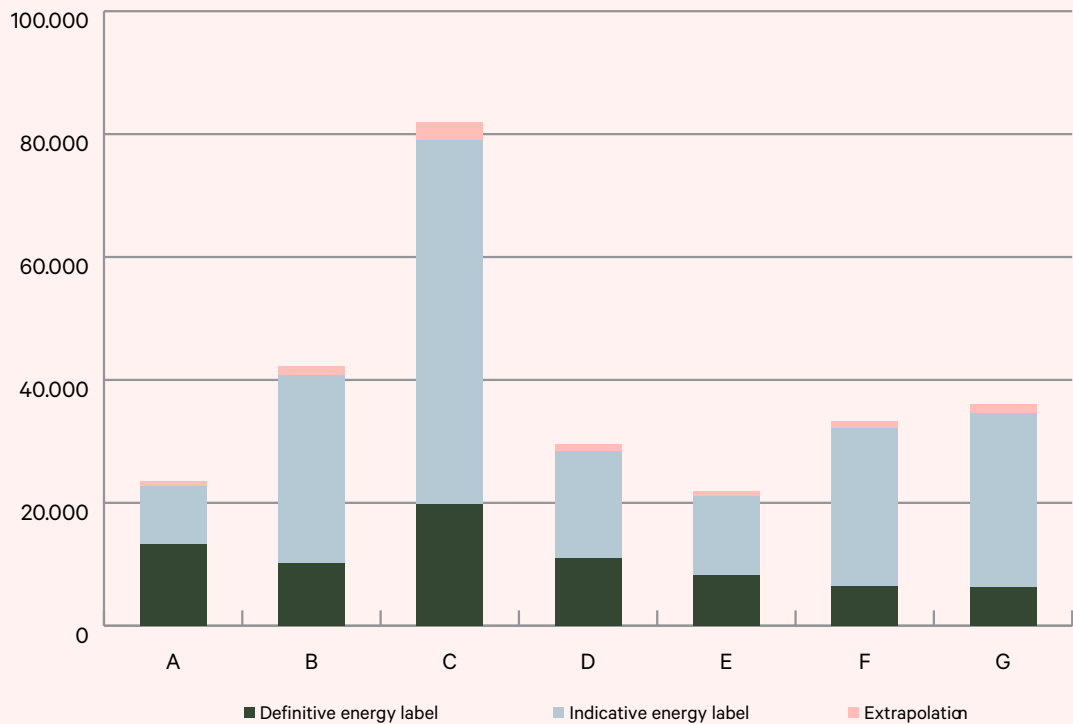


De Volksbank has provided about 270 thousand mortgages, primarily in the Netherlands, through its brands ASN Bank, BLG, Regiobank and SNS. The mortgage portfolio consists of about €47 billion of assets on de Volksbank balance sheet, which is about 80% of assets under management.

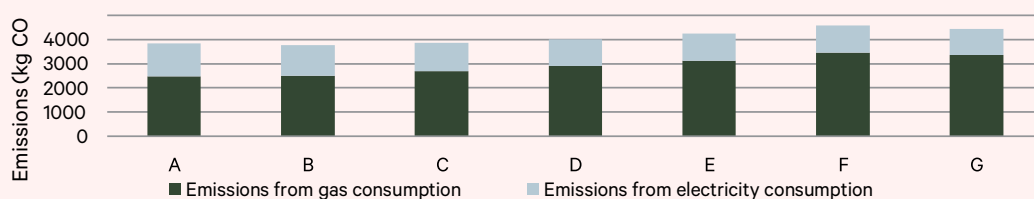
All households in the Netherlands have an indicative energy label based on general information that the authorities have about your home, such as the type of building, floor area, and the year of construction. homeowners can request a definitive energy label for their house which is a more reliable measure of the energy performance of houses. The Netherlands Enterprise Agency (RVO) registers all indicative and definitive energy labels within the Netherlands.

On a quarterly basis, the RVO energy label database is matched on addresses to the mortgage portfolio of de Volksbank. About 30% of matched addresses has a definitive energy label. If no definitive energy label is present, the provisional label is linked to a household. There is a small portion of the mortgage portfolio for which no energy label exists, like monuments, or the match could not be made due to data quality issues, for instance due to differences in suffix notation in addresses. For this small portion, the same composition of energy labels is assumed as for the rest of the mortgage portfolio.

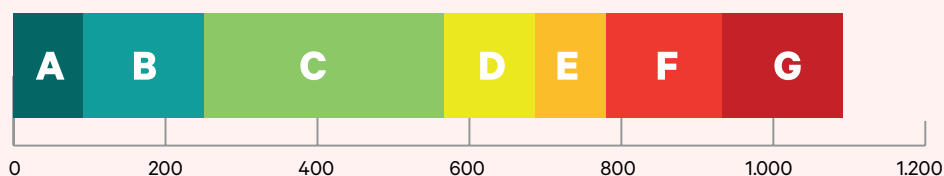
Composition of Volksbank mortgages per energy label



The average gas and electricity consumption per energy label were researched in the WoON2012 report and published in Cijfers over wonen en bouwen 2013, a report by Rijksoverheid that summarises the state of housing in the Netherlands. The average consumption per energy label can be converted to CO₂ emissions by multiplying with emission factors from www.co2emissiefactoren.nl. This is 1,791 kg CO₂/m³ for natural gas and 0,361 kg CO₂/kWh for electricity of unknown origin (both TTW value).



The portfolio emissions are calculated by multiplying the number of houses per energy label with the average CO₂ emissions per energy label. This was 1,091 ktonne CO₂ emissions for Q2 2019.



Aside from absolute and relative emissions, de Volksbank also monitors the average energy label of the mortgage portfolio. The average label is calculated by converted energy labels A through G to consecutive numbers 1 through 7, and taking the weighted average for the whole mortgage portfolio. This meant an 3.8 or average energy label D for Q2 2019.

3.4.4.5 2019 update of Working Group Mortgages

Implementation In 2019, Rabobank, ASR, Van Lanschot Kempen, ING, Triodos, de Volksbank, and ABN AMRO have adopted PCAF methodology for mortgages.

Practicalities and insights Aside from a methodology to calculate emissions from mortgages, the working group has started discussions on how to calculate the 'average energy label' as the energy label plays a central role in the carbon footprint methodology. It has been agreed in PCAF that using the Energy Index to calculate average energy labels does not always work well for mortgages because the Energy Index cannot be adequately translated into an energy label. That is why we decided to work with values per energy label, where an A label has a value of 1 and a G label has a 7 (worse) value.

Agenda for 2020 **Actual energy consumption data**
The working group has been working on acquiring actual energy consumption data and has been in discussion with CBS⁹ on if and how this could be done while taking privacy considerations into account. The discussions were very constructive and the working group expects consumption data of specific mortgage portfolios could be published next year.

Looking beyond energy labels only

Improvement in label can sometimes be realised quite simply by some improvements in the house. Sometimes this implies that consumption of gas is converted into a higher consumption of electricity. And sometimes there is still insufficient insulation available to further reduce the total heat and energy consumption. In methodology and sustainability, we look at further incentives and indicators to also take the reduction of CO₂, energy, and heat seriously.

De Volksbank wants to make a positive contribution to society. Based on our core activities we believe that we can have a significant positive impact on the financial resilience of our customers and the sustainability of our loans and investments. We seek to reduce the negative impact and increase the positive impact of our activities on the climate. Our objective is to achieve climate neutrality in both our business operations and our balance sheet by 2030 and to be a front-runner by fully integrating climate policy into our core business.

Climate change should be tackled most urgently, and we are able to achieve more by collaborating with other organisations. One example of collaboration is PCAF. After the 2015 Paris Agreement, ASN Bank – the platform's chair – started developing a uniform carbon accounting methodology in concert with eleven other Dutch financial institutions.

The PCAF participants agreed to be transparent about the climate impact of their investments and their objective to reduce this impact. The collaboration will be continued in order to implement, further fine-tune the methodology and promote it internationally. Especially 2019 has shown a great step internationally. Initiated by Amalgamated Bank in the US and the GABV, PCAF has become a worldwide partnership. We feel proud to work with such partners here in the Netherlands as well internationally.

Maurice Oostendorp, CEO de Volksbank

3.4.5 Commercial real estate

Topic	Outcome
Scopes covered	Energy use of financed buildings (scope 1 and 2).
Portfolio coverage	100% of the on-balance finance (loans, mortgage) to commercial real estate.
Attribution	Proportional in relation to the total project costs in case of newly developed building or property value (i.e. market value) for existing buildings at time of investment
Data	<p>The data availability on energy consumption of properties has improved considerably due to policy regulations on the built environment (like buildings codes and energy labels). The available data are usually averaged over a number of properties in the same street/region to anonymise the data. Various sources and commercial databases are available, dividing energy consumption by (for instance) energy label, type of property, and floor area of property. When applying these data on a large number of financed properties it is possible to get a reasonable approximation of the CO₂e emissions.</p> <p>The consumed energy can be converted to CO₂e emissions using conversion factors, ideally specified according to the type of energy consumed.</p> <p>Based on the data available, the following data hierarchy is proposed:</p> <ol style="list-style-type: none"> 1. Actual energy consumption from a property, converted to CO₂e emissions using verified emission factors specific to the type of energy consumed. 2. Actual energy consumption from a property or grid operator, converted to CO₂e emissions using grid emission factors for energy from undefined energy source. 3. Average energy consumption building type per country/region and/or energy label specific, converted to CO₂e-emissions using general grid emission factors. <p>PCAF suggests working with actual data on the energy consumption of the properties, if available.</p>
Grid emission factors	<p>The consumed gas and electricity on household level can be converted to CO₂e emissions using grid emission factors. Within the Netherlands, www.co2emissiefactoren.nl gives a list of widely accepted and uniform grid emission factors.</p> <p>PCAF has chosen to use the grid emission factor related to direct emissions, expressed under column TTW value on www.co2emissiefactoren.nl. Whenever the origin of the consumed electricity is unknown, the emission factor for electricity from undefined energy source should be used. The factor for electricity is updated regularly to reflect changes in the Dutch electricity mix.</p> <p>For 2018 measurements this leads to the following emission factors: 0.361 kg CO₂/kWh for electricity, and 1.791 kg CO₂/m³ for natural gas.</p>
Absolute vs. relative emissions	The methodology results in absolute emissions for the commercial real estate in the portfolio. This information can be further specified and translated into relative emissions based on preferred disclosure on the portfolio.
Avoided emissions	Real estate finance that is climate-positive, that is, a property generating more energy than it consumes, could be viewed as avoided emissions. This is not covered in this report.

3.4.5.1 Asset class specific considerations

Obtaining data on energy consumption	Actual energy consumption data of the commercial real estate in the portfolio is preferred, as the actual energy consumption will be more accurate than working with the average energy consumption per energy label.
Off-balance real estate finance and subsidiaries	The scope of this methodology is on-balance real estate finance, off-balance real estate finance is not included. If relevant, additional metrics can be included to disclose on off-balance real estate.
Distinguishing between private and corporate commercial real estate	No distinction is made between private or corporate commercial real estate.

3.4.5.2 Limitations

Country specific assumptions	Some country specific adjustments need to be made to make the calculation applicable for a certain country. The Dutch energy label, for instance, is the result of a European directive and differs from ways to categorise energy efficiency of houses in other EU countries and countries outside of Europe. Country specific adjustments need to be considered depending on the data availability and standards in each country.
Property value	When using property value (i.e., market value) for attributing the emissions of an existing commercial building, this value could change over time due to market developments. This will affect the attributed share of emissions to the investments. PCAF proposes to apply the property value at time of investing.

3.4.5.3 Calculation example

Description of example

The emissions of a real estate investment for a fictional school in a real estate portfolio.

Used data

- Emission factors for electricity of undefined energy source and natural gas are derived from the Dutch CO₂ database available at www.co2emissiefactoren.nl
- The energy intensity per building type and sector are derived from 'Ontwikkeling energiekentallen utiliteitsgebouwen (2016)'.

Calculation and results

Example calculation for a fictional real estate property (non-residential)

A loan of €5,000,000 is provided for a high school with a floor space of 6,000 m² and total property value of €20,000,000, at time of investing. According to 'Ontwikkeling energiekentallen utiliteitsgebouwen (2016)' the gas intensity is 13 m³/m² floor area, and an electricity intensity of 37 kWh/m².

The gas consumption is estimated on:

$$\begin{aligned} \text{gas consumption} &= \text{floorsurface} \times \text{gasintensity}_{\text{sector}} \\ \text{gas consumption} &= 6,000 \times 13 \\ \text{gas consumption} &= 78,000 \text{ m}^3 \end{aligned}$$

The electricity consumption is estimated on:

$$\begin{aligned} \text{electricity consumption} &= \text{floorsurface} \times \text{gas intensity}_{\text{sector}} \\ \text{electricity consumption} &= 6,000 \times 37 \\ \text{electricity consumption} &= 222,000 \text{ kWh} \end{aligned}$$

The gas and electricity consumption are then expressed in CO₂e emissions using direct emission factors for electricity from undefined energy source in the Netherlands and direct emission factor for natural gas; 0.361kg CO₂/kWh for electricity, and 1.791 kg CO₂/m³ for natural gas.

$$\begin{aligned} \text{CO}_2 \text{ emissions} &= \text{gas consumption} \times \text{electricity consumption} \times \text{EF}_{\text{electricity}} \\ \text{CO}_2 \text{ emissions}_{\text{highschool}} &= (78,000 \times 1.791) + (222,000 \times 0.361) \\ \text{CO}_2 \text{ emissions}_{\text{highschool}} &= (139,698) + (80,142) \\ \text{CO}_2 \text{ emissions}_{\text{highschool}} &= 219,840 \text{ kg CO}_2 \text{ e} \end{aligned}$$

Attributing these emissions to the loan provided result in the carbon footprint for this investment:

$$\text{attributed CO}_2 \text{ emissions}_{\text{highschool}} = \frac{5,000,000}{20,000,000} \times 219,840 \text{ kg CO}_2 \text{ e} = 54,960 \text{ kg CO}_2 \text{ e}$$

3.4.5.4 Case Study: ABN AMRO real estate carbon accounting



“The real estate market is challenged by CO₂ emissions and lack of sustainable innovation. Our ambition is to accelerate the sustainability shift by supporting our clients’ transition to sustainability. We believe data collection, data enhancement and digital capabilities are key in being successful,” says Tjeerd Krumpelman, Head of Advisory, Reporting & Engagement. Therefore, we have developed several tools in the past years to track implementation, such as:

1. ABN AMRO Sustainable Investment Tool (including the BREEAM Quick-scan), which gives detailed insight for objects and portfolios on current situation and possible measures to improve. The tool is populated with data such as building type, age, location, and floor area for each building, and provides a desktop assessment of investment costs, financial returns and carbon reductions for the top-5 applicable measures to the building. (<https://www.duurzameinvesteringstool.nl>)
2. Our pipeline tool, which keep track on financed green landmarks, transformation projects, and energy upgrades.
3. Our 100% financing programme for sustainable measures.
4. Our annual portfolio check on energy label improvement based on PCAF method.
5. Sustainability indicators are mandatory in the valuation report. Each valuation of commercial property for ABN AMRO has a sustainability clause. The section has been developed in close cooperation with valuers; The criteria for assessing the assessor are based on the guidelines of the RICS. The entire life cycle of objects, including by year of construction, renovations, operating costs, energy costs, CO₂ emissions, and economic life are included.
6. Our label C action tool for offices. As of 2023 every office building is required to have a minimum energy label C. We only (re)finance offices with an energy label C or better. We have recorded which objects meet the minimum requirement and which objects have a plan to upgrade or redevelop to a different use (mostly housing).

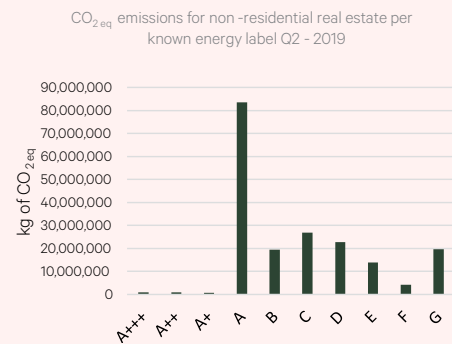
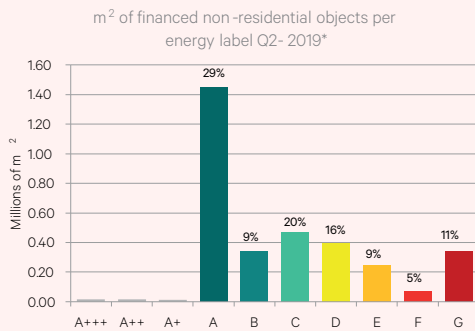
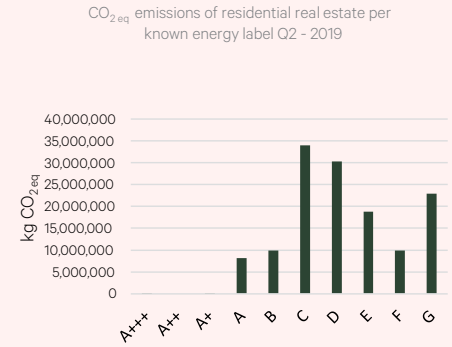
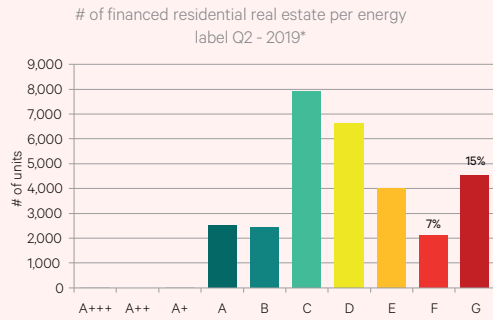
Total loan amount Commercial Real Estate: € 10.6 billion. Residential 35.3%, non-residential/commercial 64.7%. (source: Annual report 2018).

Residential real estate

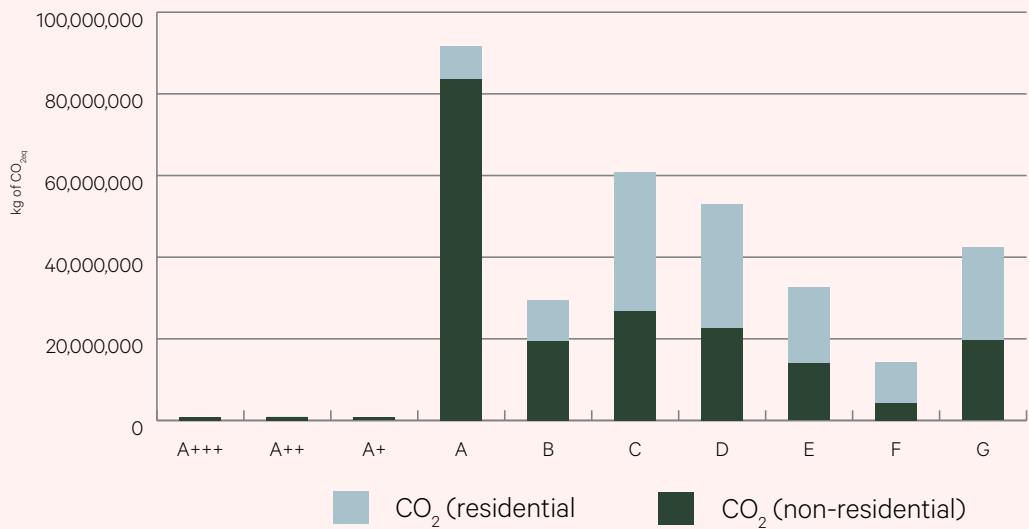
For the calculation of the CO₂ emissions of the financed residential real estate, the mortgage calculation method is applied (see Section 3.4.4). Hereby, emission factors retrieved from www.co2emissiefactoren.nl are used to calculate the CO₂ emissions based on an estimated energy and natural gas use per energy label. The lower the energy label, the higher the CO₂ emissions of the residential real estate unit.

Non-residential real estate

For the calculation of the emissions of the non-residential real estate, the emissions per rentable surface in m² are calculated. The figure below depicts a high amount of CO₂ emissions for financed real estate with energy label A. However, this is because a large portion of the financed non-residential real estate with energy label A have a large floor surface.



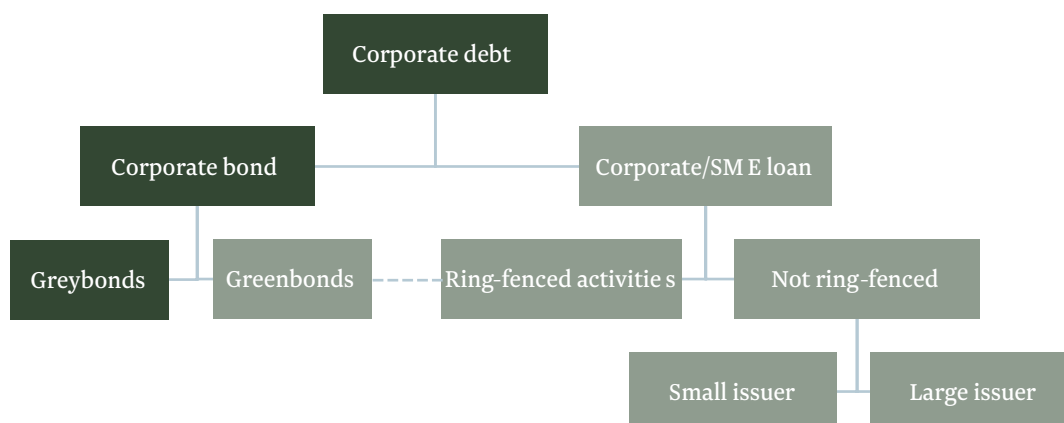
Total CO₂eq emissions of commercial real estate per known energy label (Q2 - 2019)



3.4.6 Corporate debt

This section covers credits investments as discussed and concluded by PCAF. Given the variety of debt instruments available, we distinguish between various categories that each requires its own approach.

The corporate debt working group considers the following highlighted categories¹ to be in scope of its work:



Topic	Outcome
Scopes covered	Scope 1 and scope 2 data as a minimum. Including scope 3 if available and relevant. Report scope 1, 2, and 3 separately. The reason to measure these scopes separately, even though this will require greater effort, is that scope 1 eliminates double counting and measures direct impact, also of a potential carbon tax. The reason to not include scope 3 as a mandatory requirement is that this would require better accounting and disclosure. To date, the comparability, coverage, transparency, and reliability of scope 3 data is generally insufficient.
Portfolio coverage	Ideally, 100% of the portfolio should be covered. At least the majority of the portfolio should be covered and an indication should be provided for a pathway to full coverage. Provide an explanation of which product types were included or excluded and what the main method was for estimating missing data. Cash positions can be considered as having zero emissions. Short positions can be ignored.
Attribution	Emissions are proportionally attributed to the providers of the company's total capital. To prevent double counting from this perspective, emissions are attributed proportionally to the exposure divided by the sum of total debt and equity (enterprise value). In instances where the equity share is unavailable, PCAF encourages the use of an estimate or, if impossible, to ignore the equity share and divide by debt only. If alternatives are applied, this requires further clarification of the steps taken.
Data	PCAF does not recommend a specific source. Analysis of Kepler Cheuvreux ¹⁰ for IIGCC demonstrates that for scope 1 and 2 emissions differences between data vendors are 12%-24%. It is encouraged to use the most recent available data and to mention the data source, reporting period or time stamp of these data.
Absolute vs. relative emissions	As a minimum, PCAF suggests disclosing both absolute and relative emissions. For relative emissions, we propose to divide the absolute footprint with the total assets under management.
Avoided emissions	Avoided emissions are not appropriate for this asset class.

¹⁰ Kepler Cheuvreux, 2015: Carbon Compass: Investor guide to carbon footprinting. <http://www.iigcc.org/publications/publication/investor-guide-to-carbon-footprinting>

3.4.6.1 Asset class specific considerations

Aggregation of output A decision needs to be made on the aggregation of outputs; should the total portfolio be enough, or should a division be made between for instance advanced and emerging markets?

Challenges Given the strong similarities between the calculation methods recommended for listed equities, refer to the challenges listed in the listed equities paragraph. One additional general comment is that one should be aware of the potentially undesired side-effect related to attributing the issuer's absolute carbon footprint to its total equity and debt position.

While a lower carbon footprint would typically be achieved by (encouraging) issuers to reduce their absolute carbon emissions (numerator), the recommended calculation methods implies that a similar effect could be achieved by increasing the denominator, either the issuer's equity or debt position.

3.4.6.2 Limitations

Market price fluctuations When using the enterprise value as denominator, assets under management change as a result of a fluctuating market price. An objective to reduce a relative footprint by a certain percentage becomes a moving target under the influence of this fluctuation.¹¹

Company identifiers For larger portfolios, it is important to have unique company identifiers to combine information from various sources. Examples of such identifiers are: SEDOLs, ISINs, CUSIPs, and Bloomberg Tickers. For large portfolios match external data sources can be a challenge, when for example two companies merge in market intelligence tools the company identifiers will be adjusted immediately while carbon data providers might only update such information on an annual basis.

¹¹ A possibility to overcome this would be to use normalised assets under management, whereby prices are held constant over the target period. Such adjustments should be made transparent.

3.4.6.3 Calculation example

Description of example The absolute footprint of a loan to a company is calculated by multiplying the total emissions by the proportional share of the enterprise value of a company. The absolute footprint of a portfolio of companies is calculated as the sum over all footprints.

Used data The information required for these calculations are:

Emissions: emissions can be taken from company reports if available but for large portfolios external data providers are often used. Examples of data sources include: CDP, Bloomberg, MSCI, Trucost, and Southpole. In the choice of data source asset managers will have to compare the various options (for example on coverage, data quality, transparency, service, costs etc.).

Enterprise value: this information is widely available in commercial market intelligence tools and commercial providers of financial data that are used by investors.

Invested value: this information is normally available in the internal systems used by investors for portfolio management and performance monitoring.

Calculation and results

Fund I is composed of two listed companies and contains a bit of cash (2.5 million).

Company	Enterprise value	Invested	Total emissions
A	62.5 billion	77.5 million in bonds with maturity (3 years)	700 tonnes CO ₂ e
B	12 billion	90 million in bonds with maturity (9 years)	250 tonnes CO ₂ e
Cash		2.5 million	
Total invested		170 million	

Total emissions company * (invested value / enterprise value)

For company B: $250 * (90\text{mln} / 12\text{bln}) = 250 * 0.75\% = 1.9 \text{ tCO}_2\text{e}$

For company A: $700 * (77.5\text{mln} / 62.5\text{bln}) = 700 * 0.12\% = 0.8 \text{ tCO}_2\text{e}$

For cash no emissions are attributed

Total absolute carbon footprint = $1.9 + 0.8 = 2.7 \text{ tCO}_2\text{e}$

The relative carbon footprint is calculated by dividing the absolute carbon footprint over the invested value (per million).

Total relative carbon footprint = absolute footprint / invested value per million invested

Total relative carbon footprint = $2.7 \text{ tCO}_2\text{e} / 167.5 \text{ million} = 15.9 \text{ tCO}_2\text{e per billion invested}$

3.4.6.4

Case Study: Achmea Investment Management corporate debt carbon accounting



Active ownership plays a pivotal role in the ESG strategy of Achmea Investment Management. Measuring the carbon footprint and intensity of the investments are important aspects that feed into the analysis underlying decisions related to voting and engagement.



Increasingly, clients are looking for ways to express their commitment to combatting climate change. The carbon footprint of their investments can be an interesting starting point for a discussion about values and risks but also about the various views on the impact of divestment in the real world. Often this results in decisions to pursue an active ownership strategy through which clients engage companies to address climate change appropriately.

Achmea Investment Management has been reporting its carbon intensity since 2018. It has never been a goal to report emissions and intensity since in the view of Achmea Investment Management these will be most valuable in combination with other metrics. In ESG integration, intensity figures are among the many data points that support investment decisions by the manager. Historical footprint data will enable the manager to pinpoint where in the portfolio the highest emissions occurred and support further forward-looking analysis of risk and opportunity. Clients looking for impact in the real world can benefit from looking at impact investments and find differences between carbon footprints of funds, again benefiting from consistent footprint data and calculation methodologies.

As an example of our carbon footprint analysis, we looked at the details of the holdings in the Achmea IM Euro Investment Grade Credits fund. The fund has issuers in the categories supranationals, sub-sovereigns and securitised in addition to 152 unique corporate issuers and 286 securities.

The absolute carbon footprint of the corporate issuers is 11.191,9 tCO₂. The total assets of corporate issuers is 167 mn. The relative carbon footprint of the corporate issuers: 67 tCO₂/mn. Carbon footprint data: scope 1, 2 provided by MSCI.

Achmea Investment Management is assessing how to best integrate the categories of supranationals, sub-sovereigns and securitised in its future footprint calculations.

3.4.6.5 update of Working Group Corporate debt

Practicalities and insights

The PCAF working group on Corporate Debt looks at how the carbon footprint should be calculated for green bonds, considering the positive effects that those investments are aiming for.

At present, PCAF makes no distinction between grey or green. Green bonds, or fixed income investments that serve a specific sustainability purpose often related to combatting climate change, are presently handled under the general corporate debt methodology. This makes sense as the issuers are often the same as those in regular credits universes and portfolios and the issuer's emissions do not change once a green bond has been taken to the market. The primary reason for buying a green bond lies however in the anticipated positive effects of the activities that are financed. This allows for a more nuanced approach that will take those effects into account when calculating the carbon footprint. Green bond issuers often report avoided emissions and some can demonstrate a positive effect on the climate.

One relatively simple solution would be to allocate only the emissions that are attached to the financed activities. The working group agrees that this would be the optimal solution but there are many practical hurdles here, one example being the lack of emissions data. Issuers prefer to speak of avoided emissions but rarely report of the carbon emissions that are attached to the financed activities. The working group acknowledges that this should be a question for further engagement but also looks for a practical approach for the short term.

In practice, carbon footprints of green bond portfolios are treated in various manners. Among the working group participants parties tend to choose their own approach, which is not beneficial to the comparability and consistency of reported footprints between parties. In addition to the methodology of PCAF corporate debt, which prescribes allocating the issuer's emissions to green and grey bonds in a similar manner, some participants describe to calculate a portfolio average of carbon emissions. The average is used to replace the footprint of individual green bonds. This method is more conservative than using zero for all green bonds' footprint but can nonetheless still produce a very inaccurate number.

There is more support for another approach, where green bonds aiming to finance renewable energy are distinguished from other activities. If and when the issuer is able to credibly show that a green bond finances this category, the bond will be allocated zero emissions. An investment in this green bond will automatically result in a lower calculated carbon footprint.

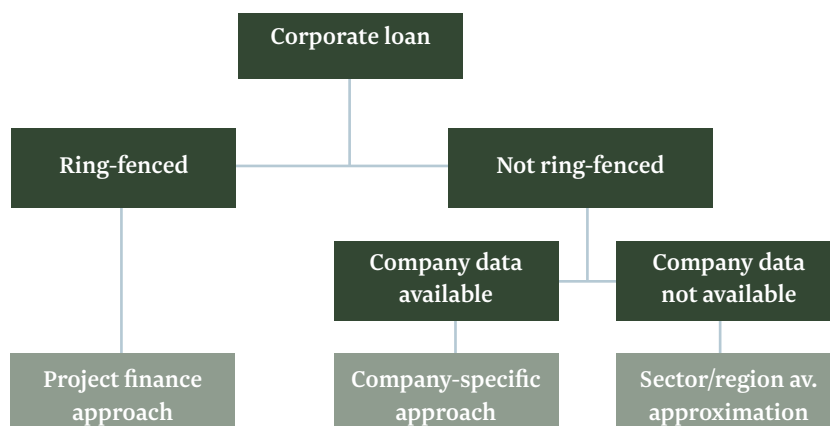
Agenda for 2020

Looking ahead, the working group aims to explore and describe how avoided emissions could play a role in calculating a carbon footprint in green bonds. External experts will be asked for input to further improve the methodology.

3.4.7 Corporate/SME Loans

This section covers corporate and SME loans (collectively referred to as corporate loans). For the purpose of this protocol, corporate loans are limited to the loans that are on the balance sheet of the financing institution. Revolving credit facilities and overdraft facilities also fall under the definition of corporate loans.

For corporate loans different accounting approaches may be followed, depending on the characteristics of the loan. This differentiation is visualised below and is further explained in the table.



Topic	Outcome
Scopes covered	Scope 1 and scope 2 minimum. Scope 3 if relevant and available.
Portfolio coverage	As stipulated in the introduction, off-balance credit products do not need to be covered. Ideally, 100% of the portfolio should be covered. For practical reasons, credit facilities linked to current accounts may be exempted, as the credit exposure is relatively small, highly volatile and not structural. Revolving credit facilities may also be excluded, unless they are significant or material (i.e., if they account for more than 10% of outstanding credit). The coverage of the corporate loan portfolio should be clearly communicated (both the criteria and the relative coverage of the outstanding exposure).

Attribution

As a basic attribution principle, the lender accounts for a portion of the GHG emissions of the financed company determined by the ratio between the lender's exposure and the enterprise value of the company (in this asset class total balance sheet of the company): the attribution factor. For this, the actual outstanding exposure is used. This means adjusting the numerator of the attribution factor annually (for instance reflecting the end-of-year exposure), resulting in the attribution to decline to 0 at the end of the lifetime of the loan (when it is fully repaid). Institutions are free to use either year-end exposure or average exposure throughout the year, as long as the approach is communicated clearly and used consistently.

For loans that are designated for a clearly ring-fenced activity, use the protocol for project finance, even if these loans are not structured as project finance (see section 3.4.3). In this case, the attribution factor should be calculated by dividing the exposure of the lender by the total investment needed for the ring-fenced activity (total balance sheet). It is important to make sure that the boundaries used to ring-fence the total investment amount of this activity are the same as the boundaries used to ring-fence the GHG emissions of this activity.

If no company data is available, then the financial institution can use sector data for the attribution of emissions. In this case, the attribution is determined by the financial institution's market share in the sector as defined by the outstanding loans of the financial institution to the sector divided by the total balance sheet of the sector, as follows:

$$\text{Financed emissions} = \text{Absolute emissions sector} \times \frac{\text{Outstanding with the sector}}{\text{Total balance sheet sector}}$$

Data

For corporate loans a twofold approach is taken to estimate and account for emissions and carbon intensity. The first approach builds on company-specific source data, provided by the borrower. The second approach is based on region/sector-specific average emissions data, using public data sources or data from third party data providers for financial and emissions data.

When reporting aggregated GHG data, it should be made clear which percentage of the reported emissions data is based on approach 1 and 2 and which criteria have been applied to decide on which approach to use when. The financial institution can set a threshold for applying approach 1 or 2.

Approach 1 is preferred from a data quality perspective, but not always realistic or practical. It is most suited for larger loans to bigger companies/ stock exchange listed companies, as these are more likely to report on emissions and can be subject to a detailed due diligence analysis and monitoring and/or target companies that have good GHG emissions data available

Financial institutions can determine the threshold based on the loan-type/size, company type/size, and emission (intensity) of the sectors themselves, but it should be used consistently and communicated clearly with emissions data.

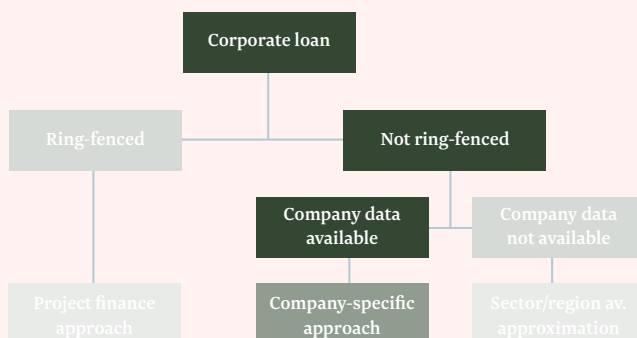
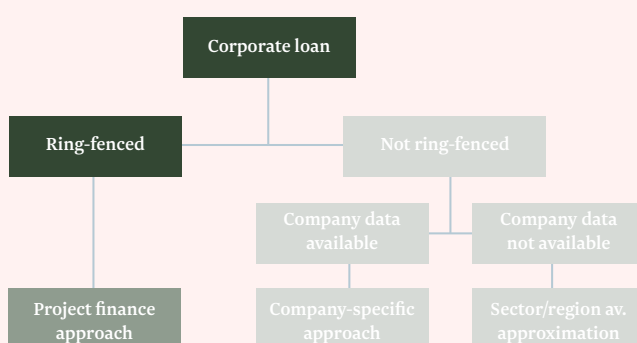
Approach 1: emission calculation based on source data provided by the borrower

Approach 1 makes use of company-specific data provided by the borrower. This can either be GHG emissions data, or other source data from which GHG emissions data can be calculated, using an appropriate calculation methodology/tool, issued or approved by a credible independent institution.

As explained in the previous section, approach 1 should also be applied for exposure to high emissions industry sectors (such as extractive industries, heavy industries, and large-scale thermal power generation), regardless if the other criteria are being triggered, if the total exposure to such sectors exceeds the minimum percentage of the portfolio.

The financial institution may also choose approach 1 if it is specifically financing best-in-class players, or specifically financing GHG-related improvements.

For loans that are designated for a clearly ring-fenced activity, the protocol for project finance should be used (see Section 3.4.3), even if they may not be structured as project finance.

**Approach 2 region/sector average based emission calculation**

The region/sector average approach is used when the borrower does not report on GHG emissions and it cannot easily be deducted from external sources. This is typically the case with small exposures and/or Small and Medium-sized Enterprises (SMEs), or when it requires too much or too complex work to collect data. Without a standard methodology for measuring the carbon footprint globally and across all sectors, a precise estimate might not be feasible.

$$\text{Financed emissions} = \text{Absolute emissions sector} \times \frac{\text{Revenue company}}{\text{Revenue sector}} \times \frac{\text{Outstanding financial institution with company}}{\text{Total balance sheet company}}$$

If revenue data for the company or the sector is not available total balance sheet can be used as a proxy, though we do note that emissions are driven by output (revenue) and not the balance sheet of a company. The region/sector average approach may also be acceptable for small and/or short term (like bridge finance), non-ring-fenced credit facilities to larger companies, as these types of credit will usually not involve a detailed due diligence analysis process.

This approach is not preferred for high emission industry sectors (such as extractive industries, heavy industries and large-scale thermal power generation). It should only be used if all the other criteria for using this approach are met and if the total exposure to such sectors is below a certain percentage of the total corporate/SME debt exposure. In other cases, the GHG emissions data from exposure to these high impact sectors should be calculated using approach 1. PCAF proposes to apply approach 1 to high emission industry if the exposure to these sectors exceeds 20% of the total portfolio. PCAF will reconsider this threshold when evaluating the protocol at a later stage.

The financing institution may also choose not to apply approach 2, if it is specifically financing best-in-class players, or specifically financing GHG-related improvements, as such impacts would not become visible using region/sector averages.

Following region/sector average approach, the emissions for each loan are calculated with the help of region/sector-based emissions data,¹² using ISIC, NACE, or another internationally accepted sector classification. The region/sector-based database provides the average GHG emission intensity of the financed activity. Multiplying this with the exposure amount provides an estimate for the financed emissions. Sampling tests based on actual data on company level which is extrapolated to portfolio level can help to test the accuracy of calculations based on region/sector averages. This may also be used to refine the average data for specific sectors or regions, if the institution has a strong presence in and specific knowledge of this sector and/or region.

In other cases, PCAF proposes to follow carbon accounting approach 1 for corporate loans, applying the following hierarchy of preference for the data sources:

1. Audited GHG emissions data from the company, in accordance with the GHG Protocol.
2. GHG data calculated by a credible external expert, in accordance with the GHG Protocol.
3. Sector-specific non-GHG source data, used to calculate GHG emissions with an approved GHG calculation tool such as IFC-CEET, the AFD carbon calculation tool, or comparable sector-specific tools issued by credible institutions such as the FAO (for agriculture)

¹² It is proposed to use credible (public) data sources such as EuroStat, RIVM for the Netherlands, CBS and the International Energy Agency, or input/output models data (list may be provided at a later stage)

3.4.7.1 Asset class specific considerations

Considerations that are specifically relevant to certain aspects of categories of debt instruments are discussed in the respective sections.

For carbon footprints related to loans that are designated to finance specifically ring-fenced activities are calculated based on the approach recommended for project finance as described in the paragraph on project finance of this report. There is a small difference regarding the type of emissions that are associated with ring-fenced corporate loans. Project finance is mostly associated with avoided emissions. For ring-fenced corporate loans however, these emissions can also be emitted during the lifetime of the activity.

3.4.7.2 Limitations

A limitation of the calculation method recommended for smaller corporate loans exposures that are not ring-fenced is that it largely depends on assumptions and approximations that are derived from region and sector averages. This makes calculations based on this approach generally less robust and more uncertain than those that are based on company data. It is however a necessary evil to address the large number of smaller loans that are often given out this way.

3.4.7.3

Case Study: Rabobank- estimating the carbon footprint of the local banks in the Netherlands



Rabobank



In 2019, Rabobank investigated applying the PCAF methodology to assess the carbon footprint for part of its loan book. This exercise was driven by a number of reasons, including the wish to get a better view on the emissions associated to a large asset category and data availability. As a result, the calculations were limited to the credit portfolio of local Rabobank banks¹³ which represents roughly 60% of the Dutch corporate loans portfolio and one-third of Rabobank's corporate loans portfolio worldwide.

The table below shows the resulting rough estimate of the carbon footprint of Rabobank's local banks' portfolio.

Sectors	2017					
	Total balance sheet of sector (mln EUR)	Outstanding loans of Rabobank local banks (mln EUR)	Share Rabobank (outstanding/total balance sheet sector)	Total emissions (mln kg CO ₂ eq)	Emissions financed by Rabobank (mln kg CO ₂ eq)	Relative emissions financed by Rabobank (kg CO ₂ eq/EUR)
A Agriculture, Forestry and Fishing	31.818		81,0%	30.426	24.651	0,96
B Mining and Quarrying	93.062	79	0,1%	2.475	2	0,03
C Manufacturing	997.635	5.755	0,6%	49.611	286	0,05
D Electricity, Gas, Steam and Air Conditioning Supply	86.563	458	0,5%	50.418	266	0,58
E Water Supply; Sewerage, Waste Management and Remediation Activities	17.378	427	2,5%	10.228	251	0,59
F Construction	83.000	4.868	5,9%	3.376	198	0,04
G Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	439.375	12.369	2,8%	4.211	119	0,01
H Transportation and Storage	138.605	4.929	3,6%	26.647	948	0,19
I Accommodation and Food Service Activities	25.389	3.469	13,7%	1.266	173	0,05
J Information and Communication	135.096	912	0,7%	261	2	0,00
M Professional, Scientific and Technical Activities	124.621	2.920	2,3%	723	17	0,01
N Administrative and Support Service Activities	85.504	1.622	1,9%	1.975	37	0,02
O Public Administration and Defence; Compulsory Social Security	3.893	15	0,4%	1.853	7	0,48
P Education	5.179	560	10,8%	589	64	0,11
Q Human Health and Social Work Activities	19.896	4.106	20,6%	1.625	335	0,08
R Arts, Entertainment and Recreation	14.238	1.276	9,0%	583	52	0,04
S Other Service Activities	7.824	876	11,2%	517	58	0,07
Totals	2.309.075	70.420		186.784	27.467	0,39

The formula used for the calculation is:

$$\text{Financed emissions} = \text{Absolute emissions sector} \times \frac{\text{Outstanding financial institution within sector}}{\text{Total balance sheet sector}}$$

We also calculate relative emissions (=emissions per mln EUR financed) for comparison purposes, as this measure can be used to compare with other financial institutions irrespective of the portfolio size.

This formula works with absolute emissions and we regard this approach to be more straightforward than working with emission intensity. Another consideration is that emission intensities based on revenue or balance sheet are subject to price and exchange rate fluctuations.

The calculation described here is a high over estimate relying on various assumptions and high level averages. As a result, we find this estimate to be unfit for steering purposes. It is an insightful exercise, as it reveals the challenges and limitations that need to be addressed for more accurate carbon footprint estimates of loan portfolios:

Assumption related challenges

The formula attributes emissions to the Rabobank based on their share in the sector calculated as outstanding loans to the sector as a share of the total balance sheet of the sector. This assumes that the emissions are attributed to the companies themselves based on their share of the sector balance sheet. However, emissions are output driven and that is not necessarily reflected by the total balance sheet.

To make it concrete, the size of a factory does not have to reflect the production in a certain year. And if on top of that the factory has already been amortised then it is no longer on the balance sheet. The attribution assessment could improve by assessing the share of emissions of the clients Rabobank finance based on their share in sector revenue (company revenue/sector revenue). This would still imply an assumption that all output is produced with the same GHG intensity, which might not be the case as companies might be using different technologies, processes etc.

Limitations due to data quality.

By definition the total balance sheet per sector calculated by the Dutch Statistics Office excludes entities such as limited partnerships and individuals such as freelancers (in Dutch “Natuurlijke personen”) are excluded. According to labour statistics, the share of these companies can be significant in some sectors.¹⁴

As a result the total balance sheet for some sectors might be underestimated, leading to a higher than justified attribution of emissions. For example, roughly 60% of employment in agriculture is provided by such companies. If we assume this type of companies account for the same share of the total sector balance sheet, then we get a much lower carbon footprint for Rabobank (see the table below).

Both absolute and relative financed emissions are halved if we make this assumption. This reinforces our statement at the beginning of this paragraph that the quality of the data available of the moment makes the estimation unfit for decision purposes. We also note that the balance sheet data per sector can vary significantly over time, much more than justified by the change in the number of entities in the sector. This will consequently affect the attribution of emissions even when the exposure remains unchanged.

¹⁴ See for instance <https://economie.rabobank.com/publicaties/2018/februari/flexibele-arbeidsmarkt-grenzen-aan-flex>

The table below shows a rough estimate of the carbon footprint of Rabobank's local banks' portfolio if we include limited partnerships and individuals in the total sector balance sheet

		2017					
Sectors		Total balance sheet of sector (mln EUR)	Outstanding loans of Rabobank local banks (mln EUR)	Share Rabobank (outstanding/ total balance sheet sector)	Total emissions (mln kg CO ₂ eq)	Emissions financed by Rabobank (mln kg CO ₂ eq)	Relative emissions financed by Rabobank (kg CO ₂ eq/ EUR)
A	Agriculture, Forestry and Fishing	79.544	25.779	32,4%	30.426	9.861	0,38
B	Mining and Quarrying	93.062	79	0,1%	2.475	2	0,03
C	Manufacturing	997.635	5.755	0,6%	49.611	286	0,05
D	Electricity, Gas, Steam and Air Conditioning Supply	86.563	458	0,5%	50.418	266	0,58
E	Water Supply; Sewerage, Waste Management and Remediation Activities	17.378	427	2,5%	10.228	251	0,59
F	Construction	83.000	4.868	5,9%	3.376	198	0,04
G	Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	439.375	12.369	2,8%	4.211	119	0,01
H	Transportation and Storage	138.605	4.929	3,6%	26.647	948	0,19
I	Accommodation and Food Service Activities	25.389	3.469	13,7%	1.266	173	0,05
J	Information and Communication	135.096	912	0,7%	261	2	0,00
M	Professional, Scientific and Technical Activities	124.621	2.920	2,3%	723	17	0,01
N	Administrative and Support Service Activities	85.504	1.622	1,9%	1.975	37	0,02
O	Public Administration and Defence; Compulsory Social Security	3.893	15	0,4%	1.853	7	0,48
P	Education	5.179	560	10,8%	589	64	0,11
Q	Human Health and Social Work Activities	19.896	4.106	20,6%	1.625	335	0,08
R	Arts, Entertainment and Recreation	14.238	1.276	9,0%	583	52	0,04
S	Other Service Activities	7.824	876	11,2%	517	58	0,07
Totals		2.356.801	70.420		186.784	12.676	0,18

Conclusion: The calculation described here is an insightful exercise, as it reveals the challenges and limitations that need to be addressed for a more accurate carbon footprint estimates of loan portfolios in the future. However, the data limitations render the estimates high level and sensitive to various assumptions, and thus unfit for decision purposes.

3.4.7.4

2019 update of Working Group Corporate/SME loans

Practicalities and insights

The availability of higher quality more granular data is a major challenge for this asset class, particularly at the international level. The main goal for 2019 was sharing experiences and finding out about the practical experience of applying the methodology in real loan portfolios at a portfolio level as well as at an individual debtor level. The WG defined two approaches:

- 1) Region/sector average based emission calculation
- 2) Emission calculation based on source data provided by the borrower

Regarding the first approach we explored the use of several data providers such as the Dutch Institute for the Environment (RIVM) and the use of Environmentally-extended Input and Output models (EEIO models) from parties such as EXIOBASE, GTAP, and WIOD. For the second approach we made some case studies on debtor level.

a) RIVM:

The RIVM is the Dutch Institute for the Environment. It publishes GHG emissions of Dutch sectors. However, this data is at very high sector level and provides little insight for individual companies or sub-sectors. For example: RIVM publishes GHG emissions for the agriculture, forestry, and fishery sector. However, the emissions of a dairy farmer relate much more closely to the specific dairy farming sector than to the agriculture, forestry, and fishery sector.

Rabobank has worked closely with RIVM to improve granularity and thanks to collaboration with PCAF, RIVM will soon publish more granular GHG data. The aim is to aggregate emissions at the lowest possible SBI-code¹⁵ level.

b) EEIO models:

EEIO models can be particularly useful for financial institutions that have a global portfolio in countries where detailed data such as the RIVM data is not available. There are only a handful of global EEIO models that can be used for estimating the emissions of a loan portfolio such as GTAP and EXIOBASE. GTAP has been used by FMO to create their Impact Model, which can also calculate GHG emissions.¹⁶ An example of the use of EXIOBASE by a financial institution is Finnfund.¹⁷ The available EEIO models vary in their regional and sectoral coverages. Choosing the most useful EEIO-model depends on the context of the specific financial institution. Analysis showed that different models can calculate varying emissions estimates for the same sector and region. This underlines the importance of understanding the characteristics of these models to be able to take a profound decision on how to use EEIO data and which model to use. In 2020, we intend to engage with experts on EEIO models to get a better understanding of how to properly use the data for carbon accounting.

Agenda for 2020

During 2020, we aim to analyse different ways to apply the attribution principle. For example:

- 1) The lender accounts for a portion of the GHG emission of the financed company determined by the ratio between the lender's exposure and the enterprise value of the company (debt plus equity).
- 2) The GHG per sector divided by the financial balance per sector.

Data quality: we will continue our work on the availability of highly granular data. We aim to gain more insight on diverse data providers for a better understanding of how to use these for carbon accounting.

Attribution: we will also focus on issues related to attribution, in particular the definition of outstanding amount. This will impact how to deal with write-offs and provisions (such as expected credit losses within a loan portfolio).

Scope 3: for aggregation purposes scope 1 should be used, we see the relevance of including scope 3 emissions for illustrating purposes for some sectors. We will look into this in 2020.

Including PSE's: in 2020 we will decide whether Public Sector Enterprises (PSEs) can be incorporated in this asset class.

¹⁵ The Dutch Standaard Bedrijfsindeling (SBI 2008) is based on the activity classification of the European Union (NACE) and on the classification of the United Nations (ISIC). The first four digits of the SBI are the four digits of NACE and the first two digits of the SBI and NACE are the same as the first two digits of ISIC.

¹⁶ <https://www.fmo.nl/1/library/download/urn:uuid:d85800f8-607a-4118-bb7a-59392b8c869/fmo+impact+model+%26+methodology.pdf>

¹⁷ https://www.finnfund.fi/wp-content/uploads/2018/12/Methodology_Finnfund_Final_2018_FINAL-3.pdf

3.4.8 Indirect investments

Topic	Outcome
Scopes covered	Indirect Investments are characterised by having an investment exposure through a vehicle, ideally with a look through for the underlying or ring-fenced assets where the financial institution is ultimately invested in. Therefore, the exposure can consist of a single asset, local or international universe, as well in listed as in private markets. As the nature of the underlying assets can vary, also the scopes covered will depend on the relevant metrics, according to existing PCAF guidelines per asset class and data availability.
Portfolio coverage	<p>Ideally, 100% of the portfolio should be covered, although we anticipate that it will be challenging to cover the majority of the portfolio and we promote a best effort approach. For a better understanding of the indirect investments universe, the following examples of instrument types could qualify:</p> <ul style="list-style-type: none"> • Equity vehicles, like investment funds (including ETFs and fund of funds) in public and private markets • Bond vehicles, like green bonds, covered bonds and asset-backed securities • Derivatives, like FX forwards, IRS, Options, Futures, CDS • Collateral, like pledged for derivatives (cleared and OTC), securities lending, or reinsurance <p>These types of indirect investments can be present in the investment portfolio of a financial institution, some of them also in short positions.</p> <p>In 2018, we began to define a methodology in the PCAF interim report for investment funds targeting public markets, as this is the most common used indirect investment product, to provide more insight and a comprehensive methodology. The majority of investment funds targeting public markets should be covered and an indication should be provided for a pathway to full coverage.</p> <p>We concluded in 2019 that other indirect investments with underlying exposure in public markets also should be covered and an indication should be provided for a pathway to full coverage. Private equity/debt vehicles have the same approach, although the pathway will take much longer.</p>

Attribution	<p>The attributed emissions of the underlying assets for indirect investments should be aggregated and calculated according to the existing PCAF methodology for each specific asset class, such as sovereign bonds, corporate bonds, equities, real estate, or mortgage loans. Cash holdings are considered as having zero emissions.</p> <p>Emissions of the underlying assets in an indirect investment are proportionally attributed to the investor's share in the total vehicle.</p> <p>In 2019, we discussed emissions from green bonds in another working group. Issuers of covered bonds can attribute the emissions of the underlying pool for informational purposes. As this covered bond pool is still in the balance sheet of the issuer, we propose to attribute the issuer's emissions to the investor in these covered bonds.</p> <p>The underlying pool for asset-backed securities is ring-fenced, therefore the emissions of these assets are proportionally attributed to the investor's exposure in the total programme.</p> <p>PCAF methodology for the most common used derivatives by financial institutions would lead to the following approach:</p> <ul style="list-style-type: none"> • FX forwards: indirect exposure to cash, so no emissions • Interest rate swaps: indirect exposure to cash, so no emissions • Options: emissions of the underlying assets are proportionally attributed using the market value of the option • Futures: still not decided, we are open for suggestions • Credit Default Swaps: emissions of the underlying assets are proportionally attributed using the market value <p>As pledged collateral is typically not owned, no emissions are attributed. We promote as best practice to (1) restrict acceptable collateral with additional guidelines in line with the SRI policy of the financial institution, and (2) attribute the emissions of the collateral for informational purposes.</p>
Data	<p>The first and most reliable source for the emissions of an indirect investment should be the asset manager or issuer, according to the existing PCAF guidelines and independently verified. Investors should engage with these asset managers and issuers to disclose the attributable emissions of these indirect investments. If not provided, carbon emissions could be made available by other providers, like public data sources or designated data vendors. Investors could engage with data vendors to provide these emissions. Finally, the investor could assess the indirect investment emissions by capturing the underlying portfolio (look through) and calculating the pro rata emissions with his own PCAF models and data sources. Investors should engage with asset managers and issuers to fully disclose the holdings of their investment funds. This approach is only realistic for underlying assets in public markets.</p>
Absolute vs. relative emissions	<p>As a minimum, PCAF suggests to disclose both absolute and relative emissions, depending on the asset class. For indirect investment with an appropriate benchmark, disclosure of the benchmark emissions is also recommended.</p>
Avoided emissions	<p>Avoided emissions can be appropriate for indirect investments targeting certain asset classes.</p>

3.4.8.1 Asset class specific considerations

Data delivery	Providers of indirect investments should report PCAF compliant numbers to their investors. We can engage with Dutch providers to do so and promote this approach for the international providers.
Challenges	Other indirect investments, we welcome relevant suggestions. More exotic types of underlying assets where PCAF methodology has not been defined yet. Derivates have optionality, which is captured now in using the market value for the proportional attribution of emissions. Is there a better approach?

3.4.8.3 Limitations

Data disclosure	<ul style="list-style-type: none">• Not all providers of indirect investments disclose carbon emissions according to PCAF methodology.• Not all providers of indirect investments disclose the relevant carbon emissions for investors.• Not all providers of indirect investments disclose their full underlying portfolio, so investors cannot calculate the emissions themselves.• Indirect investments will have an international universe and part of that can be in private markets. It will be challenging (or impossible) for the investor to make the PCAF calculation with a look through approach, because of the required carbon data for the underlying assets.
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3.4.8.3

Calculation examples

Description of example



Investment funds

“We have measured the carbon intensity for several years. In 2017 and again in 2018, we went a step further and we have assessed the carbon footprint of our assets under management. This helps clients and other stakeholders to compare the carbon footprints of different investment options, and gives investors a baseline from which carbon measures can be taken,” says Danny Dekker, Senior Responsible Investment Advisor for Kempen.

For the Kempen funds, the carbon emissions were calculated per fund via two metrics:

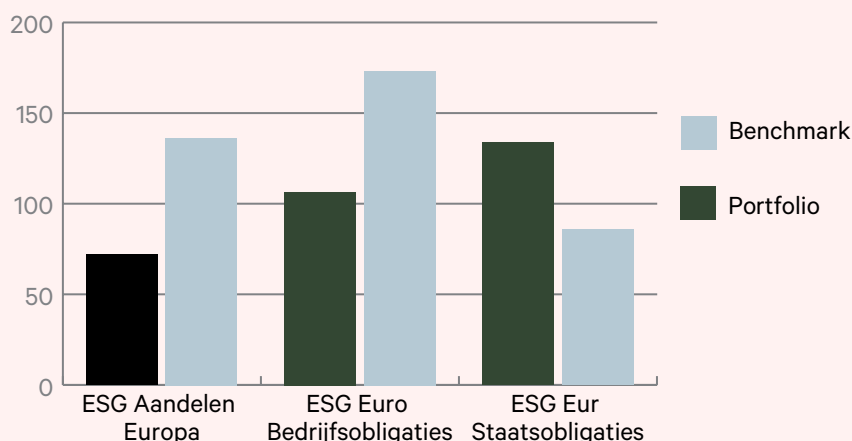
- (1) Carbon emissions per EUR million invested.
- (2) Carbon footprint per EUR million revenues (weighted average carbon intensity). Both metrics can be found in the table below.

	Emissions per million invested tCO ₂ e / MILLION EUR EV	Weighted average carbon intensity tCO ₂ e/MILLION EUR REVENUE	Intensity compared to benchmark
Kempen (Lux) Euro Credit Fund	99.4	140.0	LOWER
Kempen (Lux) Euro Credit Fund	111.5	145.5	LOWER
Plus			
Kempen (Lux) Euro Sustainable Credit Fund	113.2	186.3	LOWER
Kempen European High Dividend Fund	326.8	422.8	HIGHER
Kempen Global High Dividend Fund	268.7	406.8	HIGHER
Kempen (Lux) European Small-cap Fund	46.8	72.6	LOWER
Kempen (Lux) Sustainable Small-cap Fund	49.7	77.0	LOWER
Kempen (Lux) Euro Government Fund	38.6	36.2	LOWER
Kempen Orange Fund	115.5	267.9	HIGHER
Kempen Oranje Participaties*	53.8	64.9	
Kempen Global Sustainable Equity Fund	23.7	48.7	LOWER
Kempen Sustainable Value Creation	32.7	62.5	LOWER
Kempen Global Property Fund	8.4	99.8	LOWER
Kempen European Property Fund	3.4	68.4	HIGHER
Kempen (Lux) Global Small-cap Fund	87.9	131.3	LOWER
Kempen (Lux) Global Small-cap Fund	87.9	131.3	LOWER

* Kempen Oranje Participaties does not have a benchmark.

Source: Kempen Annual Responsible Investment Report 2018, see: <https://www.kempen.com/en/asset-management/responsible-investment>

The a.s.r. ESG funds report their carbon footprint (scope 1 + 2) compared to their respective benchmark quarterly, these are the published emissions at the end of 2019 Q2:



Source: a.s.r. Quarterly ESG Update Q2 2019, see: <https://www.asrnederland.nl/-/media/files/asrnederland-nl/duurzaam-ondernemen/duurzame-belegger/2019-q2-esg-asr-vermogensbeheer.pdf?la=nl-nl>

Used data

Kempen (the asset manager) used the investment portfolio in their general ledger and the carbon data from a specialised climate data vendor (ISS Ethix/South Pole) for the calculations.

a.s.r. (the asset manager) used the investment portfolio and relevant benchmark positions, combined with the carbon data from a specialised climate data vendor (Vigeo Eiris database August 2019) for the calculations.

Calculation and results

In the 2018 interim report we have already provided an example for investments funds.

We already see private equity managers reporting on carbon emissions for their latest funds, like SUSI and Glennmont. Capricorn has committed to do so according to PCAF methodology, as this was requested by Dutch LPs.

Volksbank has estimated the carbon emissions for the underlying pool of their covered bond programme, which resulted in 23.4 tCO₂e/M€. Although this emissions number is not attributable to the investors, this is relevant information.

a.s.r. asset management provided an example for a Put option on the Euro Stoxx50. The carbon emission of the underlying index portfolio was 130 tCO₂e/M€. The out of the money Put option with a notional of €100 million had a market value of €2 million. The attributable emissions for this position would be 260 tCO₂e negative.

3.4.8.4

Case Study a.s.r.: carbon accounting ASR ESG Euro Credit fund

a.s.r.
de nederlandse
verzekerings
maatschappij
voor alle
verzekeringen



Protection of the environment and efforts to limit the impacts of climate change are of the utmost importance to preserve our planet for future generations. For ASR Insurance, climate change is a direct risk to our business, both to the claims we pay out and to the value of our investments. Therefore, a.s.r. asset management has integrated climate change and energy transition as an explicit theme/driver into its strategic asset allocation and has taken measures to implement its commitment to the Paris Agreement across the investment portfolio.

Thanks to the extensive work of PCAF, a.s.r. asset management has started quarterly measurements, reporting, and evaluations for the carbon footprint of the investment portfolios since 2017 and also participated in the PCAF project for SBT road testing in 2019.

Jos Gijbers, Senior Portfolio Manager: “Although data quality is still challenging, we have implemented a robust process for the carbon footprint measurement to improve risk management, increase transparency and build more climate-resilient investment portfolios. The quarterly a.s.r. carbon footprint reporting is highly appreciated by the investors in the a.s.r. ESG funds and other stakeholders.”

3.4.8.5

2019 update of Working Group Indirect Investments

Implementation

We have provided PCAF compliant methodology for more types of indirect investments, having in mind a practical approach for carbon accounting.

Practicalities and insights

There are different instruments with underlying assets and indirect carbon exposure. Disclosure of the underlying assets (look through) is often in place, the carbon footprint of the underlying assets is typically not reported, except for dedicated green products or impact investments.

Agenda for 2020

Provide more detailed examples and best practices for the types of indirect investments that have been covered in this working group.

We hope to get feedback from the investor community on this PCAF approach for indirect investments, like relevant types of indirect investments to be covered by PCAF methodology.

NWB Bank has endorsed the goals of the National Climate Agreement together with the rest of the Dutch financial sector. As part of this commitment NWB Bank will start reporting on the climate impact of its loan portfolio. Reaching the goals of the Paris Agreement calls for effective and innovative cooperation. PCAF is a perfect example of such a collaboration and we are proud to have joined the platform in 2019. PCAF provides us with a framework and harmonized methodology for carbon accounting that increases transparency and awareness. We are eager to play our part in the platform and together make PCAF a global standard.

Lidwin van Velden, CEO NWB Bank

3.4.9 Public Loans

Topic	Outcome
Scopes covered	<p>According to the follow the money principle, scopes 1, 2, and scope 3 purchased goods and services of the regional- and local government (municipalities, water boards, provinces and joint regulations) are covered. PCAF considers a public loan to be a loan received by a regional and local government to support regional government spending. As such, the emissions caused by a loan not only lead to emissions caused by the specific government's own operations, but also by how the specific government finances other sectors within the region. Owned companies are not included in the calculation.</p> <p>In 2019 the first steps have been taken to define a carbon accounting approach, further development will be done in 2020.</p>
Portfolio coverage	<p>All loans should be covered. In 2020 examples will be presented for this asset class.</p> <p>Loans to public sector entities (for example: housing corporations) are in fact also public loans but have the characteristics of corporate loans and or (commercial) real estate. The calculation of these public sector entities follows the calculation approach of the asset class corporate/SME loans; mainly considering the energy use of the housing stock.</p>
Attribution	<p>Attribution is proportional to the exposure of the financial institutions in relation to the regional and local government debt plus equity. From Informatie voor Derden (IV3) reporting the sum of debt plus equity is available from municipalities, water boards, provinces, and joint regulations.</p>
Data	<p>For the waterboards energy use is available in the Klimaatmonitor.¹⁸The latest version of this Klimaatmonitor report is being drafted at the time of writing this report.</p> <p>For scope 1 and 2 of other sectors, country average data need to be used. Data that are available are the use of gas and electricity or the total of GHG emissions from the public sector. These can be attributed to municipalities and provinces based on total expenditure. Data on gas and electricity use can be used to differentiate between scope 1 and scope 2 emissions.</p> <p>For indirect emissions, a relation will be made between spending from IV3 databases with the SBI classification and related GHG emissions of other sectors.</p>
Absolute vs. relative emissions	<p>(1) $absolute\ footprint_t = \sum_{asset\ in\ portfolio} \frac{exposure_t}{denominator_t} emissions_{t-delay}$</p> <p>(2) $relative\ footprint_t = \frac{absolute\ footprint_t}{AuM_t}$</p> <p>In equation (1), the variable <i>emissions</i> refers to the emissions of a portfolio asset in period t. In this case these are the emissions of the regional and local governments (scope 1, 2, and 3). The <i>exposure</i> is the amount of euros invested in a specific area. The <i>denominator</i> (debt) can be seen as the value that defines which part of CO₂e emissions can be attributed to the portfolio or as the value that normalises the CO₂ emissions. The delay mentioned arises from a typical delay in emissions reporting by governments. A way to go about this is to use valid estimates. Under ideal circumstances, the delay in data reported should be zero.</p>
Avoided emissions	<p>Local and regional public authorities can make investments that lead to avoided emissions. Unless these investments are financed by ring-fenced projects it is not possible to account for avoided emissions. The main reason for this limitation is that energy costs and investments are not separated in specific categories.</p>

¹⁸ Unie van Waterschappen, Klimaatmonitor Waterschappen, Arcadis, 2017. <https://www.uvw.nl/wp-content/uploads/2018/12/Klimaatmonitor-waterschappen-2017.pdf>

3.4.9.1 Asset class specific considerations

Comparability with Sovereign bonds The decision on the denominator is, like the decision on scope, dependent on the purpose of carbon accounting. Because there is an advantage in comparing the GHG emissions of public loans with the GHG emissions of other classes, the choice of denominator is important. For steering on carbon in mixed funds that include municipalities, water boards, provinces and joint regulations, PCAF participants want to keep the denominators of different asset classes as similar as possible. In an ideal scenario, the debt + equity would be used as denominator, describing the relevant balance.

Data about central governmental equity is often not disclosed, for regional and local governments this is disclosed in IV3.

Owned companies Owned companies are not included in this analysis. Their emissions could be attributed to scope 3 of government but it is not certain if owned companies are already considered in the money flows of economic input-output tables. There is no publicly available database with owned enterprises. Carbon emissions of independent enterprises are disclosed separately.

Double counting The suggested calculation method for government bonds in PCAF will result in double counting, if used for municipalities and provinces, because the NACE category O (government) consist of both the central government and local and regional governments. Because regional and local governments will make up only a small share of the total NACE category O, using the production data from the I/O tables will have limited validity for the local and regional government. We will need to use other data for this asset class.

Another risk of double counting arises from that local and regional government related collaborations, companies, and projects might be included in the financial and emission reporting of municipalities and provinces. This can only be assessed for individual entities.

3.4.9.2 Limitations

Scope 1 emissions A main limitation concerns scope 1 emissions from the car fleet of the municipality. Currently available data does not allow us to estimate these emissions.

3.4.9.3 2019 update of Working Group Public loans

Implementation In 2019, the participants of the PCAF working group public loans worked on the implementation of the method for public loans. The first steps are taken for this methodology.

Practicalities and insights The methodology for public loans has been worked out together with the Telos Institute.

Agenda for 2020 For 2020, the public loan working group will aim to address some of the challenges in terms of data availability and quality by searching and combining several databases.

4 Next steps



The Dutch carbon accounting front-runners have committed to work for another year as practitioners sharing best practices, addressing shared dilemmas, and collaborating on improvements to the PCAF methodology. The group will publish an updated report at least once more to keep stakeholders informed about its progress. An overview of the activities PCAF will perform over the coming year follows. When and how this is done is at the discretion of the PCAF participants, recognising the urgent need to transition to a low carbon economy.

4.1 Continuation of implementing carbon accounting and sharing best practices

By implementing carbon accounting within each organisation, the group will address questions such as:

- Data quality, including questions of how to evaluate quality, what sources of data to use and the timing of updates
- Disclosure, including whether and how to aggregate across asset classes and which metrics to use when doing so
- Identifying and finding shared solutions to challenges in applying the methodology in practice

4.2 Negative emissions accounting

Work remains to be done on harmonising a methodology to account for carbon dioxide removal (CDR) projects that result in negative/sequestered emissions. Investing in negative emissions will be crucial to continue on a 1.5 degree pathway. A harmonised methodology for negative emissions will help make results comparable, transparent, and credible. In addition, clients would be guided by this methodology in terms of collecting data on sequestration. A few of the open questions are:

- **Aboveground/below ground biomass:** Analysis whether aboveground and/or below ground biomass growth can be included within negative emissions.
- **Carbon captured in materials:** Evaluation to what extent carbon captured within materials can be included as negative emissions. The assessment of sequestration might be different if wood products are combusted at end of their functional life or will be used for something long-term (e.g., in buildings or infrastructure).
- **Avoided deforestation:** Clarity on the assessment of avoided deforestation (e.g., certain REDD+ projects) in terms of negative emissions contribution.

4.3 Target setting

As noted in Section 2.2, PCAF's position is that a financial institution's footprint reporting is a means to an end. The ultimate purpose is to enable steering towards a low carbon portfolio in line with the Paris Agreement; holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to no more than 1.5°C above pre-industrial levels. This would significantly reduce the risks and impacts of climate change. Contributing to the development of a framework for SBTs could help institutions achieve this goal. To this end, several PCAF participants co-sponsor and engage with the SBTs for financials initiative.¹⁹

Within this SBT initiative for financial institutions, WRI, CDP, and WWF collaborate with Navigant and 2° investing initiative to develop SBT methods for the financial sector. Based on a survey, it was decided to develop SBT methods for specific asset classes; for example, residential mortgage, commercial real estate, power generation project finance, and corporate instruments (bonds, equity, debt). In the second and third quarter of 2019, draft SBT methods for these asset classes have been road tested by PCAF participants. Next to these SBT methods, PCAF participants have also assessed additional methods, building on the absolute contraction method.

The first step is to allocate parts of the global carbon budget to individual sectors. A global carbon budget is the cumulative quantity of GHG emissions over time that can be emitted for global warming to stay below the average temperature assigned to a scenario. In the case of the International Energy Agency 2°C Global Warming Scenario (IEA 2DS), this average temperature is 2°C. The large global carbon budget is divided into smaller pieces for each sector. The division of this budget can for example be based on the IEA 2DS. The IEA estimates an overall carbon budget of around 1,050 billion tonnes CO₂ emissions up to 2050. On average, this represents around 35 billion tonnes of GHG emissions per year for the coming 30 years. Knowing that CO₂ emissions globally were at record height for 2018 of around 37 billion tonnes, the global economy is already overshoot compared to the average yearly carbon budget. Future reductions per sector are needed for the coming years to stay well below this estimated global carbon budget.

The second step is the detailed data collection of the assets underlying the loan and investment of a financial institution. The most commonly used data by PCAF participants is highlighted in the table below. For all sectors, the GHG conversion is based on averages and labels can be replaced by actuals for the GHG emissions of the asset if actuals are available, for example, from the central statistical service of a country. This data can be used for scope 1, 2, and 3 and highly depends on data quality.

¹⁹ See <https://sciencebasedtargets.org/financial-institutions/> for further information

Table 2. Most commonly used data by PCAF participants for carbon accounting and target setting

Sector	Required Scenario data about asset	Target setting metric
Oil & Gas	Barrels oil, cubic meters gas	Percent reduction in extraction of barrel of oil, cubic meter gas
Coal	Metric tonnes of coal	Percent reduction in extraction of tonnes of coals
Power	Gigajoules, and type of power generation, or capacity (MW) per technology (gas, coals, nuclear, hydro, renewables)	GHG emissions per kilowatt-hour produced or percent change of capacity per technology
Automotive	Number of cars per car engine type	GHG emissions per km for combustion/electrical/hybrid engines
Shipping	Number and type of ship	GHG emissions per ton transported/nautical mile sailed per type of ship
Aviation	Number of planes	GHG emissions per air mile flown
Cement	Tonnes of cement produced	GHG emissions per tonne produced
Steel	Tonnes of steel produced	GHG emissions per tonne produced
Commercial real estate	Square meters per building	GHG emissions per m ²
Residential mortgages	Square meters per home	GHG emissions per m ²

Challenges include:

- When working with averages, the results can be highly skewed compared to the reality of assets of various capacity.
- The cost of accurate data can be expensive. There is a cost associated to data subscription services.
- Forward-looking production forecasts (such as the PACTA tool) come with uncertainty.
- Advantages include:
 - It does allow for growth of certain sectors from year-over-year, for example, more gas compared to less coal, while the GHG emissions across all sectors goes down.
 - More and more tools will be available to assist with calculations. For example, for heavy emitting industries, the PACTA tool offers an open source data collection to assess alignment in line with the IEA scenarios.
 - Actual GHG emissions will be made available for various sectors (e.g., Poseidon principles GHG emission recording for shipping, energy usage of homes can be provided by national statistical agencies).

Sectoral Decarbonization Approach

In 2015, CDP, WRI, and WWF (with technical support of Navigant) developed the Sectoral Decarbonization Approach (SDA), which is the leading and most applied methodology to set SBTs in line with the Paris Agreement. The SBT initiative has published a tool that helps companies apply the SDA.¹ The SBT methods developed for the financial sector build heavily on the SDA and use emissions intensity pathways (GHG emissions per m², per kWh, per tonne of product, per km) to determine the target.

In the SDA, the following sectors are covered:

- Buildings
- Power generation
- Cement
- Iron and steel
- Aluminium
- Pulp and paper
- Transport (road, rail, shipping, aviation)

Paris Agreement Capital Transition Assessment (PACTA)

PACTA is a tool developed by 2° investing initiative that allows banks and investors to measure the alignment of their corporate instrument portfolio (bonds, equity, debt) with the Paris Agreement goals. The tool incorporates an asset-level database covering the following sectors:

- Energy (oil, coal, and gas extraction)
- Power (conventional power generation and renewables)
- Automotive
- Shipping and aviation
- Steel
- Cement

For the shipping, aviation, steel, and cement sectors, the PACTA approach for target setting is based on the SDA. For energy, power, and automotive sectors, the PACTA approach is based on capacity projections within the scenario. Within PACTA, target metrics for the energy, power, and automotive sectors are not expressed in emissions, but in capacity growth/decline of a portfolio per technology.

The absolute contraction method

This method was used by PCAF participants and is based on absolute emissions reduction. The key concept is to scale down the absolute GHG emissions financed by loans and investments year-over-year. The allocation mechanism can be set up with a linear, compound annual growth rate or scenario reduction pathway. To be aligned with the Paris Agreement, the 2°C scenario pathway with a carbon budget of 1,050 billion tonnes emissions up to 2050 is used for this method, based on the global carbon budget set by the IPCC. The scenario pathways can be adjusted and made stricter, for example, to a 1.5°C scenario pathway. This method can be used for scope 1, 2, and 3 of investees and is simple and effective.

The major advantage of the absolute reduction method is its simplicity. Total GHG emissions need to go down to tackle

climate change. The Paris Agreement also has absolute emissions targets. This method also offers the possibility to translate the emissions into compelling and simple metrics, such as declining emissions per unit produced or per euro of value added.

Another advantage of the absolute contraction method is that it can cover all sectors. For some sectors, such as agriculture, sector-specific pathways that can be used by financial institutions do not exist yet. It is not clear if sector-specific pathways will be available and useable anytime soon for the agricultural sector, because proposed pathways vary significantly for different commodities and contexts. For financial institutions with a significant agriculture portfolio, the absolute contraction method is essential to cover a meaningful part of the portfolio.

The major disadvantage of the absolute reduction method is that it does not allow for growth among sectors.

Target setting

SBT setting can be done based on the SBT methods for power plants, cars produced, airplanes, ships, cement factories, iron and steel plants, aluminium, pulp, and paper companies, residential homes, and commercial buildings.

For homogeneous assets within the boundaries of a single geography, state, or province, or with a similar design or type, the absolute reduction method can offer simplified calculation support (for example) national housing markets, or increasingly standardised industries like car manufacturing.

To act on the targets, financial institutions have a choice between exclusion of high carbon assets and engagement with the owners of high carbon assets to agree on a transition path. This transition path involves the timing, cost, and the first step to move towards a low carbon economy. The next section details such ways to steer towards a low carbon portfolio.

We enable the Dutch public sector to achieve socially relevant objectives. Almost all our customers are delivering a positive contribution in the field of sustainability on behalf of their nature. Our challenge is to demonstrate this even better. Reporting on the climate impact of our financing and formulating action plans that contribute to reducing CO₂ emissions is our strategic spearhead. The PCAF initiative, that we joined in 2019, is an important tool for us to realize our ambitions on this subject.

Olivier Labe, member of the executive board, responsible for sustainability, BNG Bank

4.4 Steering towards low carbon portfolio

PCAF participants will apply several measures to reduce the footprint of a portfolio. An overview of possible measures, as discussed during the PCAF meetings, follows. It reflects ongoing work rather than a firm conclusion.

4.4.1 Portfolio composition

One way of steering towards a low carbon portfolio is by changing its composition. Changing its composition can be achieved through divesting from certain relatively high carbon intensity assets and replacing them with low carbon alternatives. This can be done by applying one or more of the following measures:

- Limit exposure to high carbon intensity assets, increase exposure to low carbon intensity assets and green bonds
- Set a minimum low carbon intensity assets target
- Implement a negative screen for high carbon projects, bonds, or other assets
- Explore activities that provide preferential financing conditions for low carbon intensity assets or higher transaction costs (through reporting, monitoring, and verification) for high carbon intensity assets

4.4.2 Engagement

Another way of steering is by actively engaging with investees to lower their footprint. The asset or investee does not change ownership. This active ownership approach can be executed through one or more of the following measures:

- Engage with investee companies or asset operators to increase energy efficiency and reduce emissions; for example, by offering new financial products such as green mortgages, energy efficiency loans or ESG-rated loans
- Engage on reducing high carbon CAPEX and increase climate friendly investment
- Engage on corporate GHG emission targets and strategies including disclosure and transparency

5 Glossary

Absolute emissions	Emissions attributed to an investor. Expressed in tonnes CO ₂ .
Avoided emissions	Emission reductions that occur outside of a product's life cycle but result from the use of that product when compared to a baseline where that product is not used
CO₂-equivalent (CO₂e)	The amount of carbon dioxide (CO ₂) that would cause the same integrated radiative forcing (a measure for the strength of climate change drivers) over a given time horizon as an emitted amount of another greenhouse gas or mixture of greenhouse gases
Corporate debt	The debt owed by a corporate entity
Direct emissions	Emissions from sources that are owned or controlled by the reporting entity and/or investee.
Double counting	Occurs when a single GHG emission reduction or removal, achieved through a mechanism issuing units, is counted more than once towards attaining mitigation pledges or financial pledges for the purpose of mitigating climate change.
Sovereign bond	A debt security issued by a government to support government spending.
Government debt	The debt owed by a central government.
Indirect emissions	Emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity.
Investment	The term "investment" (unless explicitly stated otherwise) is used in the broad sense: 'putting money into activities or organisations' with the expectation of making a profit'. This in contradiction to the more narrow definition sometimes used within for example a bank: as one of several financing options, besides e.g. debt finance, equity finance. Most forms of investment involve some form of risk taking, such as investment in equities, debt, property, projects, and even fixed interest securities which are subject to inflation risk, amongst other risks.
Project finance	The long-term financing of infrastructure and industrial projects
Relative emissions: per invested value	Emissions attributed to an investor (absolute emissions) normalised for the amount invested. Expressed in tonnes CO ₂ e / M€ invested.

Appendix A: Dutch Carbon Pledge

Dutch Carbon Pledge

November 28th 2015

We ask global leaders during the 21st session of the Conference of the Parties to the UNFCCC to take effective measures to keep global warming under safe levels. As financial institutions we want to take responsibility as well and come with new and meaningful steps. The annual measuring and disclosure of the carbon footprint of investments*, with the aim of using this information to identify and set carbon footprint reduction targets, is still at an early stage. Our initiative, consisting of leaders of different segments of the Dutch financial sector, intends to experiment with annual carbon foot printing, disclosure and target setting for investments. These elements are key in planning and developing investment strategies towards a low carbon society. We want to share and learn from practice and find solutions for dilemma's. We hope this will stimulate the development and adaptation of carbon foot printing and target setting in the financial sector on a larger scale for all their investments. Our goal is to form a group of leading financial institutions that cooperate in a bottom up initiative on achieving transparency and uniformity in carbon foot printing and target setting.

** investments defined in their broadest sense*



SNS BANK N.V.

Triodos Bank

Appendix B: Report guidance

An example of how to report emissions (e.g. in the company's annual report, sustainability report and/or website) follows below. Additional examples of reporting best practices are presented further down in this appendix.

Example: Reporting on data quality

Impact sector	Total outstanding loans & funds investments covered (in 1000 USD)	Attributed emissions (ktonne CO ₂ eq.)	Emission intensity (ktonne CO ₂ eq./ billion USD)	Data quality score high quality = 1 low quality = 5
Generated emissions				
Asset class 1				
Asset class 2				
Asset class 3				
Total emissions				
Avoided emissions (the emissions will be a negative number)				
Project 1				
Project 2				
Project 3				
Avoided emissions				
Total				

Triodos Bank Greenhouse Gas accounting methodology 2018

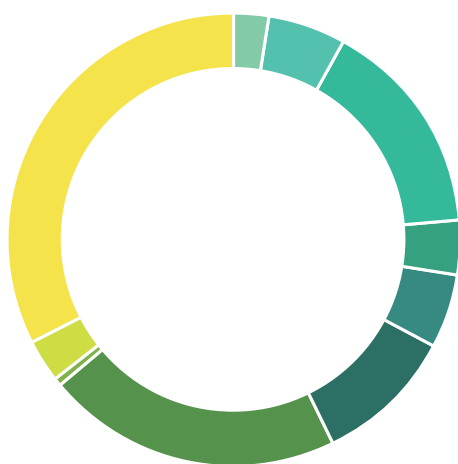
(<https://www.triodos.com/download-centre>)

The generic data quality table determines how Triodos Bank assesses the data quality of its carbon emissions assessment. It details how the generic table is applied to a specific asset class. The example below shows how it applies the data quality levels to its (renewable) energy finance:

Examples for several data qualities. Source: (Triodos Bank 2018 annual report):

Data quality (highest to lowest)	Description
1	Actual annual production (kWh) of the project
2	Estimated annual production (kWh) based on P50/P90 assessment of potential production
3	Project-specific GHG data, calculated by independent expert in accordance with the GHG Protocol and/or UNFCCC or another credible certification scheme.
4	Estimated annual production (kWh) based on capacity (MW) of project combined with average load factors per country
5	Emissions intensity factors (emissions avoided per million euro invested) per technology from own system or peer financial institutions

Example of data quality 1

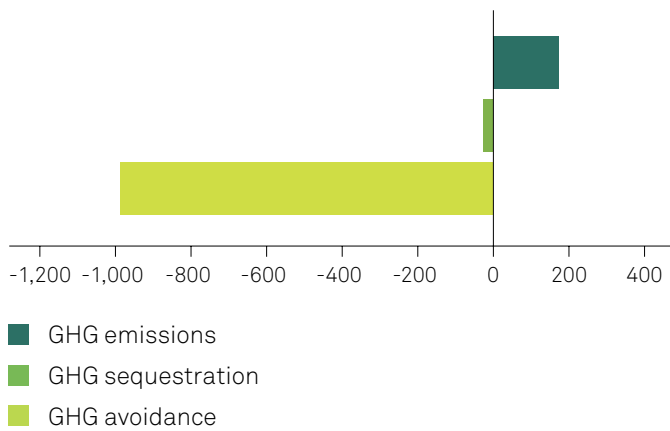


Triodos Bank assessed around 68% of its loans and funds' investments using the PCAF methodology (see figure below). The main sectors excluded from this analysis are the cultural, health, social projects, development cooperation, retail and fair trade (food and non-food) sectors, as well as sovereign debts. Triodos Bank discloses the sectors it assesses, using the PCAF methodology, and the size of those sectors. It also details which sectors are excluded and what proportion of its overall assets and emissions are assessed.

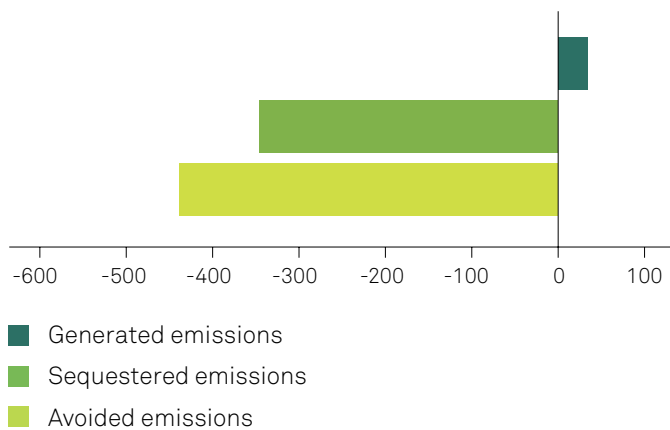
Organic farming	278
Sustainable property	589
Private mortgages retail banking	1,680
Social housing	422
Healthcare – care for the elderly	576
SRI funds	1,073
Renewable energy	2,251
Nature development and forestry	69
Other sectors included in above	329
Not covered loans and investments	3,481

Example of data quality number 4 and 5

Triodos Bank reports its absolute emissions. It highlights generated, sequestered and avoided emissions across all the assets it assesses.



Triodos Bank also discloses 'emission intensity' data in relation to generated, sequestered and avoided emissions.



Carbon accounting overview reporting examples

Example: (Triodos Bank 2018 annual report):

A detailed summary, per sector financed follows below. It shows how Triodos Bank summarizes key, high level information about its emissions assessment per sector. It highlights:

- The amount of euros invested in particular sectors.
- The attributed emissions per sector in kilotonnes of carbon equivalent. The emissions are attributed because Triodos Bank calculates this figure based on the proportion of overall finance that it is responsible for.
- The emissions intensity per sector in kilotonnes of carbon equivalent per billion euros financed.
- The data quality score per sector assessed.

Impact sector	Total outstanding loans & funds investments covered (in 1000 EUR)	Attributed emissions (ktonne CO ₂ eq.)	Emission intensity (ktonne CO ₂ eq./billion EUR)	Data quality score high quality = 1 low quality = 5
Generated emissions				
Environment:				
Organic farming	290.919	27	93	3,2
Sustainable property	903.361	22	24	3,4
Residential mortgages	1.679.827	30	18	4,0
Social:				
Care for the elderly	578.298	25	43	4,0
Social housing	455.639	19	42	4,0
SRI funds	1.073.196	53	49	2,0
	4.981.240	176	35	3,4
Sequestered emissions				
Nature development & Forestry	69.536	-24	-345	3,1
Net emissions	5.050.776	152	30	3,4
Avoided emissions				
Renewable energy	2.250.801	-985	-438	1,8
Total1	7.301.577			2,9
Coverage rate	68%			

Example: ABN AMRO Group N.V.

Source: Sustainability facts and figures & Engagement report 2018

ABN AMRO has calculated the emissions on NACE sector level for its lending portfolio. The calculation is as follows:

A: Country emissions per NACE sector (kilotonne CO₂e)

B: Country financial balances per NACE sector (M€)

A/B: Emission factor per NACE sector (kilotonne CO₂e /M€)

D: Company's lending portfolio (M€)

E: Financed emissions per NACE sector for the company's lending portfolio (kilotonne CO₂e)

$$E = \frac{A}{B} \times D$$

Note: Not all sectors have been included due to a difficulty in translating the entire lending portfolio to NACE codes. Therefore, the overview below does not contain ABN AMRO's entire lending portfolio for 2018.

ABN AMRO 2018		
NACE Sectors	Financial balance in mln per sector	GHGe in ktons
Agriculture (A)	€ 8.409	8014
Minerals (B)	€ 4.731	126
Industry (C)	€ 18.834	940
Utilities (D)	€ 1.967	1146
Water distribution (E)	€ 879	517
Construction (F)	€ 2.831	116
Retail (G)	€ 25.137	240
Transport (H)	€ 14.350	2727
Leisure (I)	€ 1.465	73
Information and communication (J)	€ 2.893	6
Administrative services (N)	€ 5.916	140
Scientific and technical activities (M)	€ 1.882	11
Healthcare (Q)	€ 4.132	336
Education (P)	€ 202	23
Other services (S)	€ 266	15
Recreation (R)	€ 1.099	46
Total	€ 94.993	14474

Real Estate Clients

ABN AMRO has calculated the carbon emissions for its real estate portfolio. For residential real-estate, the mortgage methodology is applied based on the energy labels assigned to each house. For non-residential real estate, the carbon emissions are calculated based on the floor surface and energy use per type of building. Through ABN AMRO's Mission 2030 – its entire real estate portfolio should have an average energy label A in order to decrease the overall carbon emissions of its real estate portfolio.

Mission 2030 results 2018¹

Real estate Clients

CO₂ profile: Commercial real estate portfolio type – houses

Energy label	A+++	A++	A+	A	B	C	D	E	No label	Total
Percentage of rentable units in portfolio	0%	0%	0%	4%	4%	17%	15%	12%	38%	100%
m ² rentable surface (x10)	-	-	5	1.14	265	633	465	361	1,533	4,697
Total CO₂ emissions in Kton	-	-	0.141	33.9	8.4	23.1	19.2	16.4		115

CO₂ profile: Commercial real estate portfolio type – non residential buildings

Sector	Office	Hotel	Shop without cooling	Total
Percentage of rentable units (objects) in portfolio	67% (40%)	3% (9%)	30% (51%)	100%
Total rentable units (objects)	5,551 (632)	239 (137)	2,534 (802)	8,324 (1,571)
m ² rentable surface (x 10)	2,632	96	923	3.651
Total CO₂ emissions in Kton	127.5	6.7	54.2	188
Total CO₂ emissions Real Estate clients portfolio				188

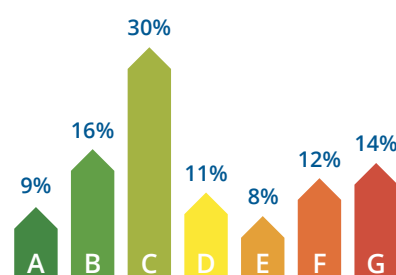
Example: De Volksbank N.V.

Annual report 2018

Additional relevant information regarding the portfolio buildup can be provided. In the below figure, qualitative information is given regarding the energy label distribution of De Volksbanks' mortgage portfolio. This information is relevant to calculate the CO₂ emissions of this portfolio.

42 de Volksbank N.V. Annual report 2018

Energy labels in our mortgage portfolio



Based on the RVO database year-end 2018.
25% of the homes has a definitive energy label.



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