

# The GLOBAL CARBON ACCOUNTING Standard

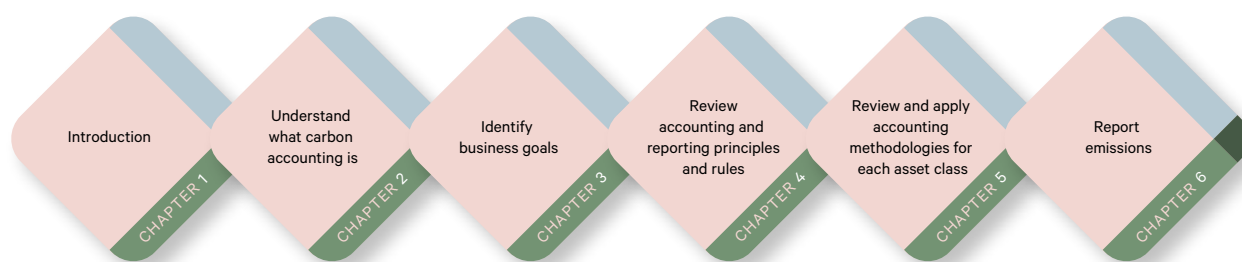
FOR THE FINANCIAL INDUSTRY

Draft version for public consultation  
August 2020



**PCAF**

Partnership for  
Carbon Accounting  
Financials



## Table of contents

Foreword by the PCAF Steering Committee	4
Executive summary	5
1. Introduction	8
2. The importance of carbon accounting	14
3. Using carbon accounting to set and achieve business goals	19
4. Principles and rules of carbon accounting for financials	26
4.1 Carbon accounting rules derived from the GHG Protocol's principles	27
4.2 Overarching rules for accounting and reporting financed emissions	29
5. Methodology to measure financed emissions	34
5.1 Listed equity and bonds	39
5.2 Business loans	48
5.3 Project finance	56
5.4 Commercial real estate	63
5.5 Mortgages	69
5.6 Motor vehicle loans	75
6. Reporting recommendations and requirements for disclosure	83
7. Glossary	89
8. References	93
Annex	95

In September 2019, the Partnership for Carbon Accounting Financials (PCAF) was launched globally to harmonize carbon accounting methods and enable financial institutions to consistently measure and disclose the greenhouse gas emissions financed by their loans and investments. These emissions are also called financed emissions or climate impact. As an industry-led partnership, PCAF is governed by a Steering Committee of ABN AMRO, ASN Bank, Amalgamated Bank, the Global Alliance for Banking on Values, Morgan Stanley and Triodos Bank. At the time of publishing this document, 70 banks and investors participate in PCAF. Out of this group, 16 volunteered to form the PCAF Core Team to co-create the Global Carbon Accounting Standard for the Financial Industry with the ultimate goal of harmonizing carbon accounting. The PCAF Core Team is depicted below:



The PCAF Secretariat facilitated the Core Team’s work by moderating their technical discussions, reviewing the content, and compiling and editing this final draft. The PCAF Secretariat is operated by Guidehouse, a global consultancy firm specialized in energy, sustainability, risk, and compliance for the financial sector.

Observers to the process of developing the Global Carbon Accounting Standard for the Financial Industry include Barclays, the Green Climate Fund, the General Council for Islamic Banks and Financial Institutions and other organisations. As observers, these financial entities were pro-actively informed and involved in the development process of the Global Carbon Accounting Standard and had the opportunity to provide input and feedback. Observers’ participation does not imply official endorsement nor commitment to PCAF.

Please cite this document as:

**PCAF Global (2020). The Global Carbon Accounting Standard for the Financial Industry. First version for stakeholder consultation.**

# Foreword by the PCAF Steering Committee

As the urgency of the climate emergency grows with still-rising global greenhouse gases and proliferating physical impacts, increasing energy is now being directed at how to prepare the global financial system to manage carbon risks and bring solutions to the climate challenge, by bringing emissions down to net-zero. It is against that back drop that, as members of the Steering Committee for the Partnership for Carbon Accounting Financials (PCAF), we have been building what we believe to be an essential and crucial component of the broader climate finance ecosystem. Since our global launch in September 2019, there has been a surge of interest from banks and investors worldwide to have a clear and transparent set of rules to measure their financed emissions to assess risk, manage impact, meet the disclosure expectations of important stakeholders, and assess progress to global climate goals.

We owe the globalization of PCAF to the pioneering work of the Dutch financial industry. In 2015, they took the lead in developing approaches to understand their portfolios' contribution to climate change—they strongly believed that measuring financed emissions would enable them to take informed actions to decarbonize their portfolios in order to minimize climate risks and maximize opportunities. They were right. By measuring financed emissions, they were able to identify carbon-intensive hotspots and develop innovative low carbon products for their clients and investees. Their work reveals that measuring financed emissions is the cornerstone of informed climate actions. It is one of the first steps any financial institution should take when embarking upon a process to understand climate risks and opportunities and assessing portfolio alignment in the context of the Paris Agreement.

The PCAF Netherlands success led to the uptake of the same approaches in North America in 2018. After being tried and tested in the Netherlands, Canada and the United States, and bolstered by a public commitment from pioneers of values-based banking from all corners of the world to adopt this approach, many other financial institutions around the globe began to inquire about how this experience could be applied in other countries.

We listened to our peers and understood that it was time to have harmonized methodologies to measure financed emissions that can be used by financial institutions of various sizes and with diverse models wherever they are in the world. The Global Carbon Accounting Standard that you are about to read is a response to this global request.

This version for global stakeholder consultation is the result of the tenacious work of financial institutions who are part of the PCAF Global Core Team, who volunteered their time to create it. We encourage you to engage in the consultation process and provide further feedback to the Core Team and to help them deliver the final version to be published later this year.

We thank the William & Flora Hewlett Foundation for their generous support of this work, we thank the institutions we work for who provided us with the time to work on something that is of benefit to the industry as a whole, and we thank the hundreds of financial institutions, governmental and non-governmental organizations who have helped bring this important idea to life.

## The PCAF Steering Committee

Tjeerd Krumpelman

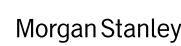
Ivan Frishberg

Jeroen Loots

James Niven

Sean Wright

Marcel Proos



## Executive summary

The Partnership for Carbon Accounting Financials (PCAF) is an industry-led initiative. It was created in 2015 by Dutch financial institutions, extended to North America in 2018, and scaled up globally in 2019. PCAF helps financial institutions assess and disclose greenhouse gas (GHG) emissions from their loans and investments through carbon accounting.

Carbon accounting enables financial institutions to disclose these emissions at a fixed point in time and in line with financial accounting periods. These disclosures are crucial for allowing stakeholders to understand how a financial institution's loans and investments are contributing to, or inhibiting, the transition to a low carbon economy. Creating a low carbon economy is essential for achieving the goals of the Paris Agreement and limiting dangerous global temperature rise.

Until now, there has not been a globally accepted methodology for the measurement and disclosure of financed emissions. The absence of harmonized methodologies and reporting rules has led to the poor uptake of carbon accounting of financed emissions and inconsistent disclosures across financial institutions.

Responding to industry demand for a global, standardized carbon accounting approach, PCAF developed the Global Carbon Accounting Standard for the financial industry (the Standard). With the GHG Protocol Scope 3 Standard<sup>2</sup> as its foundation, the Standard builds upon the carbon accounting methods that PCAF has been developing since 2015. These methods are widely tested by banks and investors and used to prepare disclosures of financed emissions.

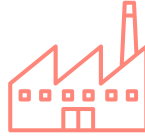
---

2 (WRI and WBCSD, 2011)

These methods assist in the measurement and disclosure of GHG emissions associated with the following six asset classes:



**Listed equity and bonds**



**Business loans**



**Commercial real estate**



**Mortgages**



**Motor vehicle loans**



**Project finance**

The Standard provides detailed guidance for each asset class to calculate the emissions resulting from activities in the real economy that are financed through lending and investment portfolios. Emissions are attributed to financial institutions based on robust, consistent accounting rules that are specific for each asset class. By following the methodology for each, financial institutions will be able to measure GHG emissions for each asset class and produce disclosures that are consistent, comparable, reliable, clear, and efficient.

Limited data is often the main challenge in calculating financed emissions; however, data limitations should not deter financial institutions from starting their carbon accounting journeys. Beginning with estimated or proxy data can help identify carbon-intensive hotspots in lending and investment portfolios. The Standard provides guidance on data quality scoring per asset class, facilitating data transparency and encouraging improvements to data quality in the medium and long term. The Standard also provides recommendations and requirements for disclosures, which include a minimum disclosure threshold with flexibility to report beyond this level. Any requirements not fulfilled must be accompanied by an explanation.

Using this Standard equips financial institutions with standardized, robust methods to measure financed emissions, the first step in the journey to make finance flows consistent with the goals of the Paris Agreement. Measuring financed emissions enables the institutions to assess climate-related risks in line with Task Force on Climate-related Financial Disclosures (TCFD), set science-based targets using methods developed by the Science Based Targets initiative, inform climate actions, and disclose progress.

WRI and WBCSD published Corporate Value Chain (Scope 3) Accounting and Reporting Standard

2011



PCAF founded by Dutch financial institutions

2015



PCAF launched in North America

2018



PCAF published 2 reports on carbon accounting methods

2019



PCAF launched globally

2019



PCAF launches Global Carbon Accounting Standard for the financial industry

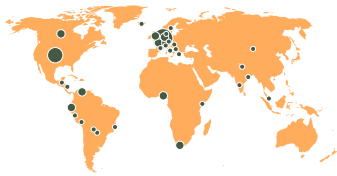
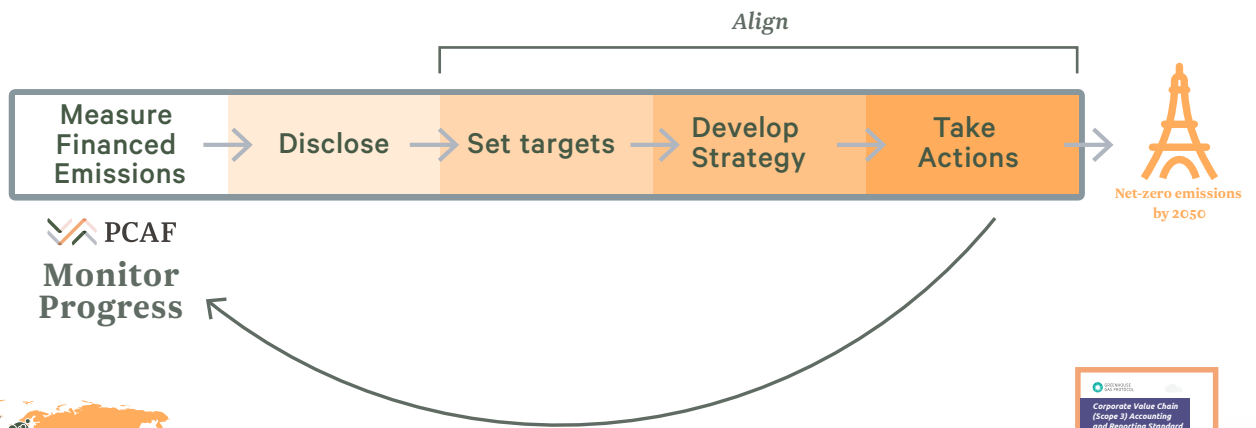
2020



# The GLOBAL CARBON ACCOUNTING Standard

FOR THE FINANCIAL INDUSTRY

Using The Standard is the first step in the journey to align with the Paris Agreement



70 financial institutions, with over \$ 10 Trillion in financial assets committed (July 2020).



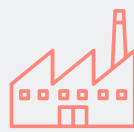
Based on the GHG Protocol Scope 3 Standard



### Listed Equity & Bonds

$$\frac{\text{Outstanding amount}}{\text{EVIC}} \times \text{Company emissions}$$

*EVIC = enterprise value including cash*



### Business Loans

$$\frac{\text{Outstanding amount}}{\text{EVIC or total company equity + debt}} \times \text{Company emissions}$$



### Commercial Real Estate

$$\frac{\text{Outstanding amount}}{\text{Property value at origination}} \times \text{Building emissions}$$

## Carbon accounting for six asset classes



### Mortgages

$$100\% \times \text{Building emissions}$$



### Motor Vehicles Loans

$$\frac{\text{Outstanding amount}}{\text{Vehicle value at origination}} \times \text{Vehicle emissions}$$

*For consumer loans, the attribution of vehicle emissions is 100%*



### Project Finance

$$\frac{\text{Outstanding financing (debt + equity)}}{\text{Total project size or total assets}} \times \text{Project emissions}$$



Partnership for Carbon Accounting Financials

The Partnership for Carbon Accounting Financials (PCAF) is an industry-led initiative enabling financial institutions to measure and disclose greenhouse gas (GHG) emissions of loans and investments.

# 1. Introduction

Introduction

CHAPTER 1

Understand what carbon accounting is

CHAPTER 2

Identify business goals

CHAPTER 3

Review accounting and reporting principles and rules

CHAPTER 4

Review and apply accounting methodologies for each asset class

CHAPTER 5

Report emissions

CHAPTER 6



## The role of the financial sector

With the planet nearing global warming of 3°C, there is urgent need to act in the short-term for our long-term benefit. To limit global warming to 1.5°C above pre-industrial levels, all sectors of society need to decarbonize and collectively reach net zero emissions by 2050. The financial sector can help facilitate the transition in line with a 1.5°C scenario by providing capital to support decarbonization.

To trigger changes in capital flows and signals for all sectors, the financial industry must acknowledge and endorse the need for and pace of decarbonization. The industry should begin with better understanding the climate risks to their portfolio and the greenhouse gas (GHG) emissions (or climate impact) associated with their loans and investments. Measuring financed emissions is crucial in providing this understanding. If financial institutions know the emissions financed by loans and investments they can better manage risks, navigate emissions reduction goals, act, and disclose progress. This understanding then triggers internal discussions and engagements with stakeholders to identify concrete actions that help lower financed emissions.

## The role of PCAF and greenhouse gas emissions accounting in Paris alignment

Previously, financial institutions used different approaches and accounting methodologies to measure financed emissions and opted for various reporting metrics, leading to inconsistent assessments of the industry's climate impact. This lack of standardization hampers transparency, comparability, and accountability of the financial sector to the Paris Agreement.

With this issue in mind, banks, investors, and fund managers from five continents partnered to create the Partnership for Carbon Accounting Financials (PCAF or the Partnership)<sup>2</sup>. Committed to the measurement and disclosure of the absolute GHG emissions of their portfolios (Scope 3 financed emissions), this industry-led initiative is rapidly expanding in North America, Latin America, Europe, Africa, and Asia Pacific<sup>3</sup>. The Partnership aims to standardize the way financial institutions measure and disclose financed emissions and increase the number of financial institutions that commit to measuring and disclosing financed emissions.

Accounting for financed emissions is the first in a sequence of steps that banks and investors can take to ultimately align with the goals of the Paris Agreement. This sequence has five interdependent steps: measuring financed emissions, disclosing financed emissions, setting science-based targets, designing strategies to reach the targets, and implementing concrete actions to achieve the targets. After step five is completed, financial institutions need to go back to step one to measure and disclose its progress against its climate targets.

Standardized emissions accounting is the foundation that enables financial institutions to make informed decisions while working toward their alignment with the Paris Agreement.

---

<sup>2</sup> More information about PCAF is found at: <https://carbonaccountingfinancials.com>

<sup>3</sup> A full list of PCAF participants is found at: <https://carbonaccountingfinancials.com/financial-institutions-taking-action#overview-of-institutions>

## The relationship with other climate initiatives for the financial sector

Multiple climate initiatives for financial institutions have been launched of late, including high level commitments, measuring financed emissions, scenario analysis, target setting, and concrete climate action and reporting. High level commitments and policies endorsed by C-suite executives instill a strong rationale for financial institutions to address climate change, while measuring financed emissions provides the emissions baseline for scenario analysis and target setting, informs climate actions, and enables reporting (Figure 1-1).

**Figure 1-1. Foundation for other initiatives**



For each of these areas, there are a number of climate initiatives with a specific target audience and focus (Figure 1-2).

As PCAF focuses on measuring financed emissions, the Partnership complements the work and services that other initiatives offer to financial institutions. Building synergies is core to PCAF's work, which has led to collaborations with the following initiatives:

- UNEP FI Principles for Responsible Banking (PRB) and its Collective Commitment on Climate Action (CCCA)
- United Nations-convened Net-Zero Asset Owner Alliance (AoA)
- Task Force on Climate-related Financial Disclosures (TCFD)
- Science-based targets for financial institutions (SBTi-FIs)
- Center for Climate-Aligned Finance of Rocky Mountain Institute
- Carbon Disclosure Project (CDP)
- European Commission Technical Expert Group on Sustainable Finance (EU-TEG)

Figure 1-2. The cluster of climate initiatives

For whom?		◆ Focus of Initiative	High-level Commitment to Act	Measuring Financed Emissions	Scenario Analysis	Target-setting	Enabling Action	Reporting
B Banks	I Investors							
B		UNEP FI Principles for Responsible Banking (PRB): Collective Commitment on Climate Action	◆					
B		Climate Action in Financial Institutions	◆					
	I	United Nations-convened Net-Zero Asset Owner Alliance	◆					
	I	Investor Agenda	◆					
B I		Task Force on Climate-related Financial Disclosures (TCFD)						◆
B I		Partnership for Carbon Accounting Financials (PCAF)		◆				
B		Poseidon Principles (for shipping sector only)			◆			
B I		UNEP FI TCFD pilots			◆			
B I		Paris Agreement Capital Transition Assessment (PACTA)			◆			
	I	IIGCC Paris Aligned Investment Initiative			◆			
B I		Science Based Targets for Financial Institutions				◆		
B		Climate Safe Learning Lab					◆	
B		Banking Environment Initiative					◆	
	I	Climate Action 100+					◆	
B I		CDP Financial Services Questionnaire						◆

Source: (PCAF, 2019)

## Standardizing greenhouse gas emissions accounting for financial institutions

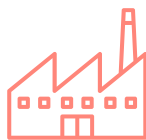
This document is the first draft of the Global Carbon Accounting Standard for the financial industry. Throughout this document, the Global Carbon Accounting Standard is commonly referred to as the Standard. The purpose of the Standard is to provide financial institutions with transparent, harmonized methodologies to measure and report the emissions the institutions finance through loans and investments, in line with the requirements of the GHG Protocol.

The Global Carbon Accounting Standard was developed by the PCAF Global Core Team, a heterogeneous group of banks and investors of varied sizes and from different regions. This Core Team has wide experience in carbon accounting: ABN AMRO, Access Bank, Amalgamated Bank, Banco Pichincha, Bank of America, Boston Common Asset Management, Crédit Coopératif and its subsidiary Ecofi, FirstRand Ltd., FMO, KCB, LandsBankinn, Morgan Stanley, Produbanco, ROBECO, Triodos Bank, and Vision Banco.

At the end of October 2019, the PCAF Global Core Team kicked-off its activities by selecting a set of asset classes that are typical of banks, asset owners, and asset managers globally. These asset classes are the focus of this first draft and can be extended with additional asset classes at a later moment as this Standard and PCAF evolve over time. The Standard currently covers the following asset classes:



### Listed equity and bonds



### Business loans



### Commercial real estate



### Mortgages



### Motor vehicle loans



### Project finance

The PCAF Core Team formed asset class-specific working groups, which focused on drafting the methods and reporting principles covered in the Standard. The approaches developed by PCAF Netherlands<sup>4</sup> and PCAF North America<sup>5</sup> are the foundation from which the Core Team built its work. This first draft of the Standard is under global stakeholder consultation from August to September 2020. After addressing stakeholders' feedback, the PCAF Core Team will launch the Global Carbon Accounting Standard in November 2020.

## Built on the Greenhouse Gas Protocol

The Global Carbon Accounting Standard builds on the GHG Protocol and its technical guidance for calculating scope 3 emissions of a reporting company (i.e., investors and companies that provide financial services). More specifically, the Standard forms an extension to the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard.<sup>6</sup> Consequently, this Standard refines and expands the GHG Protocol's accounting rules for scope 3, category 15 (investments), aiming at providing detailed guidance per asset class.

## Expected users of this standard

This standard is written primarily from the perspective of a financial institution that wishes to measure and disclose the GHG emissions associated with its loans and investments, including:

- Commercial banks
- Investment banks
- Development banks
- Asset owners/managers (mutual funds, pension funds, close-end funds, investment trusts)
- Insurance companies

4 (PCAF, 2019)

5 (PCAF, 2019)

6 (WRI and WBCSD, 2011)

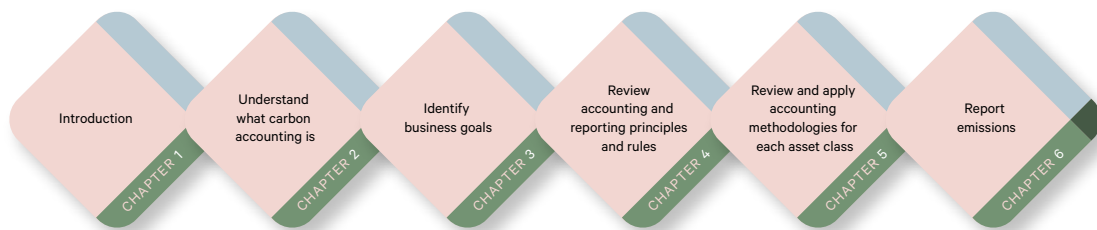
## How to read this standard

The Global Carbon Accounting Standard uses precise language to indicate which provisions are requirements, which are recommendations, and which are allowable options that financial institutions may choose to follow. The following terms are used throughout this Standard:

- “Shall” or “required”: Indicates what is required for a GHG inventory to be in conformance with this Standard.
- “Should”: Indicates a recommendation, but not a requirement.
- “May”: Indicates an option that is allowed.
- “Needs,” “can,” and “cannot”: May be used to provide guidance on implementing a requirement or to indicate when an action is or is not possible.

The structure of this Standard and steps for disclosing financed emissions are found in Figure 1-3.

**Figure 1-3 Overview of Standard and steps for disclosing financed emissions**



# 2. The importance of carbon accounting

Introduction

CHAPTER 1

Understand what carbon accounting is

CHAPTER 2

Identify business goals

CHAPTER 3

Review accounting and reporting principles and rules

CHAPTER 4

Review and apply accounting methodologies for each asset class

CHAPTER 5

Report emissions

CHAPTER 6

## What is carbon accounting?

GHG emissions accounting refers to the processes required to consistently measure the amount of GHGs emitted, avoided, or removed by an entity, allowing it to track and report these emissions over time. The emissions measured are the seven gases mandated under the Kyoto Protocol and to be included in national inventories under the United Nations Framework Convention on Climate Change (UNFCCC)—carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF<sub>6</sub>) and nitrogen trifluoride (NF<sub>3</sub>). For ease of accounting, these gases are usually converted to and expressed as carbon dioxide equivalents (CO<sub>2</sub>e), and GHG emissions accounting is commonly referred to as carbon accounting.

Carbon accounting is most commonly used by governments, corporations, and other entities to measure the direct and indirect emissions that occur throughout their value chains as a result of organizational and business activities. According to the *GHG Protocol Corporate Accounting and Reporting Standard*<sup>7</sup>, direct emissions are emissions from sources that are owned or controlled by the reporting company. Indirect emissions are emissions that are a consequence of the operations of the reporting company, but occur at sources owned or controlled by another company.

Direct and indirect emissions are further categorized by scope and distinguished according to the source of the emissions and where in an organization's value chain the emissions occur.

The three scopes defined by the GHG Protocol—scope 1, scope 2 and scope 3—are briefly described below and illustrated in Figure 2-1.

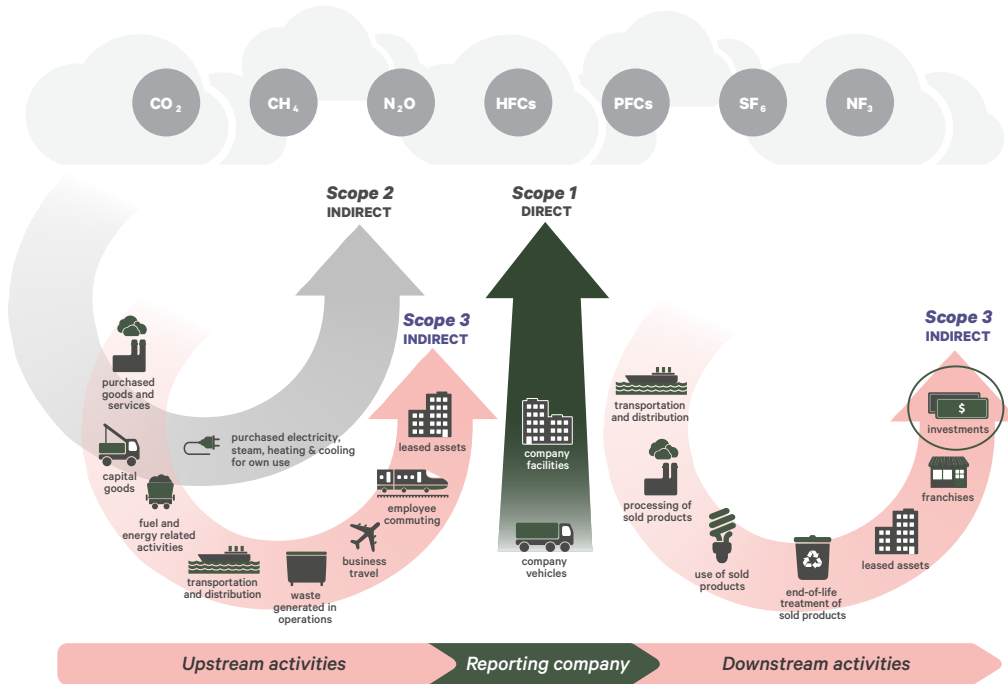
- Scope 1: Direct GHG emissions that occur from sources that are owned or controlled by the reporting company, i.e., emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.
- Scope 2: Indirect GHG emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting company. Scope 2 emissions physically occur at the facility where the electricity, steam, heating, or cooling is generated.
- Scope 3: All other indirect GHG emissions (not included in scope 2) that occur in the value chain of the reporting company. Scope 3 can be broken down into upstream emissions that occur in the supply chain (for example, from production or extraction of purchased materials) and into downstream emissions that occur as a consequence of the use of the organization's products or services.

The GHG Scope 3 Protocol categorizes scope 3 emissions into 15 categories, which are also listed in Figure 2-1. As the figure shows, the emissions resulting from a reporting company's loans and investments fall under scope 3 downstream emissions, and more precisely under scope 3 category 15: investments.

Carbon accounting of financial portfolios is the annual accounting and disclosure of scope 3 category 15 emissions at a fixed point in time in line with financial accounting periods.

7 (WRI and WBCSD, 2004)

Figure 2-1. Overview of GHG Protocol scopes and emissions across the value chain



Source: WRI and WBCSD (2011). Corporate Value Chain (Scope 3) Accounting and Reporting Standard

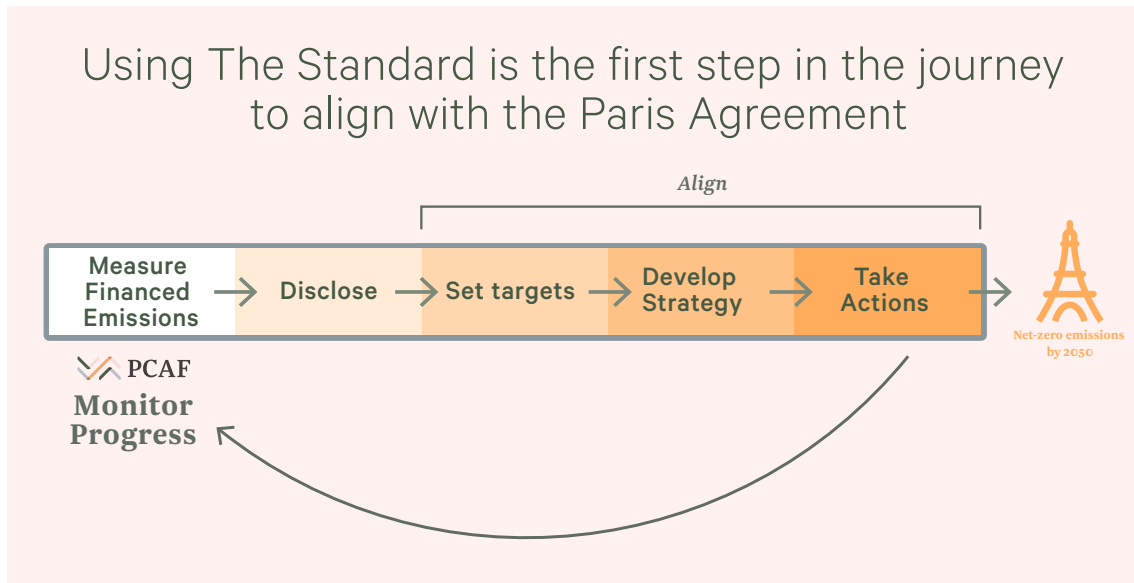
## The importance of carbon accounting of loans and investments

To limit dangerous global warming and achieve the goals of the Paris Agreement, global GHG emissions must be cut drastically. Carbon accounting is a necessary step for organizations to better manage their emissions and align with the Paris Agreement. For a financial institution, emissions from loans and investments are often the most significant part of its GHG emissions inventory and special consideration must be made regarding how these financed emissions are measured. The Global Carbon Accounting Standard aims to provide a standardized approach to account for financed emissions, ensuring that the approach used by financial institutions is robust, transparent, and comparable. This is crucial because measuring financed emissions is the first step financial institutions take when they decide to align their loans and investments with those required to decarbonize the global economy and achieve the goals of the Paris Agreement.

Figure 2-2 illustrates the three-step sequence financial institutions should follow to align with the Paris Agreement. Measuring financed emissions allows financial institutions to identify the emissions baseline for scenario analysis and target setting. Without measuring a clear baseline, financial institutions are left blind when assessing scenarios and defining their climate targets, let alone gauging their progress in aligning with the Paris Agreement. A robust, transparent, and harmonized approach to measuring financed emissions helps financial institutions make informed decisions on target setting, strategy, and actions required to decarbonize the economy.



Figure 2-2. The Paris alignment value chain for financial institutions



As described in chapter 1, there are multiple climate initiatives supporting the financial sector in decarbonizing their portfolios. Each initiative plays a key role in each step of the Paris Alignment value chain. PCAF focuses on standardizing the measurement and reporting of financed emissions, TCFD and CDP provide a framework for disclosure, and the SBTi-FIs provides guidance on science-based target setting. Other initiatives, such as Climate Action 100+ and Climate Safe Lending Network, support financial institutions on defining concrete climate strategies and actions.

### Carbon accounting helps measure three types of climate impact: generated emissions, avoided emissions, and emission removals

Carbon accounting is used to measure amounts of GHGs generated, avoided, or removed by an organization. The volume of GHGs emitted by an organization is commonly referred to as its **generated emissions**. To limit climate change and meet the goals of the Paris Agreement, organizations and their financiers must actively seek out actions that reduce generated emissions in absolute terms (i.e., absolute emissions<sup>8</sup>).

However, not all loans and investments result in GHG emissions. Loans and investments in renewable energy or energy efficiency projects, for example, can result in emissions being avoided as they displace the emissions that normally would have occurred without the project's implementation.<sup>9</sup> These emissions are referred to as **avoided emissions** and reporting them is a way to demonstrate a quantifiable positive contribution to decarbonization. For the financial sector, which provides finance for projects and products that lead to avoided emissions, quantifying this effect is relevant.

<sup>8</sup> The GHG Protocol often refers to generated emissions as absolute emissions. In this standard, where the term "absolute emissions" is used, it is referring to generated emissions and not values relating to avoided emissions or emission removals.

<sup>9</sup> Note that avoided emissions from renewable and energy efficiency projects account for operational emissions only and not lifecycle emissions, i.e. emissions generated from the manufacture and distribution of project components are not included in the total calculation for avoided emissions.

Similarly, loans and investments in the forestry and land-use sector or carbon capture and storage can result in CO<sub>2</sub> being sequestered or removed from the atmosphere and stored in solid or liquid form, removing its harmful global warming effect. For example, investments in afforestation projects can directly result in newly planted trees absorbing CO<sub>2</sub> from the air. The volume of CO<sub>2</sub> absorbed is considered an **emission removal** and can also be quantified and reported, demonstrating another type of positive contribution toward decarbonization. However, measuring emission removals is complex, especially where issues of permanence and land-use change come into play. While PCAF acknowledges that emission removals are integral in combatting climate change, due to the complexity of the calculations and the data requirements, this version of the Standard does not provide guidance for financial institutions on how to measure these emissions. The GHG Protocol is developing additional accounting guidance on carbon removals and emissions from land use. For more information on the reporting of carbon removals we refer to the (upcoming) guidance from the GHG Protocol.

## Carbon accounting enables benchmarking

Measuring financed emissions in absolute terms (i.e., absolute emissions) provides financial institutions with the necessary baseline for climate action in alignment with the Paris Agreement. When banks and investors aim to benchmark or compare companies, sectors, or portfolios to each other, normalization is required. This means translating the absolute financed emissions to an emission intensity metric (emissions per a specific unit).

A wide array of intensity metrics are applied in the market and each has its own merits. Table 2-1 includes a list of the most common metrics.

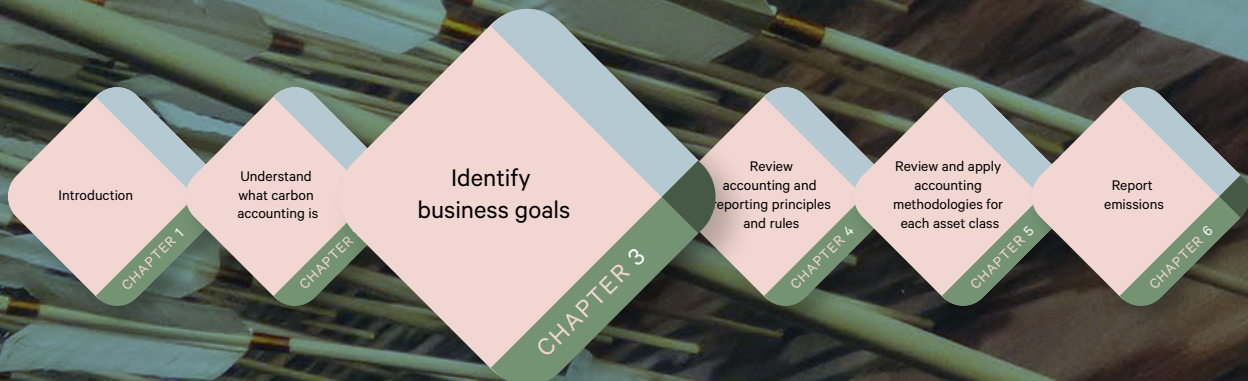
**Table 2-1. Financed emissions metrics<sup>10</sup>**

Metric	Purpose	Description
<b>Absolute emissions</b>	To understand the climate impact of loans and investments, and set a baseline for climate action	The total GHG emissions of an asset class or portfolio
<b>Emissions intensity</b>	To compare how different portfolios (or parts of portfolios) stack up against each other	Absolute emissions divided by the loan and investment volume, expressed as tCO <sub>2</sub> e/\$M invested
<b>Sector-specific emissions intensity</b>	To understand the efficiency of a portfolio (or parts of a portfolio) in terms of total carbon emissions per unit of output	Absolute emissions divided by an output value, expressed as tCO <sub>2</sub> e/MWh, tCO <sub>2</sub> e/ton product produced
<b>Weighted Average Carbon Intensity (WACI)</b>	To understand exposure to carbon-intensive companies	Portfolio's exposure to carbon-intensive companies, expressed as tCO <sub>2</sub> e/\$M company <sup>11</sup> revenue

<sup>10</sup> Adapted from (CRO Forum, 2020)

<sup>11</sup> The word company refers to the financial institution's borrower or investee.

# 3. Using carbon accounting to set and achieve business goals



Understanding the climate impact of financial portfolios makes good business sense for financial institutions. Carbon accounting is a tool that can help an organization achieve multiple objectives, such as aligning financial flows with the goals of the Paris Agreement, creating transparency for stakeholders, and managing climate-related transition risks (Figure 3-1.). Financial institutions cite these goals (which this chapter describes in greater detail) as the key reasons for undertaking an assessment of financed emissions but this list is by no means exhaustive.

**Figure 3-1. Carbon accounting can help financial institutions meet multiple business goals**



The level of detail captured in the financed emissions assessment could dictate how well the inventory can meet the organization's business goals. For example, if a financial institution wishes to use the inventory to manage risk, it may consider measuring and recording sector-level emissions from its borrower or investees to identify carbon-intensive industry investments in its portfolios. Other financial institutions that do not share this business goal may not wish to structure their inventories in this way. In the end, what is captured in the inventory should serve the goals of the organization.

### **Business goal 1: align financial flows with Paris Agreement**

Financial institutions' commitments to set science-based targets<sup>12</sup>, transition their investment portfolios to net-zero GHG emissions by 2050 (e.g., Net Zero Asset Owner Alliance<sup>13</sup>), and align their lending with the objectives of the Paris Agreement (e.g., Banks Collective Commitment to Climate Action<sup>14</sup>), are examples of this business goal.

Financial institutions that want to align their financial flows with the goals of the Paris Agreement implement portfolio carbon accounting to understand the absolute emissions they finance in the real economy. They use this information as the basis for analyzing decarbonization scenarios and setting emission-based targets. While there are other climate initiatives that focus on scenario analysis and target setting (see chapter 1), PCAF has been established to solely focus on carbon accounting of financial portfolios as a means to facilitate and feed into the process of aligning with the Paris Agreement.

Box 1 shows how the PCAF carbon accounting methods offered in this Standard align with SBTi's framework for setting science-based emission reduction targets. SBTi will publish target-setting

<sup>12</sup> Information about the science-based targets for financial institutions can be found at: <https://sciencebasedtargets.org/financial-institutions>

<sup>13</sup> Information about the Net Zero Asset Owner Alliance can be found at: <https://www.unepfi.org/net-zero-alliance>

<sup>14</sup> Information about the Collective Commitment to Climate Action by signatories of the Principles of Responsible Banking can be found at <https://www.unepfi.org/banking/bankingprinciples/collective-commitment>

guidance for financial institutions in September 2020, which will include case studies of banks and investors using PCAF carbon accounting methods as a precursor to setting science-based targets<sup>15</sup>.

Next to setting targets, aligning financial flows with the Paris Agreement means that financial institutions would take concrete actions to transition their portfolio to net-zero financed emissions by 2050. In this process, banks and investors could identify opportunities to develop new products that help borrowers and investees reduce their own emissions.

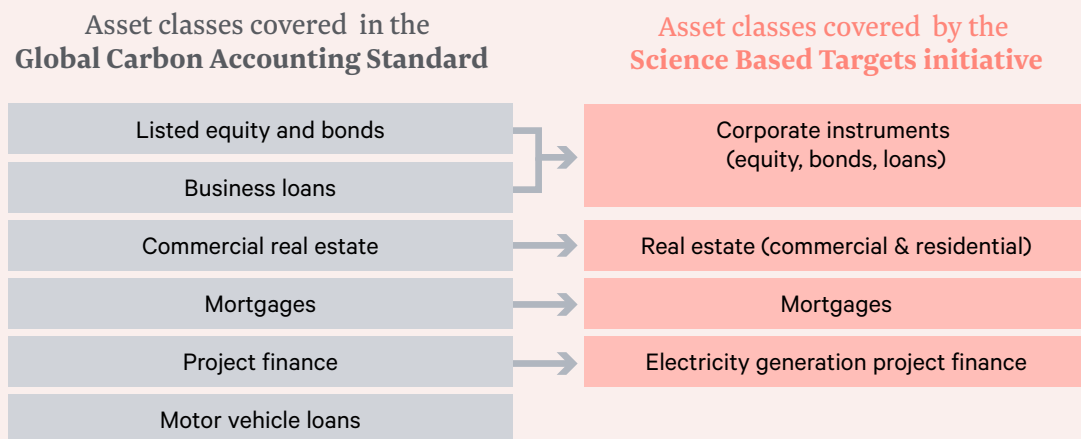
**Box 1. Steering decarbonization: from carbon accounting to setting science-based targets**

Financial institutions that decide to set science-based targets need to measure their financed emissions to identify the baseline from which targets would be established and to measure progress against the targets.

SBTi framework for the financial sector enables financial institutions to align lending and investment portfolios with the Paris Agreement’s goals. Financial institutions that set science-based targets (SBTs) and work toward attaining those targets act on their responsibility to finance the net-zero emission transition, as preserved in the Paris Agreement.

The Sectoral Decarbonization Approach (SDA) is an SBT method that involves setting emissions-based targets, in which carbon accounting is a fundamental step of the process. The asset classes covered in the Global Carbon Accounting Standard match all four asset classes included in the SBT framework.

**Figure 3-2. Asset classes covered by PCAF and SBTi**

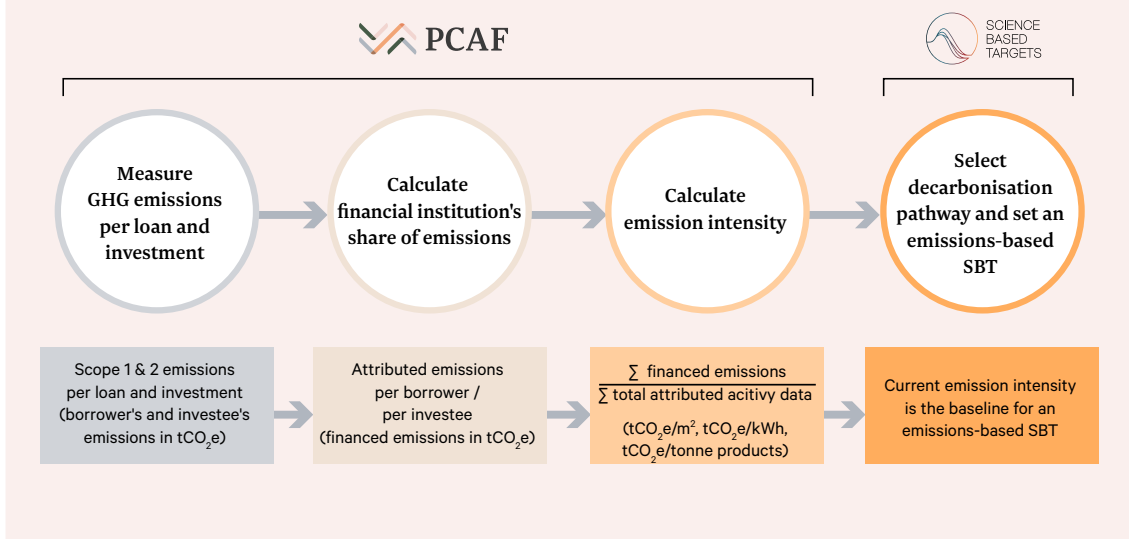


15 More information about the SBTi for financial institutions can be found at: <https://sciencebasedtargets.org/financial-institutions/>

Financial institutions may use carbon accounting to screen and prioritize the parts of the portfolio that would be the focus for target setting (i.e., asset classes and sectors). Next to this, financial institutions measure financed emissions to determine the emission baselines from which emission-based SBTs are set. For tracking progress against the target, financial institutions also need to measure and disclose their financed emissions annually.

Determining sector-specific emissions intensity at asset class/sector level is the starting point to apply the SDA for target setting. Sector-specific emissions intensity refers to financed emissions per unit of activity data (e.g., kgCO<sub>2</sub>e/m<sup>2</sup>, kgCO<sub>2</sub>e/kWh, kgCO<sub>2</sub>e/ton cement). Three steps are taken to derive emission intensities as illustrated in the following figure:

Figure 3-3. From carbon accounting to setting SBTs



## Business goal 2: create transparency for stakeholders

Financial institutions motivated to be more transparent about their climate impact can use carbon accounting to measure the emissions associated with their loans and investments. Since the economic crisis of 2007-2009, a wide range of stakeholders have demanded more transparency around how their money is invested. In response to demand and the consensus that climate change poses a considerable threat to the global economy, the Financial Stability Board (FSB) launched the industry-led Task Force on Climate-related Financial Disclosures (TCFD). The remit of the TCFD was to develop recommendations for “consistent, comparable, reliable, clear and efficient climate-related disclosures by companies.”<sup>16</sup>

The TCFD framework has grown since the recommendations were launched in 2017 to be the global standard on how companies should disclose their climate-related risks and opportunities. At the time of publication of this Standard, TCFD-recommended disclosures are voluntary. However, with strong backing from the central banks, the Supervisors Network for Greening the

<sup>16</sup> More information about FSB can be found at: <https://www.fsb.org/work-of-the-fsb/policy-development/additional-policy-areas/climate-related-financial-disclosures>

Financial System (NGFS), and the industry itself, it is likely that companies will be faced with new regulatory requirements in this arena.

For financial institutions, a key facet of TCFD disclosure relates to their lending and investment activities. This facet is recognized by CDP, which—in aligning with the TCFD framework—adapted its 2020 climate questionnaire for the financial sector to include a section on the reporting of scope 3, category 15 (investment) emissions. The first step of this disclosure is measurement. Information on how the PCAF methodologies support CDP in creating transparent reporting can be found in Box 2.

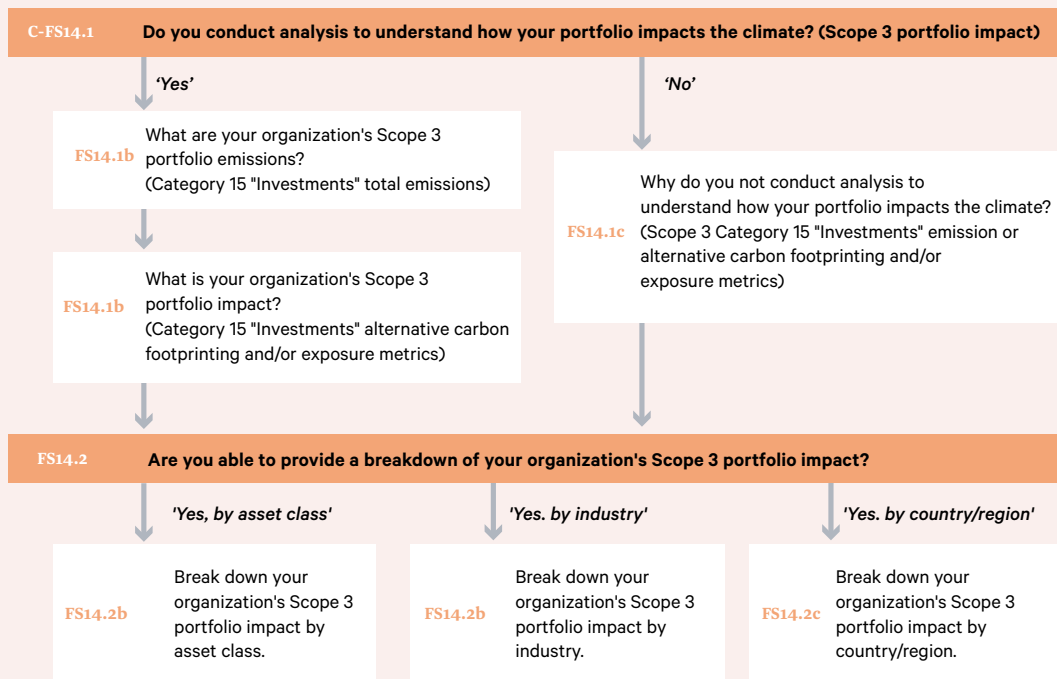
Creating transparency for internal stakeholders can also be a business goal for financial institutions. Carrying out an assessment of financed emissions allows a financial institution's board members and senior management to get a better picture of their organization's impact on the climate and how to steer activities toward the Paris Agreement goals. By measuring and disclosing financed emissions, and thereby creating opportunities for climate discourse, financial institutions can gain internal alignment on their role in the transition to a net-zero economy, as well as the financial sector's responsibility as a whole in this transition.

**Box 2. PCAF supports CDP in creating transparency for stakeholders**

Since its inception in 2000, CDP has evolved to become the globally accepted disclosure system for investors, companies, cities, states, and regions to report and manage their environmental impacts. In response to the TCFD’s recommendations highlighting the importance of indirect financing impacts (alongside the disclosed operational impacts), CDP adapted its 2020 Climate Change questionnaire for the financial services sector to include questions about financed emissions. In its revised questionnaire (shown below), CDP asks financial institutions to disclose their scope 3, category 15 (investments) emissions, along with the breakdown of these emissions by asset class, sector, and geography. The Global Carbon Accounting Standard directly supports financial institutions in answering these questions by providing asset class-specific methodologies and guidance for calculating financed emissions that allow for disclosures on these levels. In its questionnaire, CDP names PCAF as a key framework that can be used for measuring and reporting.

PCAF and CDP collaborate closely to provide transparent disclosures for stakeholders to better understand financial institutions’ portfolio alignment to global climate goals and their exposure to carbon-intensive industries.

**Figure 3-4. Extract from the CDP Climate Change 2020 Questionnaire**



Source: (CDP, 2020)



### Business goal 3: manage climate-related transition risks

Financial institutions are increasingly inclined to understand the exposure of their portfolios to risks posed by climate-related policies and regulations. Carbon accounting helps these institutions screen and identify areas of their lending and investment activities that fall under carbon-intensive assets. Such lending and investment activities could suffer setbacks by the insertion of carbon prices and anti-fossil fuel policies and regulations.

Understanding the exposure to risk is at the heart of TCFD. TCFD's guidance for the financial sector notes that financial institutions that provide loans to or invest in companies with direct exposure to climate-related risks (e.g., fossil fuel producers, intensive fossil fuel-based utilities, property developers and owners, or agricultural and food companies) may accumulate climate-related risks through their credit and equity holdings<sup>17</sup>.

Applying the carbon accounting methods in this Standard, financial institutions can identify areas of significant exposure to carbon-intensive assets and use this information as the basis to assess climate risk scenarios. Box 3 describes how the Standard aligns with and provides added value to the TCFD framework.

#### **Box 3. PCAF supports the TCFD framework in identifying and managing climate risk**

One of the goals of the TCFD framework is to measure and disclose the risks posed to organizations by climate-related policies and regulations that are implemented to further the transition to a net-zero economy. PCAF directly supports this objective by providing methodologies to measure financed emissions and provide financial institutions with a total value for the absolute emissions associated with their loan and investment portfolios. As a result of emissions assessments, financial institutions can identify carbon-intensive hotspots that could be subject to higher transition risk.

The quantification of financed emissions, the expected trajectory of these emissions, and the ability of asset holders and lenders to reduce emissions over time, are important metrics in estimating the impact of transition risks and opportunities and the positioning of the overall portfolio in respect to the transition to a net-zero economy.



17 (TCFD, 2017)

# 4. Principles and rules of carbon accounting for financials

Introduction

CHAPTER 1

Understand what carbon accounting is

CHAPTER 2

Identify business goals

CHAPTER 3

Review accounting and reporting principles and rules

CHAPTER 4

Review and apply accounting methodologies for each asset class

CHAPTER 5

Report emissions

CHAPTER 6

PCAF harnessed existing carbon accounting principles (as set out by the GHG Protocol) to create this Standard<sup>18</sup>. To translate these principles to relevant and tangible actions for financial institutions, PCAF developed a set of five overarching rules to guide accounting and reporting.

## 4.1 Carbon accounting rules derived from the GHG Protocol's principles

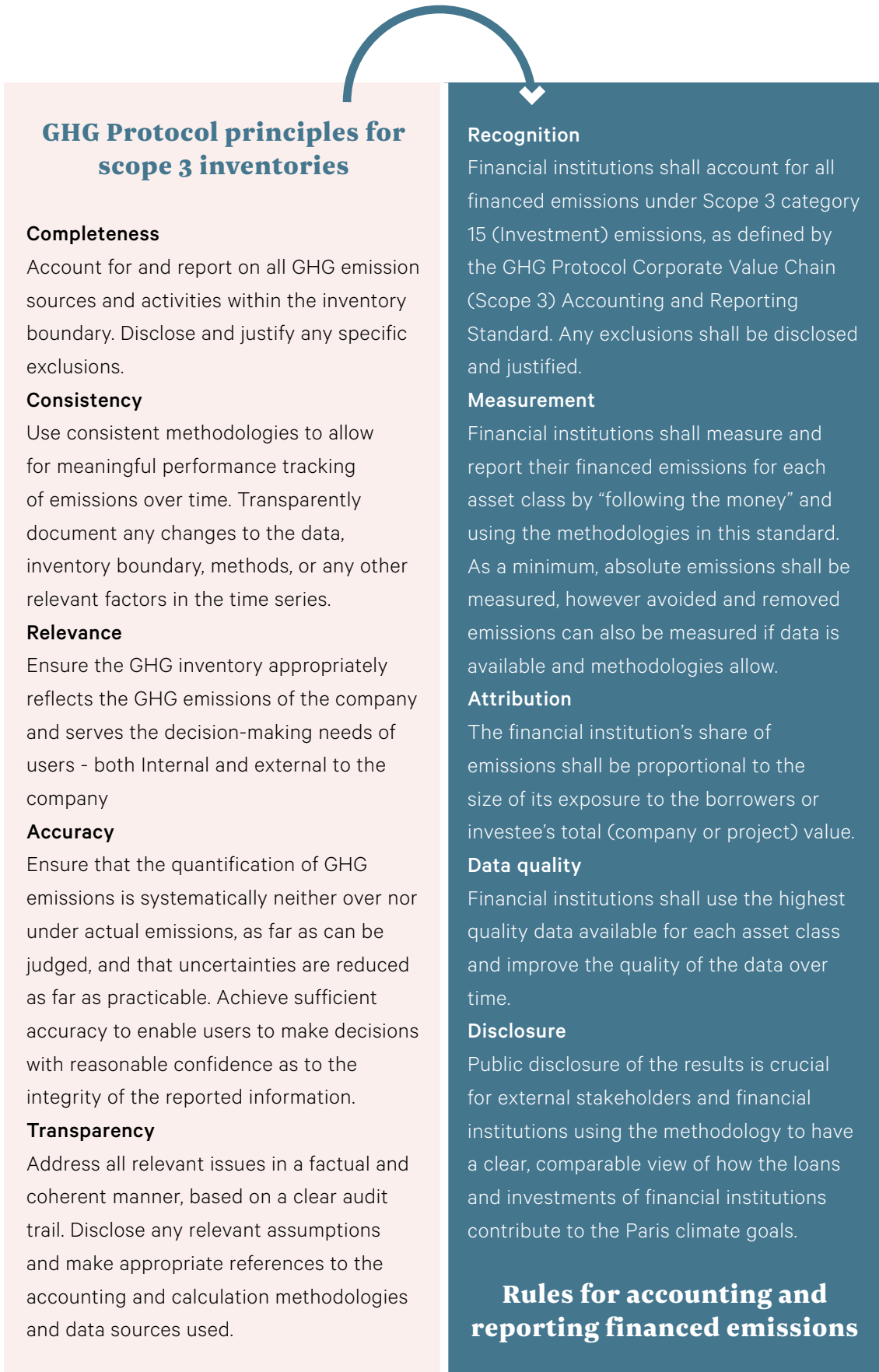
Like financial accounting and reporting, carbon accounting and reporting follows generally accepted principles to ensure that an organization's disclosure represents an accurate, veritable, and fair account of its GHG emissions. The core principles of carbon accounting are set out in the *GHG Protocol Corporate Accounting and Reporting Standard*<sup>19</sup>. The GHG Protocol's five core principles are completeness, consistency, relevance, accuracy, and transparency. The Global Carbon Accounting Standard for financial institutions upholds and builds upon these principles and also provides additional rules that are directly relevant for financial institutions wishing to assess their financed emissions (Figure 4-1).

---

18 (WRI and WBCSD, 2004)

19 (WRI and WBCSD, 2004)

**Figure 4-1. The PCAF rules of carbon accounting and reporting are derived from the GHG Protocol's five principles**



## 4.2 Overarching rules for accounting and reporting financed emissions

This section describes the overarching rules of carbon accounting for financials and how these rules provide guidance on accounting for and reporting financed emissions, regardless of the loan and investment type. Chapter 6 includes additional details on reporting.

### Recognition

According to the GHG Protocol Corporate Accounting and Reporting Standard, organizations can choose from three approaches when defining their organizational boundaries and consolidating the GHG emissions measured and reported in their inventories: the equity approach, the financial control approach, and the operational control approach. The selection of one of these approaches affects which activities in the company's value chain are categorized as direct emissions (i.e., scope 1 emissions) and indirect emissions (i.e., scope 2 and scope 3 emissions)<sup>20</sup>.

For consistency in reporting across organizations and reporting periods, this Standard requires financial institutions to measure and report their GHG emissions using the operational control approach. As explained in Box 4, this means that emissions from financial institutions' loans and investments in all asset classes would always sit in their downstream scope 3 accounts—specifically, what the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard defines as scope 3, category 15 (investments). This requirement eliminates inconsistencies in accounting that could arise from using the other consolidation approaches. As a result, the Standard provides a harmonized approach that can be used by financial institutions wishing to account for and disclose their scope 3, category 15 (investments) emissions—otherwise known as their financed emissions—and these are the sole focus of this Standard.

Box 4 details consolidation approaches as applied to the financial sector.

20 (WRI and WBCSD, 2004)

**Box 4. Why the Global Carbon Accounting Standard requires financial institutions to measure and report financed emissions using the operational control approach**

The GHG Protocol presents three consolidation approaches when preparing GHG emission inventories—the equity approach, the financial control approach, and the operational control approach.

Under the equity approach, an organization accounts for GHG emissions from operations according to its equity share—or ownership—in the operation. Alternatively, an organization can report using the control approach, whereby the company reports 100% of the GHG emissions over which it has control and does not account for GHG emissions from operations where it owns an interest but does not have control. A control approach can be sub-classified as either financial control or operational control, and companies using the control approach must pick between these two options for reporting. Using the financial control approach, the organization must report GHG emissions for all activities in the company where it can directly influence financial and operational policies and has the potential to benefit economically from the company's activities. Using the operational control approach, an organization accounts for 100% of emissions from operations over which it—or one of its subsidiaries—has control and the authority to introduce and implement operational policies.

The consolidation approach used by a financial institution could have a significant impact on how it accounts for its financed emissions. If choosing the equity approach or financial control approach, for example, some financed emissions from equity investments could fall into its own scope 1 accounts, while financed emissions from other asset classes could fall into its downstream scope 3 accounts. Further, a financial institution's equity share or financial interest could change over time, leading to inconsistencies in how the financed emissions are accounted for over varying timeframes. These inconsistencies would make it difficult to track targets and understand if changes in total scope 1 and downstream scope 3 emissions were real, or rather a by-product of accounting. For example, if a financial institution's financial interest decreased to below the scope 1 reporting threshold (as formally defined by the reporting entity), the emissions from this company would move from its scope 1 to scope 3 inventory, decreasing its total scope 1 emissions and increasing its scope 3 emissions. With financial interests in companies changing all the time, the ability of a financial institution to fully understand the emissions associated with its investments would dissipate.

For these reasons, the Standard requires that financial institutions use the operational control approach.

## Measurement

“Follow the money” is a key tenet for carbon accounting of financial assets, meaning that the money should be followed as far as possible to understand and account for the climate impact in the real economy (i.e., emissions caused by the financial institution’s loans and investments).

Financial institutions should measure and report their financed emissions for each asset class, using the methodologies set out in this Standard and covering the seven GHGs required under the Kyoto Protocol. As a minimum, absolute GHG emissions of loans and investments (scope 3, category 15) in the reporting year shall be measured where data is available. In addition, avoided emissions and emission removals may be separately measured and reported when relevant to the loans and investments if data is available and methodologies allow.

Financial institutions shall choose a fixed point in time to measure and report annual financed emissions, such as the last day of its fiscal year (e.g., June 30 or December 31). The carbon accounting period shall align with the financial accounting period. Given that financial portfolios are dynamic and can change frequently throughout the reporting year, financial institutions can correct with a flow variable. For example, if an asset manager owns 100% of company A during the entire year but sells all the shares on December 30, the calculation on December 31 would not show the shares of company A anymore. Thus, the exposure the investor had to company A during the year is not expressed accurately in the carbon accounting assessment. In this case the flow variable is the proportion of days the investors held company A in its book during the year i.e., 364/365. Financial institutions that use the flow variable, should factor it into the attributed emissions.

## Attribution

According to the GHG Protocol, GHG emissions from loans and investments should be allocated to the reporting financial institutions based on the proportional share of lending or investment in the borrower or investee. Attribution is based on annual emissions of lending and investment and, as a result, GHG emissions are reported on an annual basis.

Double counting—which occurs when GHG emissions are counted more than once in the financed emissions calculation of one or more institutions—should be avoided as much possible. Double counting occurs between the different scopes of emissions from loans and investments when a financial institution invests in stakeholders that are in the same value chain<sup>21</sup>. This form of double counting cannot be avoided, but can be made more transparent by separately reporting the scope 1, 2, and 3 emissions of loans and investments (see requirements on this in Chapter 6).

<sup>21</sup> The scope 1 emissions of one company can be the upstream scope 2 or 3 emissions of its customer. For example, Scope 1 emissions from a utility providing energy to a company would end up in the scope 2 inventory of that company. If both companies are receiving funding from the same financial institution these emissions would be double counted within its inventory.

Apart from this, double counting can take place at five levels:

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

PCAF recognizes that double counting of GHG emissions cannot be avoided completely; however, it should be minimized. Double counting between co-financing institutions and between transactions within the same asset class of a financial institution are avoided by using the appropriate attribution rules consistently.

PCAF defines attribution rules for each method described in this Standard. By using the correct attribution method, double counting of emissions between institutions can be minimized.

Additional asset class-specific information on attribution can be found in Chapter 5.

### **Data quality**

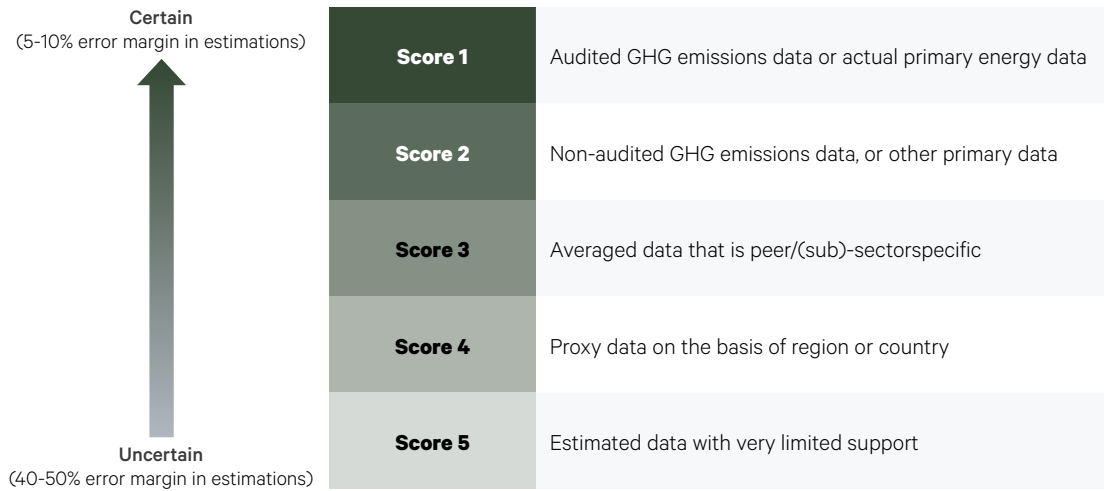
Financial institutions shall ensure their carbon accounting appropriately reflects the GHG emissions of their loans and investments and serves the decision-making needs of internal and external users. To safeguard these outcomes, they should use the highest quality data available for each asset class for calculations and, where relevant, improve the quality of the data over time. PCAF recognizes that high quality data can be difficult to come by when calculating financed emissions, particularly for certain asset classes. However, data limitations should not deter financial institutions from taking the first steps toward preparing their inventories, as even estimated or proxy data can help them identify carbon-intensive hotspots in their portfolios, which can inform their climate strategies. Where data quality was found to be low quality, financial institutions can design approaches to improving it over time.

For measuring financed emissions in each asset class, various data inputs are needed to calculate the financial institution's attribution share and the borrower's or investee's total emissions. The data needed to calculate attribution share typically can come from the financial institution itself and its borrower/investee. However, the data required to calculate the borrower's or investee's emissions might not be readily available and must be sought out by the reporting entity. The quality of this data can vary depending on assumptions relating to its assuredness, specificity, and other variables.

It is often the case that high quality data is not available to the financial institution for all asset classes. In these instances, the institution should use the best available data in accordance with the data hierarchy shown in Figure 4-2. Data quality score cards, specific to each asset class, are presented in chapter 5.



**Figure 4-2. General data quality score card**



PCAF recognizes that there is often a lag between financial reporting and required data, such as emission factors becoming available. In these instances, financial institutions should use the most recent data available even if they are representative of different years. For example, it would be expected and appropriate that a financial institution reporting in 2020 for its 2019 financial year would use 2019 financial data alongside 2018 (or other most recent) emission factors.

Data quality is specific to each asset class. More information on issues related to data quality and how to employ the hierarchy for each asset class can be found in Chapter 5.

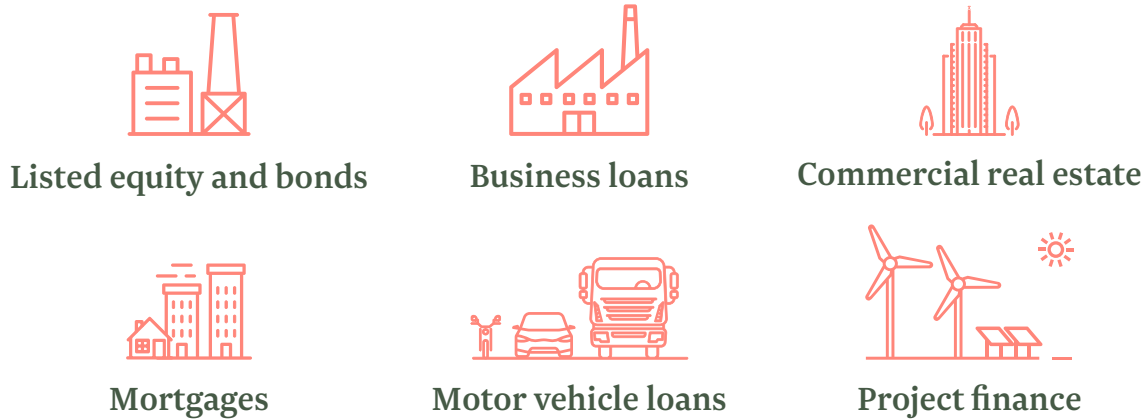
## Disclosure

The public disclosure of absolute financed emissions is crucial for external stakeholders and financial institutions using the methodology to have a comparable view of financial institutions' climate impact. To this end, financial institutions shall disclose absolute emissions. To support their disclosures, financial institutions shall follow the requirements and guidelines listed in Chapter 6 on how to report information relating to methodology, calculations, timeframes, and data quality (as scored using the hierarchies provided in Chapter 5). Disclosures should meet the needs of the reporting institution's business goals.

# 5. Methodology to measure financed emissions



This chapter describes the methods to calculate financed emissions for six asset classes.



Each asset class has its own section covering methodological guidance on the following elements:<sup>22</sup>

- Asset class definition
- Emission scopes covered
- Attribution of emissions
- Calculation approach
- Data required
- Other considerations
- Limitations of the method

Guidance for calculating absolute emissions is covered in each asset class section. Guidance for calculating avoided emissions is provided in the project finance section only. Methods for calculating emission removals, including sequestered emissions, were not drafted for this version of the Standard<sup>23</sup>.

### How to choose the right asset class method?

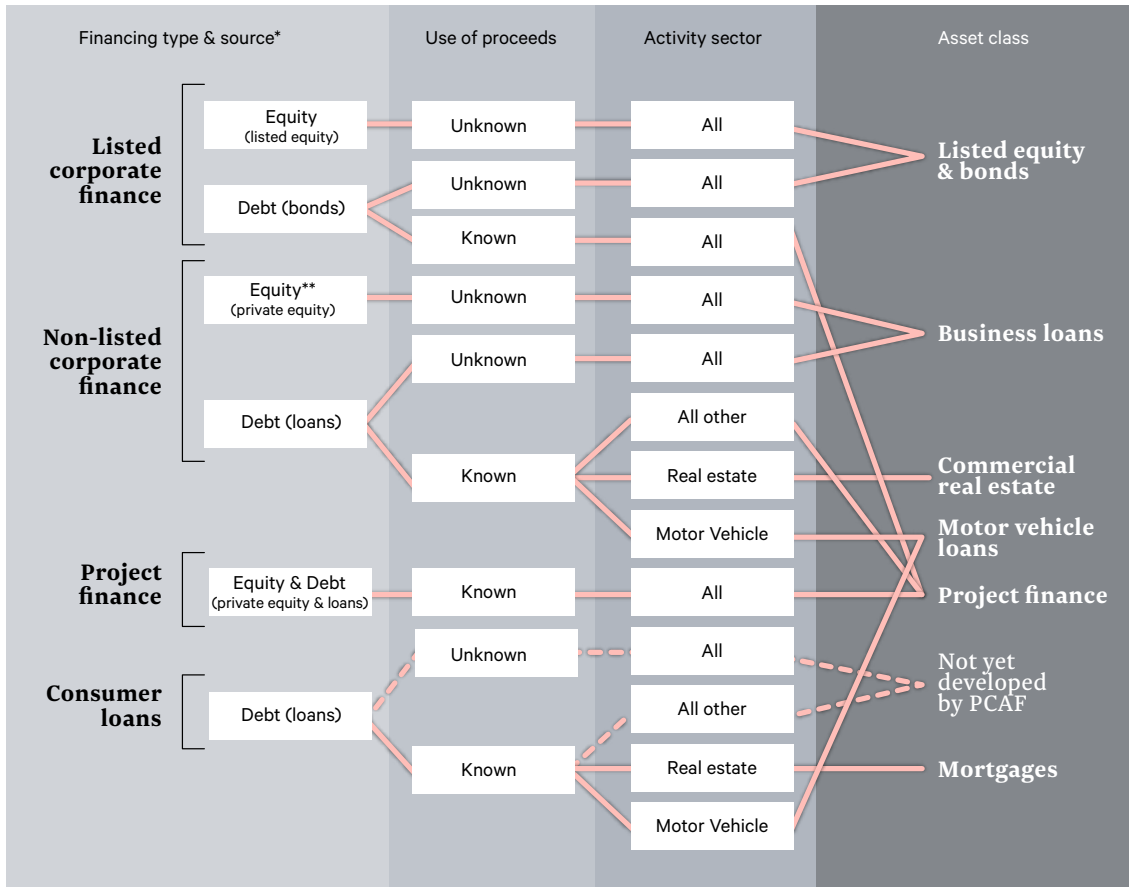
How financed emissions are measured may vary by the type of financing provided to the borrower and investee and by what is known about the flow of the money. Financial institutions should use Figure 5-1 and the guidance that follows to select the appropriate asset class method.

Figure 5-1 is intended to help financial institutions select the appropriate asset class method for measuring financed emissions. The flowchart should be read from left to right, with each column representing a choice to be made by the financial institution before ultimately determining the appropriate asset class method.

<sup>22</sup> These are the minimum elements in each asset class section. Some sections include more information, where relevant and specific to the asset class.

<sup>23</sup> Definitions of absolute emissions, avoided emissions and emission removals can be found in chapter 2 and in the glossary.

**Figure 5-1. Guidance for choosing an approach to calculate financed emissions**



\* Guidance and methods for public lending and indirect lending have not been developed as part of this standard. More information relating to public lending can be found in PCAF The Netherlands, report 2019.

\*\* Guidance for private equity has not been developed as part of this standard. However, financial institutions can apply the methods described in the business loans section to this asset class.

Beginning with the far-left side of the figure, financial institutions should select the type and source of financing provided, followed by whether the financing is equity or debt<sup>24</sup>.

The choices are:

- **Listed corporate finance:** Finance provided to companies that is traded on a market, such as listed equity and corporate bonds.
- **Non-listed corporate finance:** Finance provided to companies that is not traded on a market, such as business loans or commercial real estate.
- **Project finance:** The financing of projects—such as industrial, infrastructure, and agricultural projects—relying primarily on the project’s cash flow for repayment.
- **Consumer loans:** Financing centered on individual and household consumers. It includes mortgages and motor vehicle loans, as well as personal loans extended to people who use the funds for individual or family purposes.

<sup>24</sup> Equity is defined as ownership in the company or project. Debt is defined as a financing instrument that requires repayment by the borrower.

As described in Chapter 4, “follow the money” is a key tenet for GHG accounting of financial assets. The money should be followed as far as possible to understand and account for the climate impact of lending and investments. The next columns in Figure 5-1 relate to how much is known about how the borrower or investee used the money provided and the sector in which the financing was used. For the column labeled “Use of proceeds” the financial institution should select “Known” or “Unknown” depending on whether information is held on how the borrower or investee used the money provided. If the flow of money is “Unknown,” the tile option in the next column, “Activity sector,” will default to “All.” However, if the flow of money is “Known,” the financial institution will be required to also select the sector in which the loan or investment was made.

Financial products (for consumers or companies) can be used to finance different products and activities in various sectors. The specific methodology for calculating financed emissions in these sectors can differ, as described in the methods for commercial real estate, mortgages, and motor vehicle loans. Financed emissions in other sectors are currently treated the same. This may evolve over time if financial institutions solicit PCAF to develop additional accounting rules and guidance for other sectors (e.g., financial products for shipping or aviation).

By following the guidance thus far, financial institutions should now know the appropriate asset class methods to use.

Table 5-1 provides descriptions of the asset classes along with the location in the document where specific guidance can be found.

**Table 5-1. List of asset classes**

Asset class	Description	Further guidance
<b>Listed equity and bonds</b>	This asset class includes all corporate bonds without known use of proceeds (otherwise covered under project finance) and all listed equity on the balance sheet or actively managed by the financial institution.	Section 5.1
<b>Business loans (and private equity*)</b>	The business loans asset class includes any on-balance sheet loans and lines of credit with unknown use of proceeds to businesses, nonprofits, and any other structure of organization. Revolving credit facilities and overdraft facilities, as well as business loans secured by real estate (such as commercial real estate-secured lines of credit), are also included in the business loans asset class. (* Note that the business loans method can also be applied for private equity investments. For that reason, private equity is not covered as a separate asset class.)	Section 5.2
<b>Project finance</b>	On-balance sheet loan or equity with known use of proceeds that are designated for a defined, ringfenced activity or set of activities, such as the construction of a gas fired power plant, a wind or solar project, or energy efficiency projects.	Section 5.3
<b>Commercial real estate</b>	On-balance sheet loans for the purchase, refinance, construction, or rehabilitation of commercial real estate (CRE). This definition implies that the property is used for commercial purposes.	Section 5.4
<b>Mortgages</b>	On-balance sheet loans to purchase residential property, including multifamily properties with no limit on the number of units. This definition implies that the property is used for residential purposes.	Section 5.5
<b>Motor vehicle loans</b>	This asset class refers to on-balance sheet loans that are used to finance one or several motor vehicles. Financial institutions will finance different vehicle types and will also use different internal definitions and categories for the motor vehicle types being financed by their loans and investments.	Section 5.6

# 5.1 Listed equity and bonds



## Asset class definition

This asset class includes all corporate bonds without known use of proceeds (otherwise covered under project finance) and all listed equity<sup>25</sup> on the balance sheet or actively managed by the financial institution.

These include:

- All types of corporate bonds without known use of proceeds
- Common stock
- Preferred stock
- Treasury stock

For indirect investments (e.g., exchange traded funds or fund of funds) that incorporate listed equity and bonds, the methodological approach is the same, provided the information on the individual holdings is available.

Private equity with unknown use of proceeds shall use the business loans asset class approach, as the method for calculating financed emissions for private equity investments is similar to the method for business loans. Detailed guidance for private equity has not yet been developed as part of this draft of the Standard but may be developed in future versions.

## Emission scopes covered

Financial institutions shall report borrowers' and investees' absolute scope 1 and scope 2 emissions across all sectors at any time. Reporting borrowers' and investees' scope 3 emissions is required for lending to and making investments in companies, depending on the sector they are active in (i.e., where they earn revenues). PCAF provides a sector list detailing where scope 3 emissions of borrowers and investees are required to be reported. The sector list aligns with the phased-in approach for scope 3 emissions as defined by the Technical Expert Group on Sustainable Finance set-up by the European Commission (EU TEG), which was included in article 5 of the (draft) Supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards minimum standards for EU Climate Transition Benchmarks and EU Paris-aligned Benchmarks. Table 5-2 includes the sector list. In practice, this means that financial institutions shall start including scope 3 emissions for some sectors, adding more over time.

PCAF acknowledges that, to date, the comparability, coverage, transparency, and reliability of scope 3 data still vary greatly per sector and data source. However, by requiring scope 3 reporting for selected sectors, PCAF seeks to make scope 3 emission reporting more common by improving data availability and quality over time.

<sup>25</sup> Listed equity refers to equity that is traded on a stock exchange or another securities exchange



**Table 5-2. List of sectors with required scope 3 emissions inclusion as defined by the EU TEG**

Phase in period	NACE Level 2 (L2) Sectors considered
From 2020	At least energy (oil & gas), mining (i.e., NACE L2: 05-09, 19, 20)
From 2023	At least transportation, construction, buildings, materials, industrial activities (i.e. NACE L2: 10-18, 21-33, 41-43, 49-53, 81)
From 2025	Every sector

## Attribution

As a basic attribution principle, the financial institution accounts for a portion of the emissions of the financed company determined by the ratio between the institution's outstanding amount (numerator) and the value of the financed company (denominator). This ratio is called the attribution factor.

1. **Outstanding amount (numerator):** This is the actual outstanding amount in listed equity or bonds. Financial institutions should either use the calendar or financial year-end outstanding amount, provided the approach is communicated clearly and used consistently.
2. **Company value (denominator):** For listed companies, this is the Enterprise Value Including Cash (EVIC) of the respective company.

Enterprise value (EV) is commonly used as a measure of a company's total value, often used as a more comprehensive alternative to equity market capitalization.

PCAF chose to align the definition of EVIC with the definition provided by:

1. The Technical Expert Group on sustainable finance set-up by the European Commission (EU TEG) in its *Handbook of Climate Transition Benchmarks, Paris-Aligned Benchmark and Benchmarks' ESG Disclosure*<sup>26</sup>.
2. The (draft) *Supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards minimum standards for EU Climate Transition Benchmarks and EU Paris-aligned Benchmarks*, which has defined that EVIC should be used to determine the GHG intensities for the benchmarks.

In the EU TEG handbook, EVIC is defined as:

**The sum of the market capitalization of ordinary shares at fiscal year end, the market capitalization of preferred shares at fiscal year-end, and the book values of total debt and minorities' interests. No deductions of cash or cash equivalents are made to avoid the possibility of negative enterprise values.**

Another benefit of not deducting cash (beyond avoiding negative enterprise values) is that using EVIC ensures that exactly 100% of all investee's emissions will be attributed to the equity and debt holders as these now jointly determine 100% of the company's EVIC.

<sup>26</sup> (EU Technical Expert Group on Sustainable Finance, 2019)

Exceptions:

1. In case elements of the enterprise value are not available (e.g., due to data issues), the total balance sheet value expressed as the sum of total company equity and debt should be used.
2. In case a financial institution only invests in equity and undertakes GHG accounting from a risk perspective, emissions can also be attributed to the total market capitalization (market value of all organizations' outstanding shares) of this organization. This follows the 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.
3. In instances where the equity share is unavailable, PCAF encourages using an estimate, or, if impossible, ignoring the equity share and dividing by debt only. If alternatives are applied, this requires further clarification of the steps taken.

### Equations to calculate financed emissions

The financed emissions of investment in a company are calculated by multiplying the attribution factor in an investee company by the emissions of the respective investee company. The total financed emissions of a listed equity and bonds portfolio is calculated as follows:

$$\text{Financed emissions} = \sum_c \text{Attribution factor investee}_c \times \text{Company emissions}_c$$

*(with c = investee company)*

In this asset class, the sum represents all companies in an institution's portfolio, and the attribution factor represents the proportional share of a given company—that is, the ratio of the outstanding amount to EVIC:

$$\text{Financed emissions} = \sum_c \frac{\text{Outstanding amount}}{\text{Enterprise Value Including Cash}} \times \text{Company emissions}_c$$

*(with c = investee company)*

In cases where the equity share in the EVIC is unavailable, PCAF encourages the use of an estimate or, if an estimate is impossible, to ignore the equity share and divide by debt only.

The financed emissions from listed equity and bonds can be calculated in different ways, depending on the availability of borrower- and investee-specific financial and emissions data. Overall, PCAF distinguishes three different options to calculate the financed emissions from listed equity and bonds depending on the emissions data used:

- **Option 1: Reported emissions**, where audited<sup>27</sup> or unaudited<sup>28</sup> emissions are collected from the borrower or investee company directly (e.g., company sustainability report) or indirectly via verified third-party data providers (e.g., CDP), and then allocated to the reporting financial institutions using the attribution factor.
- **Option 2: Physical activity-based emissions**, where emissions are estimated by the reporting financial institution based on primary physical activity data collected from the borrower or investee company (e.g., MWh of natural gas consumed or tons of steel produced), and then allocated to the reporting financial institution using the attribution factor. The emissions data should be estimated using an appropriate calculation methodology or tool with verified emission factors expressed per physical activity (e.g., tCO<sub>2</sub>e/MWh or tCO<sub>2</sub>e/t of steel), issued or approved by a credible independent body.
- **Option 3: Economic activity-based emissions**, where emissions are estimated by the reporting financial institution based on economic activity data collected from the borrower or investee company (e.g., euro of turnover or euro of asset), and then allocated to the reporting financial institution using the attribution factor. The emissions data should be estimated using official statistical data or acknowledged Environmentally Extended Input Output (EEIO) tables providing region/sector-specific average emission factors expressed per economic activity (e.g., tCO<sub>2</sub>e/EUR of revenue or tCO<sub>2</sub>e/EUR of asset)<sup>29</sup>.

## Data required

PCAF distinguishes three options to calculate the financed emissions from listed equity and bonds depending on the emissions data used:

- Option 1: Reported emissions
- Option 2: Physical activity-based emissions
- Option 3: Economic activity-based emissions

<sup>27</sup> This refers to reported emissions being calculated in line with the GHG Protocol and verified by a third-party auditor.

<sup>28</sup> This refers to reported emissions being calculated in line with the GHG Protocol without verification by a third-party auditor. Unaudited reported emissions can be either calculated by an external party or by the investee company itself.

<sup>29</sup> 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 this data from statistics and/or EEIO Tables. This may also be used to refine the data for specific sectors or regions, if the reporting financial institution has a strong presence in and specific knowledge of the respective sector and/or region. National agencies and regional data providers or statistical offices in individual regions may assist reporting Financial institutions and investee companies in various regions in finding regional and more relevant financial and/or emissions data information.

While Option 1 and Option 2 are based on company-specific reported emissions or primary physical activity data provided by the borrower or investee and/or third-party data providers, Option 3 is based on region/sector-specific average emissions or financial data using public data sources such as statistics or data from other third party-providers<sup>30</sup>.

Option 1 and Option 2 are preferred over Option 3 from a data quality perspective as the former options provide more accurate emissions results to a financial institution. From a data quality perspective, the reporting financial institution shall always use Option 1 or Option 2 before opting for Option 3.

Table 5-3 provides data quality scores for each of the described options and (if applicable) sub-options that can be used to calculate the financed emissions for listed equity and bonds.

**Table 5-3. General description of the data quality score table for listed equity and bonds**  
(Score 1 = highest data quality; score 5 = lowest data quality<sup>31</sup>)

Data Quality	Options to estimate the financed emissions	When to use each option	
Score 1	Option 1: Reported emissions	1a	Outstanding amount in the company and EVIC are known. <b>Audited emissions</b> of the company are available.
		1b	Outstanding amount in the company and EVIC are known. <b>Unaudited emissions</b> calculated by the company are available.
Score 2	Option 2: Physical activity-based emissions	2a	Outstanding amount in the company and EVIC are known. Reported company emissions are not known. Emissions are calculated using primary physical activity data of the <b>company's energy consumption</b> and emission factors specific to that primary data. Relevant process emissions are added.
		2b	Outstanding amount in the company and EVIC are known. Reported company emissions are not known. Emissions are calculated using primary physical activity data of the <b>company's production</b> and emission factors specific to that primary data.
Score 3			
Score 4	Option 3: Economic activity-based emissions	3a	Outstanding amount in the company, EVIC, and the <b>company's turnover</b> are known. Emission factors for the sector per unit of turnover are known (e.g., tCO <sub>2</sub> e per euro of turnover earned in a sector).
Score 5		3b	Outstanding amount in the company is known. Emission factors for the sector per unit of asset (e.g., tCO <sub>2</sub> e per euro of asset in a sector) are known.
		3c	Outstanding amount in the company is known. Emission factors for the sector per unit of turnover (e.g., tCO <sub>2</sub> e per euro of turnover earned in a sector) and <b>asset turnover ratios</b> for the sector are known.

30 Note that Option 1 and Option 2 were called "Approach 1: company specific approach" and Option 3 was called "Approach 2: Sector/region average approximation" in the report produced by the PCAF Dutch team: (PCAF, 2019).

31 Note that for business loans to listed companies, total company equity + debt is defined as the enterprise value including cash (EVIC) of the respective company.

A detailed summary of the data quality score table including data needs and equations to calculate financed emissions is provided in the Annex (Table 9-1).

Data for all three options in Table 5-3 can be derived from different data sources.

**Official Organization Filings:**

Where available, PCAF recommends using energy and emissions data reported by companies, given that the data fully covers a company's emissions-generating activities that are disclosed in official filings and environmental reports. The most recent available data should be used with mention of the data source, reporting period, or publication date. Using this data is in line with option 1.

**Data Providers (Option 1):**

If the organization does not report energy use and emissions data, PCAF recommends using third-party data providers, such as CDP, Bloomberg, MSCI, Sustainalytics, S&P/Trucost, and ISS ESG Solutions. Data providers typically make scope 1 and 2 emissions data available. It is encouraged to use the most recent available data and to mention the data source, reporting period, or publication date.

Data providers collect emissions data as reported by listed companies themselves, either through a standardized framework such as CDP or through a company's own disclosures in official filings and environmental reports. This would be in line with calculation option 1. However, data providers often have their own methodologies to estimate/calculate companies' emissions, especially if this data is not reported. In this case, the calculation would be in line with calculation option 2 or 3, assuming the methodology used is in line with the GHG Protocol.

Financial institutions should ask data providers to be transparent, disclose the calculation method they use, and confirm alignment with the GHG Protocol. This will enable financial institutions to apply the proper score to the data. In addition, PCAF encourages data providers to apply the PCAF scoring method to their own data, which would allow them to share the data quality scores directly with their clients.

PCAF does not recommend a preferred data vendor. PCAF recommends using data providers that use the standardized CDP framework and suggests data providers disclose the data quality score according to the scoring hierarchy in Table 5-3.<sup>32</sup> When using data providers, PCAF recommends using the same provider for all equity and bonds due to variability of scope 1 and 2 emissions observed by providers.

**Estimation Models (Option 2 and 3):**

Not all companies disclose their emissions data in official filings or through data providers. Reporting in emerging markets lags developed markets. To maximize the coverage of emissions data, the remaining gaps are often filled with estimates.

If no data is available, estimation models consistent with the emissions from the primary business

<sup>32</sup> More information about CDP can be found at: <https://www.cdp.net/en>.

activity may be used. Production-based models are preferred over revenue-based models because 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.

For calculation option 2 (physical activity-based emissions), PCAF recommends using actual energy consumption (e.g., MWh of natural gas consumed) or production (e.g., tons of steel produced) data reported by companies, given that the data fully covers the emissions-generating activities of the organization that are disclosed in official filings and environmental reports. The emission factors expressed per physical activity used should be based on appropriate and verified calculation methodologies or tools that are issued or approved by a credible independent institution. Example data sources for retrieving emission factors are Ecoinvent,<sup>33</sup> DEFRA,<sup>34</sup> IPCC,<sup>35</sup> GEMIS,<sup>36</sup> and FAO.<sup>37</sup> The most recent available data should be used, including a mention of the data source, reporting period, or publication date.

For Option 3 (economic activity-based emissions), PCAF recommends using official statistical data or acknowledged EEIO tables providing region/sector-specific average emission factors expressed per economic activity (e.g., tCO<sub>2</sub>e/EUR of revenue or tCO<sub>2</sub>e/EUR of asset). Financial institutions should use emission factors as consistently as possible with the primary business activity. For example, for a business loan to a paddy rice farmer, the financial institution should seek to find and use a region/sector-specific average emission factors for the paddy rice sector and not an emission factor for the agricultural sector in general. Example EEIO databases that can be used to obtain such emission factors are EXIOBASE,<sup>38</sup> GTAP,<sup>39</sup> or WIOD.<sup>40</sup>

PCAF expects that the financed emissions for most listed equity and bonds can be derived through either reported emissions (Option 1), physical activity data (Option 2), or economic activity data (Option 3). However, PCAF allows the use of other alternative approaches to calculate emissions if none of the options specified above can be used, or in the case that new approaches are developed. The reporting financial institution shall always explain the reasons for using an alternative approach if it deviates from the options defined above.

## Limitations

### Market Price Fluctuations

When using EVIC as the denominator, assets under management change as a result of fluctuating market prices. Under the influence of this fluctuation, an objective to reduce relative financed emissions by a certain percentage becomes a moving target. Using normalized assets under management may help overcome this, as prices are held constant over the target period. For

33 More information can be found at: <https://www.ecoinvent.org/>

34 More information can be found at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019>

35 More information can be found at: [https://www.ipcc-nggip.iges.or.jp/EFDB/find\\_ef.php](https://www.ipcc-nggip.iges.or.jp/EFDB/find_ef.php)

36 More information can be found at: <http://iinas.org/gemis-download.html>

37 More information can be found at: <http://www.fao.org/partnerships/leap/database/ghg-crops/en>

38 More information can be found at: <https://www.exiobase.eu>

39 More information can be found at: <https://www.gtap.agecon.purdue.edu>

40 More information can be found at: <http://www.wiod.org>

example, the EU-TEG and EU Regulation on benchmarks require the application of an inflation correction to changes in EVIC over time. In case the financial institution decides to apply such adjustments, these should be made transparent. PCAF will also investigate the challenges linked to steering on financed emissions and describe the metrics in use by investors as emerging practices.<sup>41</sup>

### **Organization Identifiers**

For larger listed equity and bonds portfolios, organization identifiers should be in place to combine information from various sources. Examples of such identifiers include Stock Exchange Daily Official Lists, International Securities Identification Number, Committee on Uniform Security Identification Procedures numbers, and Bloomberg Tickers. For large portfolios, matching external data sources can be a challenge when two companies merge; the organization identifiers will be adjusted immediately while carbon data providers might only update such information on an annual basis.

### **Side Effects**

There is a potentially undesired side-effect related to attributing the issuer's absolute emissions to its total equity and debt position. While lower emissions would typically be achieved by encouraging issuers to reduce their absolute emissions (numerator), the recommended calculation methods imply that a similar effect could be achieved by increasing the denominator (either the issuer's equity or debt position).

---

<sup>41</sup> 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 participations 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.

# 5.2 Business loans

Introduction

CHAPTER 1

Understand what carbon accounting is

CHAPTER 2

Identify business goals

CHAPTER 3

Review accounting and reporting principles and rules

CHAPTER 4

Review and apply accounting methodologies for each asset class

CHAPTER 5

Report emissions

CHAPTER 6



## Asset class definition

The business loans asset class includes any on-balance sheet loans and lines of credit with unknown use of proceeds to businesses, nonprofits, and any other structure of organization.<sup>42</sup> Revolving credit facilities and overdraft facilities and business loans secured by real estate, such as commercial real estate-secured lines of credit, are also included in the business loans asset class.

Business loans with known use of proceeds are not included in this asset class but instead are covered by the project finance asset class, even if they may not be structured as project finance per se (see section 5.3). Business loans for the financing of commercial real estate or motor vehicles are also considered separate asset classes, i.e., commercial real estate (see section 5.4) and motor vehicle loans (see section 5.6), respectively.

Private equity with unknown use of proceeds shall also use the business loans asset class approach as the general method for calculating financed emissions. For private equity investments, this method is similar to the one for business loans. Detailed guidance for private equity has not yet been developed as part of this Standard but may be developed in future versions.

## Emission scopes covered

Financial institutions shall report borrowers' and investees' absolute scope 1 and scope 2 emissions across all sectors at any time. The reporting of borrowers' and investees' scope 3 emissions is required for loans and investments in companies depending on the sector they are active in (i.e., where they earn revenues).<sup>43</sup>

PCAF provides a sector list for those sectors where scope 3 emissions of borrowers and investees are required to be reported. The sector list aligns with the phased-in approach for scope 3 emissions as defined by the Technical Expert Group on Sustainable Finance set-up by the European Commission (EU TEG), which has been included in article 5 of the (draft) Supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards minimum standards for EU Climate Transition Benchmarks and EU Paris-aligned Benchmarks. Table 5-4 includes the sector list. In practice, this means that financial institutions start including scope 3 emissions for some sectors and add others over time.

PCAF acknowledges that, to date, the comparability, coverage, transparency, and reliability of scope 3 data still vary greatly per sector and data source. However, by requiring scope 3 reporting for selected sectors, PCAF seeks to make scope 3 emissions reporting more common by improving data availability and quality over time.

<sup>42</sup> The term "company" is used throughout this section, but can refer to any type of organization, including non-profits.

<sup>43</sup> The business loans methodology covers both loans and private equity investments. For simplicity, the terms "borrowers" and "loans" are used, but could be used interchangeably with "investees" and "investments" in the case of private equity.

**Table 5-4. List of sectors with required scope 3 emissions inclusion as defined by the EU TEG**

Phase in period	NACE Level 2 (L2) Sectors considered
<b>From 2020</b>	At least energy (oil & gas), mining (i.e. NACE L2: 05-09, 19, 20)
<b>From 2023</b>	At least transportation, construction, buildings, materials, industrial activities (i.e. NACE L2: 10-18, 21-33, 41-43, 49-53, 81)
<b>From 2025</b>	Every sector

## Attribution of emissions

As a basic attribution principle, the financial institution accounts for a portion of the borrower's emissions, as determined by the ratio between the outstanding amount (numerator) and the value of the financed company (denominator). This ratio is called the attribution factor.

1. **Outstanding amount (numerator):** This is the actual outstanding loan amount.<sup>44</sup> It will be adjusted annually to reflect the correct exposure resulting in the attribution to decline to 0 at the end of the lifetime of the loan (i.e., when it is fully repaid). Financial institutions should either use the calendar or financial year-end outstanding loan, provided the approach is communicated and used consistently.
2. **Company value (denominator):** For business loans to listed companies, this is the enterprise value including cash (EVIC) of the respective company.<sup>45</sup> For non-listed companies,<sup>46</sup> which are common for this asset class, the enterprise value is not likely to be available (due to the lack of information on market capitalization). In this case, the total balance sheet value expressed as the sum of total company equity and debt shall be used.

The basic attribution factor approach is used for business loans where borrower-specific financial data is available. For business loans, where such data is unavailable, the attribution factor is not based on borrower-specific financial data but is based on region/sector-specific average financial data and the outstanding amount. This is explained in more detail in the section for "Equations to calculate financed emissions" (see Option 3b and Option 3c).

## Equations to calculate financed emissions

The financed emissions from a single business loan are calculated by multiplying the attribution factor by the emissions of the borrower company.<sup>47</sup> The total financed emissions from multiple business loans are calculated as follows:

<sup>44</sup> When this method is used to measure emissions financed through private equity, the outstanding amount is the outstanding investment or equity.

<sup>45</sup> Note that in this case, the formula to calculate the financed emissions is exactly the same as for the asset class listed equity & bonds (see section 5.1).

<sup>46</sup> This includes privately held companies and government owned companies.

<sup>47</sup> Where loans are made to a subsidiary company, it is okay to aggregate all loans to the parent and its subsidiaries at the parent level and calculate financed emissions at the parent level.

$$\text{Financed emissions} = \sum_c \frac{\text{Outstanding amount}_c}{(\text{EVIC or Total company equity} + \text{debt})_c} \times \text{Company emissions}_c$$

(with  $c$ =borrower company<sup>48</sup>)

For business loans to listed companies, the denominator of the attribution factor is defined as the EVIC of the respective company (as is also done in the asset class listed equity and bonds). For non-listed companies, the denominator of the attribution factor is defined as the total equity and debt from a company's balance sheet. From now on, the denominator is simply referred to as total equity and debt without explicitly stating EVIC.

Financed emissions from business loans can be calculated in different ways, depending on the availability of borrower-specific financial and emissions data. Overall, PCAF distinguishes three different options to calculate the financed emissions from business loans depending on the emissions data used:

- **Option 1: Reported emissions**, where audited<sup>49</sup> or unaudited<sup>50</sup> emissions are collected from the borrower company directly (e.g., company sustainability report) or indirectly via verified third-party data providers (e.g., CDP), and then allocated to the reporting financial institution using the attribution factor.
- **Option 2: Physical activity-based emissions**, where emissions are estimated by the reporting financial institution based on primary physical activity data collected from the borrower (e.g., MWh of natural gas consumed or tons of steel produced), and then allocated to the reporting financial institution using the attribution factor. The emissions data should be estimated using an appropriate calculation methodology or tool with verified emission factors expressed per physical activity (e.g., tCO<sub>2</sub>e/MWh or tCO<sub>2</sub>e/t of steel), issued or approved by a credible independent body.
- **Option 3: Economic activity-based emissions**, where emissions are estimated by the reporting financial institution based on economic activity data collected from the borrower company (e.g., euro of turnover or euro of asset), and then allocated to the reporting financial institution using the attribution factor. The emissions data should be estimated using official statistical data or acknowledged Environmentally Extended Input Output (EEIO) tables providing region/sector-specific average emission factors expressed per economic activity (e.g., tCO<sub>2</sub>e/EUR of revenue or tCO<sub>2</sub>e/EUR of asset).<sup>51</sup>

48 When this method is used to measure emissions financed through private equity,  $c$  = investee company).

49 This refers to reported emissions being calculated in line with the GHG Protocol and verified by a third-party auditor.

50 This refers to reported emissions being calculated in line with the GHG Protocol without verification by a third-party auditor. Unaudited reported emissions can be either calculated by an external party or by the investee company itself.

51 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 this data from statistics and/or EEIO Tables. This may also be used to refine the data for specific sectors or regions, if the reporting financial institution has a strong presence in and specific knowledge of the respective sector and/or region. National agencies and regional data providers or statistical offices in individual regions may assist reporting Financial institutions and investee companies in various regions in finding regional and more relevant financial and/or emissions data information.

## Data required

As described, PCAF distinguishes three options to calculate the financed emissions from business loans depending on the emissions data used:

- Option 1: Reported emissions
- Option 2: Physical activity-based emissions
- Option 3: Economic activity-based emissions

While Option 1 and Option 2 are based on company-specific reported emissions or primary physical activity data provided by the borrower company or third-party data providers, Option 3 is based on region/sector-specific average emissions or financial data using public data sources such as statistics or data from other third-party providers.<sup>52</sup>

Option 1 and 2 are preferred over Option 3 from a data quality perspective as the former options provide more accurate emissions results to a financial institution. Due to data limitations, it is possible that financial institutions use option 1 or 2 for certain companies and option 3 for others. The data quality mix shall be reflected in the average data quality score, as chapter 6 illustrates.

---

<sup>52</sup> Note that Option 1 and Option 2 were called “Approach 1: company specific approach” and Option 3 was called “Approach 2: Sector/region average approximation” in the report produced by the PCAF Dutch team: (PCAF, 2019).

Table 5-5 provides data quality scores for each of the described options and (if applicable) sub-options that can be used to calculate the financed emissions for business loans.

**Table 5-5. General description of the data quality score table for business loans**  
(Score 1 = highest data quality; score 5 = lowest data quality)<sup>53</sup>

Data Quality	Options to estimate the financed emissions	When to use each option	
Score 1	Option 1: Reported emissions	1a	Outstanding amount in the company and total company equity plus debt are known. <b>Audited emissions</b> of the company are available.
		1b	Outstanding amount in the company and total company equity plus debt are known. <b>Unaudited emissions</b> calculated by the company are available.
Score 2	Option 2: Physical activity-based emissions	2a	Outstanding amount in the company and total company equity plus debt are known. Reported company emissions are not known. Emissions are calculated using primary physical activity data for the company's energy <b>consumption</b> and emission factors specific to that primary data. Relevant process emissions are added.
Score 3		2b	Outstanding amount in the company and total company equity plus debt are known. Reported company emissions are not known. Emissions are calculated using primary physical activity data for the company's <b>production</b> and emission factors specific to that primary data.
Score 4	Option 3: Economic activity-based emissions	3a	Outstanding amount in the company, total company equity plus debt, and the <b>company's turnover</b> are known. Emission factors for the sector per unit of turnover are known (e.g., tCO <sub>2</sub> e per euro of turnover earned in a sector).
Score 5		3b	Outstanding amount in the company is known. Emission factors for the sector per unit of asset (e.g., tCO <sub>2</sub> e per euro of asset in a sector) are known.
		3c	Outstanding amount in the company is known. Emission factors for the sector per unit of turnover (e.g., tCO <sub>2</sub> e per euro of turnover earned in a sector) and <b>asset turnover ratios</b> for the sector are known.

A detailed summary of the data quality score table including data needs and equations to calculate financed emissions is provided in the Annex (Table 9-2).

Data for all three options in Table 5-5 can be derived from different data sources.

#### Data Providers (Option 1):

For Option 1 (Reported emissions), PCAF recommends either collecting emissions from the borrower company directly (e.g. company sustainability report) or third-party data providers, such as CDP, Bloomberg, MSCI, Sustainalytics, S&P/Trucost, and ISS ESG Solutions. The data providers typically make scope 1 and 2 emissions data available. It is encouraged to use the most recent available data and to mention the data source, reporting period, or date of publication.

<sup>53</sup> Note that for business loans to listed companies, total company equity + debt is defined as the enterprise value including cash (EVIC) of the respective company.

Data providers collect emissions data as reported by listed companies themselves, either through a standardized framework such as CDP or through a company's own disclosures in official filings and environmental reports. However, data providers often have their own methodologies to estimate/calculate companies' emissions, especially if emissions are not reported. In this case, the calculation would be in line with calculation Option 2 or 3, assuming the methodology used is in line with the GHG Protocol. Financial institutions should ask data providers to be transparent, disclose the calculation method they use, and confirm alignment with the GHG Protocol. This will enable financial institutions to apply the proper score to the data. In addition, PCAF encourages data providers to apply the PCAF scoring method to their own data, which would allow them to share the data quality scores directly with their clients.

PCAF does not recommend a preferred data vendor. PCAF recommends using data providers that use the standardized CDP framework and suggests data providers to disclose the data quality score according to the scoring hierarchy in Table 5-5.<sup>54</sup> When using data providers, PCAF recommends using the same provider for all business loans due to variability of scope 1 and 2 emissions observed by providers.

### **Estimation Models (Option 2 and 3):**

For Option 2 (physical activity-based emissions), PCAF recommends using actual energy consumption (e.g., MWh of natural gas consumed) or production (e.g., tons of steel produced) data reported by companies, given that the data fully covers the company's emissions-generating activities. The emission factors expressed per physical activity used should be based on appropriate and verified calculation methodologies or tools that are issued or approved by a credible independent institution. Example data sources for retrieving emission factors are Ecoinvent,<sup>55</sup> DEFRA,<sup>56</sup> IPCC,<sup>57</sup> GEMIS,<sup>58</sup> and FAO.<sup>59</sup> The most recent available data should be used and should mention the data source, reporting period, or publication date.

For Option 3 (economic activity-based emissions), PCAF recommends using official statistical data or acknowledged EEIO tables providing region/sector-specific average emission factors expressed per economic activity (e.g., tCO<sub>2</sub>e/EUR of revenue or tCO<sub>2</sub>e/EUR of asset). Financial institutions should use emission factors as consistently as possible with the primary business activity.<sup>60</sup> For example, for a business loan to a paddy rice farmer, the financial institution should seek to find and use a region/sector-specific average emission factors for the paddy rice sector and not an emission factor for the agricultural sector in general. Example EEIO databases that can be used to obtain such emission factors are EXIOBASE,<sup>61</sup> GTAP,<sup>62</sup> or WIOD.<sup>63</sup>

54 Note that for business loans to listed companies, total company equity + debt is defined as the enterprise value including cash (EVIC) of the respective company.

55 More information can be found at: <https://www.ecoinvent.org/>

56 More information can be found at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019>

57 More information can be found at: [https://www.ipcc-nggip.iges.or.jp/EFDB/find\\_ef.php](https://www.ipcc-nggip.iges.or.jp/EFDB/find_ef.php)

58 More information can be found at: <http://iinas.org/gemis-download.html>

59 More information can be found at: <http://www.fao.org/partnerships/leap/database/ghg-crops/en/>

60 For conglomerates financed emissions from a mix of activities can be made if data (e.g. revenue split) is available. If not, the primary revenue-generating activity should be chosen.

61 More information can be found at: <https://www.exiobase.eu>

62 More information can be found at: <https://www.gtap.agecon.purdue.edu>

63 More information can be found at: <http://www.wiod.org>

PCAF expects that the financed emissions for most business loans can be derived through either reported emissions (Option 1), physical activity data (Option 2), or economic activity data (Option 3). However, PCAF allows the use of other alternative approaches to calculate emissions if none of the options specified previously can be used, or in the case that new approaches are developed. The reporting financial institution shall always explain the reasons for using an alternative approach if it deviates from the options defined above.

### **Limitations of the method**

One limitation of Option 3 is the generalized nature and necessary assumptions made in applying average values (both for emissions and financial data). This makes calculations based on this approach less robust and more uncertain than those that are based on borrower-specific data, as the data for this option largely depend on assumptions and approximations that are derived from region and sector averages.

In addition, sectors from statistical data or acknowledged EEIO tables for a given region need to be critically mapped to the ones used by the reporting financial institution, as the sectors may not map one-to-one and may cause emissions to be over or understated for business loans.

Inconsistencies can arise from measuring part of the business loan portfolio with borrower-specific emissions data (which may encompass scopes 1, 2, and 3 emissions) and from measuring the other part with region/sector-specific average emissions data (which often encompasses only scope 1 and 2 emissions). One mitigating factor is that using borrower-specific emission data could improve the accuracy of the region/sector-specific average data if the reporting financial institution had enough borrower-specific data points relative to the size of the portfolio in a given sector. For example, if a majority of the borrowers in a lender's textile manufacturing loan portfolio provides specific emissions data, then these averages could be applied (instead of industrywide sector averages) to the remainder of the borrowers in this sector that did not provide specific emissions data.

Another limitation for all the described options stems from the use of year-end outstanding balances. For a portfolio that includes loans to businesses in industries with high seasonal variability or temporal volatility, using year-end outstanding balances may not capture the activity occurring during seasons that do not overlap with the end of the year. Similarly, reporting financial institutions using different fiscal calendars may be less comparable with each other. A solution could be that financial institutions opt to conduct GHG accounting using an average monthly balance for the year instead of a year-end balance. However, this would put more burden on reporting financial institutions.

# 5.3 Project finance

Introduction

CHAPTER 1

Understand what carbon accounting is

CHAPTER 2

Identify business goals

CHAPTER 3

Review accounting and reporting principles and rules

CHAPTER 4

Review and apply accounting methodologies for each asset class

CHAPTER 5

Report emissions

CHAPTER 6



## Asset class definition

On-balance sheet loan or equity with known use of proceeds that are designated for a defined activity or set of activities, such as the construction of a gas-fired power plant, a wind or solar project, or energy efficiency projects. For the calculation of emissions, only the financed (ring-fenced) activities are included. Emissions and financials related to existing activities outside the financed project but within the financed organization are not considered.

## Emission scopes covered

Financial institutions shall cover scope 1 and 2 absolute emissions of the project. Scope 3 should be covered if relevant. Avoided and removed emissions may be reported if relevant, but must be reported separately from absolute emissions.

## Attribution

The project finance attribution factor is defined as the outstanding amount divided by the project size or total assets.

$$\text{Attribution factor} = \frac{\text{Outstanding financing (debt + equity)}_p}{\text{Total project size or total assets}_p}$$

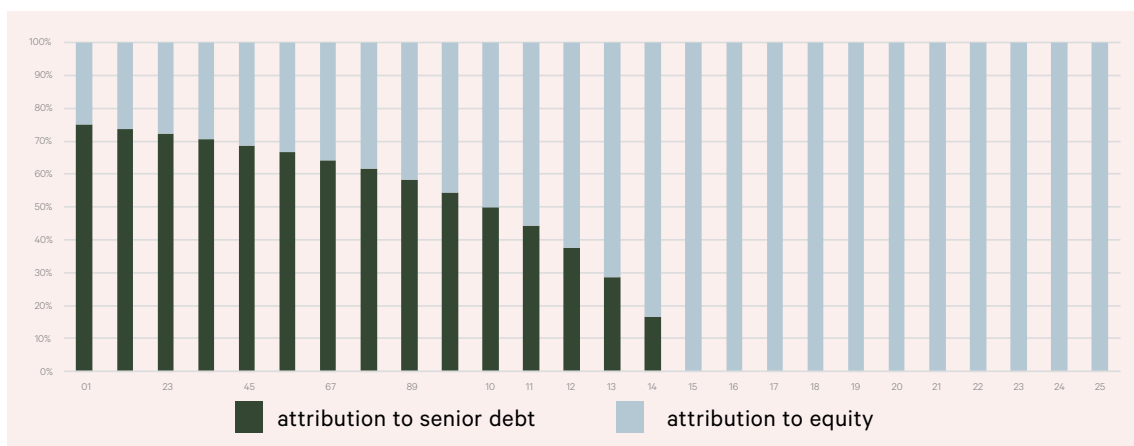
*(with p = project)*

At the start of the project, the project size is the total financing available for the project (total debt plus equity to realize the project). In subsequent years, it is expected that 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 assets can then be used as the attribution factor.

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

Figure 5-2 illustrates the attribution rule, where initially most of the (avoided) emissions from the project are attributed to debt, but as debt is repaid more and more of the emissions become attributable to the equity providers.

**Figure 5-2. Illustration of changes in equity/debt attribution over time**



## Equations to calculate financed emissions

The attributed emissions from a financed project are calculated by multiplying the attribution factor by the emissions of the respective project. The following equation is used:

$$\text{Financed emissions} = \sum \frac{\text{outstanding financing (debt + equity)}_p}{\text{total project size or total assets}_p} \times \text{project emissions}_p$$

(with  $p = \text{project}$  )

Overall, PCAF distinguishes three different options to calculate project emissions, depending on the availability of project-specific data:

- **Option 1: Reported emissions**, where audited<sup>64</sup> or unaudited<sup>65</sup> emissions are collected from the project directly or indirectly through independent third parties.
- **Option 2: Physical activity-based emissions**, where emissions are estimated based on primary physical activity data collected from the project (e.g., MWh of electricity produced). The emissions data should be estimated using an appropriate calculation methodology or tool with verified emission factors expressed per physical activity (e.g., tCO<sub>2</sub>e/MWh), issued or approved by a credible independent body such as the IEA.
- **Option 3: Economic activity-based emissions**, where emissions are estimated based on economic activity data collected from the project (e.g., turnover or assets). The emissions data should be estimated using official statistical data or acknowledged Environmentally Extended Input Output (EEIO) tables providing region/sector-specific average emission factors expressed per economic activity (e.g., tCO<sub>2</sub>e/EUR of revenue or tCO<sub>2</sub>e/EUR of asset).<sup>66</sup>

64 This refers to reported emissions being calculated in line with the GHG Protocol and verified by a third-party auditor.

65 This refers to reported emissions being calculated in line with the GHG Protocol without verification by a third-party auditor. Unaudited reported emissions can be either calculated by an external party or by the investee project itself.

66 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 this data from statistics and/or EEIO Tables. This may also be used to refine the data for specific sectors or regions, if the reporting financial institution has a strong presence in and specific knowledge of the respective sector and/or region. National agencies and regional data providers or statistical offices in individual regions may assist reporting Financial institutions and investee companies in various regions in finding regional and more relevant financial and/or emissions data information.

## Data required

Within the due diligence and monitoring of a project finance transaction, the availability and quality of project-specific data is good. Project-specific, independently validated GHG data (option 1) ranks highest in quality and consistency but will not always be available. Physical activity-based data (option 2) such as MWh produced is generally available from a previous year or as estimation, e.g., P50 estimations for renewable energy projects.<sup>67</sup> The lowest data quality applies when there is no project-specific physical data, but only financial data (option 3).

The data quality score card in Table 5-6 is recommended for project finance. Financial institutions can refine or specify this generic data quality table per type of project, as long as these refined data quality tables are disclosed transparently.

**Table 5-6. General description of the data quality score table for project finance**  
(Score 1 =highest data quality; score 5 = lowest data quality)

Data Quality	Options to estimate the financed emissions	When to use each option	
Score 1	Option 1: Reported emissions	1a	Outstanding amount in the project and total project equity plus debt are known. <b>Audited emissions</b> of the project are available.
		1b	Outstanding amount in the project and total project equity plus debt are known. <b>Unaudited emissions</b> reported by the project are available.
Score 2	Option 2: Physical activity-based emissions	2a	Outstanding amount in the project and total project equity plus debt are known. Project emissions are not known but calculated using primary physical activity data for the project's energy <b>consumption</b> and emission factors specific to that primary data. Relevant process emissions are added.
Score 3		2b	Outstanding amount in the project and total project equity plus debt are known. Project emissions are not known. Emissions are calculated using primary physical activity data for the project's <b>production</b> and emission factors specific to that primary data.
Score 4	Option 3: Economic activity-based emissions	3a	Outstanding amount in the project, total project equity plus debt, and the <b>project's turnover</b> are known. Emission factors for the sector per unit of turnover or from similar projects is known (e.g., tCO <sub>2</sub> e per euro of turnover earned in a sector).
Score 5		3b	Outstanding amount in the project is known. Emission factors for the sector per unit of asset or economic activity-based emissions factors from similar projects (e.g., tCO <sub>2</sub> e per euro of asset in a sector) are known.
		3c	Outstanding amount in the project is known. Emission factors for the sector per unit of turnover (e.g., tCO <sub>2</sub> e per euro of turnover earned in a sector) and <b>asset turnover ratios</b> for the sector or from similar projects are known.

<sup>67</sup> For renewable energy projects it is customary to have experts calculate percentile production predictions based on an analysis of historic data 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). PCAF proposes to use the P50 predicted production.

A detailed summary of the data quality score table, including data needs and equations to calculate financed emissions, is provided in the Annex (Table 9.3).

PCAF expects that the financed emissions for most projects can be derived through either reported emissions (Option 1), physical activity data (Option 2), or economic activity data (Option 3).

## Avoided emissions

Avoided emissions are the reduction in emissions of the financed project compared to what would have been emitted in the absence of the project (the baseline emissions). They are calculated based on the GHG Protocol for Project Finance and are a separate category compared to the calculation of absolute emissions based on the GHG Protocol for Corporate Accounting.

Calculating the annual avoided emissions from an institution's renewable power project portfolio at a fixed point in time and in line with the financial reporting cycle is a detailed process. The (estimated) annual power production of these projects over the reporting period must be compared with the fossil fuel power mix per country over the same period. In this comparison, it is assumed that the production of renewable power (over the reporting period) might have avoided the need to run certain fossil fuel power plants.

Fossil fuel power mix and associated grid emissions factors can be derived using various approaches and assumptions, as illustrated in Table 5-7.

**Table 5-7. Emission factors per type of fossil fuel power mix**

Preferred options	Type of mix	Description of emission factors
<b>1</b>	<b>Operating margin<sup>68</sup></b>	Emission factors based on the existing fossil-fuel power plants in a country/region whose operation will be most affected (reduced) by the project (i.e., the generation from the power plants with the highest variable operating costs in the economic merit order dispatch of the electricity system).
<b>2</b>	<b>Fossil-fuel mix traded</b>	Emission factors based on the emissions of all fossil fuel power (including or excluding nuclear) traded (i.e., produced and imported minus exported) in a country/region.
<b>3</b>	<b>Fossil-fuel mix produced</b>	Emission factors based on the emissions of all fossil fuel power (including or excluding nuclear) produced in a country/region.
<b>4</b>	<b>Average electricity mix</b>	Emission factors based on the emissions of all power (fossil and non-fossil) produced in a country/region.

Various publicly available data sources on national and international level are available and provide (the data to calculate) these emissions factors (e.g., IEA, EPA, EEA).

PCAF prefers to use the Operating Margin emissions factor for the accounting of the avoided emissions of renewable power project portfolio over the reporting period.

<sup>68</sup> The Operating Margin is a term defined under the UNFCCC Clean Development Mechanism (CDM) for grid connected electricity generation from renewable sources and represents the cohort of existing power plants whose operation will be most affected (reduced) by the project

The UNFCCC IFI's - Harmonization of Standards for GHG accounting has calculated these Operating Margin emissions factors for various countries, using the methodology published by the IFI's Technical Working Group on Greenhouse Gas Accounting.<sup>69</sup>

If the Operating Margin is not available, financial institutions can use the fossil fuel mix traded, the fossil fuel mix produced, or (as a last resort) the average electricity mix. In principle, PCAF recommends excluding nuclear energy in line with the IFI methodology but PCAF also allows the inclusion of nuclear as most data sources include nuclear power under the fossil fuel mix.

### **Emissions removals**

Emissions removals can be relevant for project finance. Sequestered emissions (which is one form of emissions removals) accounts for carbon sinks where carbon is absorbed from the atmosphere. PCAF members are developing more detailed guidance on accounting for sequestered emissions.

### **Lifetime emissions**

Portfolio accounting in line with PCAF does not consider lifetime emissions insofar as these emissions happen before or after the reporting year. For example, emissions related to future disposal of a wind park are not reported in the current reporting year.

However, this principle is problematic for construction projects. Investment in the construction of a gas-fired power plant is one example. In portfolio carbon accounting terms, construction emissions would be accounted for during the construction phase and operational emissions during the operational phase. However, if the loan is repaid shortly after operation starts, the portfolio emissions for that investment would only reflect a small portion of the total emissions impact during the gas-fired power plant's lifetime.

If a financial institution is an initial sponsor or lender, they should assess the total projected lifetime scope 1 and scope 2 emissions for projects that were financed during the reporting year. Those emissions should be reported separately.

---

69 (IFI, 2020)

## Portfolio versus (annualized) lifetime emissions

Various (multilateral) development banks have been working on harmonizing carbon accounting of new projects under IFI's Framework for a Harmonized Approach to Greenhouse Gas Accounting.<sup>70</sup> These financial institutions developed a methodology to calculate the expected emissions of newly signed contracts for specific projects in the reporting year.<sup>71</sup> In IFI's methodology, expected (avoided) emissions are assessed using emissions factors (called combined margin) that incorporate future greening of the electricity grid. These expected (avoided) emissions are annualized and reported in the year of loan/equity origination.

Unlike IFI's methodology, PCAF's portfolio carbon accounting involves calculating the annual emissions linked to the financial institution's balance sheet and using emission factors (operating margin) that are based on the existing fossil-fuel power plants in a country/region whose operation will be most affected (reduced) by the project.

PCAF considers that portfolio and (annualized) lifetime carbon accounting are complementary. Portfolio carbon accounting better lends itself to target setting compared to a global carbon budget, whereas (annualized) lifetime carbon accounting can be used to reflect the (avoided) emissions over the operational lifetime. Portfolio carbon accounting is more suited to guide strategic developments on a portfolio level, while lifetime carbon accounting can be used to make investment-level decisions (e.g., to avoid investments with carbon lock-in).

70 (UNFCCC, 2015) Additional information can be found at:

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

71 The emission factors can be found at:

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

# 5.4 Commercial real estate

Introduction

CHAPTER 1

Understand what carbon accounting is

CHAPTER 2

Identify business goals

CHAPTER 3

Review accounting and reporting principles and rules

CHAPTER 4

Review and apply accounting methodologies for each asset class

CHAPTER 5

Report emissions

CHAPTER 6

## Asset class definition

On-balance sheet loans for the purchase, refinance, construction, or rehabilitation of commercial real estate (CRE). This definition implies that the property is used for commercial purposes. A large multi-unit property with combined residential and retail components can ignore the commercial aspects if they are minimal, in which case the mortgage method should be used. If data is available to differentiate the residential and retail components, financial institutions can conduct two parallel calculations, one for the residential part using the mortgage method and another for the commercial part using the CRE method. These decisions should be documented and noted in the disclosure reports. Loans secured by CRE for other purposes (with unknown use of proceeds), such as lines of credit, are classified under business loans.

## Emission scopes covered

Financial institutions shall cover the absolute scope 1 and 2 emissions related to the energy use of financed buildings (energy use includes the energy consumed by the building's occupant).

## Attribution of emissions

The attribution of emissions depends on whether the building is under development, construction, rehabilitation, or already developed. When the former is the case, the attribution is equal to the ratio of the outstanding loan or investment amount at the time of carbon accounting to the total construction cost (equity plus debt).

$$\textit{Attribution factor}_b = \frac{\textit{Outstanding amount}_b}{\textit{Total construction cost}_b} \quad (\textit{with } b = \textit{building})$$

If the building is already developed, the attribution is equal to the ratio of the outstanding loan or investment amount at the time of carbon accounting to the property value at loan or investment origination.

$$\textit{Attribution factor}_b = \frac{\textit{Outstanding amount}_b}{\textit{Property value at origination}_b} \quad (\textit{with } b = \textit{building})$$

When the CRE loan is refinanced, the property value at loan origination shall be the property value at time of refinancing.



## Equations to calculate financed emissions

Financed emissions of a commercial real estate loan or investment are calculated by multiplying the attribution factor by the building's emissions. Thus, financed emissions are calculated as follows:

$$\text{Financed emissions} = \sum_b \text{Attribution factor}_b \times \text{Emissions of building}_b$$

*(with b = building)*

The emissions of buildings are calculated as the product of its energy consumption and specific emission factors for each type of energy consumed. The total energy use of the building includes the energy consumed by the building's occupant. The equations below are the result.

For buildings under development, construction, or rehabilitation:

$$\text{Financed emissions} = \sum_b \frac{\text{Outstanding amount}_b}{\text{Total construction cost}_b} \times \text{Energy consumption}_b \times \text{Emission factor}_e$$

*(with b = building, e = energy source or energy carrier)*  
*In this case, the energy consumption is the energy that is expected to be consumed once the building is ready for occupancy*

For existing buildings:

$$\text{Financed emissions} = \sum_b \frac{\text{Outstanding amount}_b}{\text{Property value at origination}_b} \times \text{Energy consumption}_b \times \text{Emission factor}_e$$

*(with b = building, e = energy source or energy carrier)*

## Data required

Direct measurements of building energy consumption are preferred but may not be widely available. In the absence of direct measurements, energy use can be estimated based on building characteristics and publicly available data.

Various sources and commercial databases are available and divide energy consumption by characteristics like energy label, type of property, and floor area of property. When applying these data on a large sample of financed properties it is possible to get a reasonable approximation of the CO<sub>2</sub>e emissions. Similarly, verified emission factors for specific energy sources should be used if they are available. If they are not, average/standard emission factors may be used.

Based on the data available, the following data hierarchy is proposed in order of preference:

**Table 5-8. General description of the data quality score table for commercial real estate**  
**(Score 1 = highest data quality; score 5 = lowest data quality)**

Data Quality	Options to estimate the financed emissions	When to use each option
Score 1	Option 1: Actual building emissions	1a Outstanding amount and construction costs OR property value at loan or investment origination are known. Primary data on <b>actual building energy consumption</b> is available. Emissions are calculated using actual building energy consumption and <b>verified emission factors</b> specific to the respective energy source.
Score 2		1b Outstanding amount and construction costs OR property value at loan or investment origination are known. Primary data on <b>actual building energy consumption</b> is available. Emissions are calculated using actual building energy consumption and <b>average/standard emission factors</b> specific to the respective energy source.
Score 3	Option 2: Estimated building emissions based on floor area	2a Outstanding amount and construction costs OR property value at loan or investment origination are known. <b>Estimated building energy consumption per floor area based on official building energy labels AND the floor area</b> are available. Emissions are calculated using estimated building energy consumption and <b>average/standard emission factors</b> specific to the respective energy source.
Score 4		2b Outstanding amount and construction costs OR property value at loan or investment origination are known. <b>Estimated building energy consumption per floor area based on building type and location specific statistical data AND the floor area</b> are available. Emissions are calculated using estimated building energy consumption and <b>average/standard emission factors</b> specific to the respective energy source.
Score 5	Option 3: Estimated building emissions based on number of buildings	3 Outstanding amount and construction costs OR property value at loan or investment origination are known. <b>Estimated building energy consumption per building based on building type and location specific statistical data AND the number of buildings</b> are available. Emissions are calculated using estimated building energy consumption and <b>average/standard emission factors</b> specific to the respective energy source.

A detailed summary of the data quality score table, including data needs and equations to calculate financed emissions, is provided in the Annex (Table 9-4).

### Grid Emission Factors

Consumed energy can be converted to CO<sub>2</sub>e using emission factors. When converting building electricity use to GHG emissions, care should be taken to use energy units—i.e., source or primary versus site energy—appropriate for the GHG emission factors. These factors should be specified according to the type of energy consumed. PCAF recommends using emission factors for the grid mix.

### Building Characteristics

Various building characteristics can be taken into consideration to provide additional resolution to average energy consumption and emissions when actual data is unavailable. Many countries conduct surveys to publicly provide building type and location-specific statistical data on average

energy consumption by characteristics such as floorspace, principle building activity, region, number of floors, and year constructed. Other national surveys might also provide tables on emissions and energy source/end use by industry and region.

## Other considerations

### Obtaining Data on Energy Consumption

Actual energy consumption data of CRE is preferred; however, when information is not available in existing portfolios, financial institutions should opt to estimate the energy use. Where possible, most-common regional electricity grid mix data for the building's location should be used. If unavailable, country-level electricity grid mix emissions data should be used.

To improve building energy use estimation, financial institutions should collect data on building characteristics (e.g., size, building use, climate zone, and year constructed).

### Accounting for Energy Performance

In the case that building energy use is estimated, an optional energy efficiency discount factor (i.e., modifier) may be applied to account for energy performance that is different from the average, for example, buildings with high efficiency features or efficiency energy labels. Such a factor can be applied to either overall building energy consumption or specifically to one component of energy use; for example, to discount electricity consumption in the case of a building with a solar PV system. If such a factor is used for energy estimation, its value and justification should be reported. If the discount factor exceeds 100% (i.e., the building is a net exporter of energy), it should be considered an energy project and its emissions should be calculated using the project finance methodology (section 5.3).

## Limitations of the method

### Country-Specific Assumptions

Many countries lack widespread use of building energy labels, and it may be challenging for financial institutions to access a borrowers' measured consumption data. As such, limited actual data will require financial institutions to estimate building energy use. Institutions may find that the data they have available in the existing portfolio requires the use of average values. Collection of additional building data at loan or investment origination may improve future estimations of energy use. Some municipal governments are collecting building energy data and this could prove useful for some institutions.

Some country-specific adjustments will need to be made depending on the data availability and standards in each country to make the calculation applicable. The variations across countries in their systems of categorizing energy efficiency of buildings require a tailored approach for optimal accuracy in calculations.

### **Property Value**

This Standard requires financial institutions to use the property values determined at the origination of the loan or investment, both as a practical matter (property value is generally required at loan origination and may not be regularly updated) and as a conceptual one (e.g. the loan was made in relation to the original value, using loan outstanding to original value provides a consistent estimate of the proportion of the project attributable to the loan). If the property value is not available, alternative sources may be used, such as tax assessment records. The property value should include the value of both the land and building improvements.

# 5.5 Mortgages

Introduction

CHAPTER 1

Understand what carbon accounting is

CHAPTER 2

Identify business goals

CHAPTER 3

Review accounting and reporting principles and rules

CHAPTER 4

Review and apply accounting methodologies for each asset class

CHAPTER 5

Report emissions

CHAPTER 6

## Asset class definition

On-balance sheet loans used to purchase residential property, including multifamily properties with no limit on the number of units. This definition implies that the property is used for residential purposes. A large, multi-unit property with minimal retail components could ignore the commercial aspects if they are minimal. If data is available to differentiate the residential and retail components, it is suggested that two parallel calculations are conducted, one for the residential part using the mortgage method and another for the commercial part using the commercial real estate method. These decisions should be documented and noted in the disclosure reports.

More accurate results are attainable if the mortgage methodology is used when CRE transactions involve residential housing.

The lending secured for homes where the funds are used for any purpose other than purchasing that property are considered consumer loans.<sup>72</sup>

## Emission scopes covered

Financial institutions shall cover the absolute scope 1 and 2 emissions related to the energy use of financed buildings (energy use includes the energy consumed by the building occupant).

## Attribution of emissions

When calculating the financed emissions, 100% of a building's annual emissions are attributed to the financial institution (i.e., attribution factor is 100%).

Mortgages are an example of an asset class where a financial institution can directly engage with its customers and take responsibility for a societal challenge because a financial institution is often the only provider of a mortgage to purchase a property. While this is not true across all markets, the energy characteristics of the financed properties can be considered in lending decisions. Some lenders do or could develop product lines to support increased efficiency or use of clean energy for financed homes. This attribution rule also applies if the financial institution provides an additional mortgage for property improvement. If the mortgage is for financing a renewable energy project or energy efficiency project on the house, the financial institution should use the project finance method (section 5.3).

This Standard does not take the loan-to-value (LTV) into account because it leads to emissions fluctuating with property value. Financial institutions shall assume 100% of the building's emissions until it is feasible for property owners to take ownership of the emissions from the equity stake in their properties. During the mortgage period financial institutions have the opportunity to lower the financed emissions by offering additional financial services to improve the building's energy performance (e.g., green mortgages, low carbon mortgages or energy efficient mortgages are some of the existing products in various markets around the globe).

<sup>72</sup> If the consumer loan is to purchase motor vehicles, financial institutions shall use the motor vehicle loans asset class method (section 5.6)

## Equations to calculate financed emissions

Since the attribution factor for this asset class is 100%, the annual financed emissions of a mortgage are equivalent to 100% of the building's emissions at the time of carbon accounting.

$$\text{Financed emissions} = \sum_b \text{Emissions of building}_b$$

$$\text{Financed emissions} = \sum_b \text{Energy consumption}_b \times \text{Emission factor}_e$$

(with  $b$  = building,  $e$  = energy source or energy carrier)

## Data required

The data availability on the energy consumption of properties is still limited in many countries; in others, it has improved considerably due to policy regulations within the built environment (like the introduction of energy performance certificates and energy labels). In such countries, the available data is usually anonymized by averaging data over several households in the same peer group. Often building's energy data is available by energy label, type of household/sector, and type of property. When applying these data on many financed properties it is possible to get a reasonable approximation of the CO<sub>2</sub>e emissions.

As more data sources become available it is expected that institutions move up the data hierarchy, but easily accessible data for many countries are currently between score 4 and 5 of the data quality score table provided below.

Some financial institutions may not collect information on property size, in which case they can use the average energy consumption by building and geographic region. Financial institutions should use the highest precision dataset possible and evaluate new data sources on a regular basis.

**Table 5-9. General description of the data quality score table for mortgages**  
**(Score 1 = highest data quality; score 5 = lowest data quality)**

Data Quality	Options to estimate the financed emissions	When to use each option
Score 1	<b>Option 1: Actual building emissions</b>	<b>1a</b> Primary data on <b>actual building energy consumption</b> is available. Emissions are calculated using actual building energy consumption and <b>verified emission factors</b> specific to the respective energy source.
Score 2		<b>1b</b> Primary data on <b>actual building energy consumption</b> is available. Emissions are calculated using actual building energy consumption and <b>average/standard emission factors</b> specific to the respective energy source.
Score 3	<b>Option 2: Estimated building emissions based on floor area</b>	<b>2a</b> <b>Estimated building energy consumption per floor area based on official building energy labels AND the floor area</b> are available. Emissions are calculated using estimated building energy consumption and <b>average/standard emission factors</b> specific to the respective energy source.
Score 4		<b>2b</b> <b>Estimated building energy consumption per floor area based on building type and location specific statistical data AND the floor area</b> are available. Emissions are calculated using estimated building energy consumption and <b>average/standard emission factors</b> specific to the respective energy source.
Score 5	<b>Option 3: Estimated building emissions based on number of buildings</b>	<b>3</b> <b>Estimated building energy consumption per building based on building type and location specific statistical data AND the number of buildings</b> are available. Emissions are calculated using estimated building energy consumption and <b>average/standard emission factors</b> specific to the respective energy source.

A detailed summary of the data quality score table including data needs and equations to calculate financed emissions is provided in the Annex (Table 9-5).

Financial institutions should work with actual data on the energy consumption of properties, if available. The consumed energy at the household level (e.g., gas, electricity, heating oil, wood) can be converted to CO<sub>2</sub>e-emissions using verified emission factors or average emission factors if no emissions data is provided in the chosen data sources (some data sources report only energy use whereas others report CO<sub>2</sub>e emissions). As an intermediate step, financial institutions could start collecting building size (in addition to geographic location and building type) and energy labels where available to more accurately capture the associated GHG emissions of their mortgages.



## Other considerations

### Obtaining Data on Energy Consumption

Actual consumption data that is made anonymous (but also specific for a certain mortgage portfolio) is preferred. The actual energy consumption will be more accurate than working with average energy consumption. In some markets with clear government partnerships on climate action, financial institutions might attempt to work at a policy level to obtain actual data directly from grid operators.

Likely the largest impact on emissions will be the energy mix and sources for the grid in the building's location. Over time almost all grids are becoming lower emission, providing gradually reduced emissions for mortgage portfolios. Where possible, most-common regional electricity grid mix data for the building's location should be used; if unavailable, country-level electricity grid mix emissions data should be used. If actual consumption data is unavailable, financial institutions should start collecting building size data in addition to geographic location and building type to more accurately capture the associated GHG emissions of their mortgages.

If actual consumption data is used, it is unclear if all the energy consumption is applicable solely for the house or, for instance, also for an electric vehicle. The actual energy consumption data can be further refined using the type of electricity used.

### Off-Balance Mortgages and Subsidiaries

The scope of this methodology is on-balance mortgages; therefore, off-balance are not included. If relevant and substantial, off-balance sheet mortgages can be reported separately.

### Distinguishing between Private and Corporate Mortgage

No distinction is made between private or corporate mortgages.

## Limitations of the method

### Results Dependent on Data Quality

Many assumptions must be made to calculate the emissions of mortgages as data is 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 is replaced by actual consumption data from grid operators.

### Country-Specific Assumptions

Some country-specific adjustments will need to be made depending on the data availability and standards in each country to make the calculation applicable. The variations across countries in their systems of categorizing energy efficiency of houses require a tailored approach for optimal accuracy in calculations.

### **Double Counting**

As 100% of the emissions per mortgage is attributed to the mortgage provider, it is possible that houses with mortgages from multiple providers get double counted.

### **Mortgage size and amortization of a mortgage**

As the attribution is 100% of the annual building's emissions, the size of the mortgage is not taken into account. Also, the amortization of a mortgage loan over the loan period is not incorporated in this method. To overcome these limitations, there are potentially two options which should be considered with stakeholders in preparing the final methodology; 1. an institution could choose to reduce the loan amount after origination based on the remaining principal of the loan. In year one of a mortgage it is 100% attribution, for example, in year thirty on a thirty year mortgage it is 0%; 2. an institution could attribute the emissions to the value of the property at loan origination.

# 5.6 Motor vehicle loans

Introduction

CHAPTER 1

Understand what carbon accounting is

CHAPTER 2

Identify business goals

CHAPTER 3

Review accounting and reporting principles and rules

CHAPTER 4

Review and apply accounting methodologies for each asset class

CHAPTER 5

Report emissions

CHAPTER 6

## Asset class definition

This asset class refers to on-balance sheet loans that are used to finance one or several<sup>73</sup> motor vehicles. Financial institutions will finance different vehicle types and will also use different internal definitions and categories for the motor vehicle types being financed by their investments. For example, one financial institution may have a portfolio mainly of passenger cars and motorcycles, while another financial institution may have a strong share of buses and heavy duty trucks. This methodology does not prescribe a specific list of vehicle types falling within this asset class but instead leaves it open for financial institutions to decide and define what vehicle types to include in their inventory of financed emissions. It is the responsibility of each financial institution to define the vehicle types included in their inventory of financed emissions, and (in the case of leaving a specific vehicle type out of the carbon accounting exercise) provide a transparent explanation of why a vehicle type is excluded.

The following list exemplifies the possible vehicle types that may fall under the asset class of motor vehicle loans:

- Passenger car
- Motorcycle
- Light commercial truck
- Medium/heavy commercial truck
- Bus
- Snowmobiles/all-terrain vehicles (ATVs)
- Boats, including out board motors<sup>74</sup>
- Yellow equipment (i.e., earth-moving vehicles for mining and construction)

This is not an exhaustive list, other vehicle types can also be included.

Financial institutions typically finance motor vehicle loans through consumer lending or business lending. Consumer lending for motor vehicles includes financing the purchase of a single motor vehicle, whereas business loans for motor vehicles typically includes financing a fleet of motor vehicles. Motor vehicle loans are distinguished as consumer loans for the purchase of motor vehicles (i.e., consumer motor vehicle loans) and as business loans for the purchase of motor vehicles (i.e., business motor vehicle loans).

## Emission scopes covered

Financial institutions shall cover the following emission scopes:

- Scope 1 – Direct emissions from fuel combustion in vehicles.
- Scope 2 – Indirect emissions from electricity generation consumed in EVs (hybrid and electric vehicles).
- Scope 3 emissions related to the production of vehicles, delivery of vehicles to buyer, or decommissioning of vehicle after use are not covered as these emissions are considered marginal<sup>75</sup>.

<sup>73</sup> It is possible that a single loan covers the purchase of several vehicles or fleets. In any case, the methodology presented in this chapter should be used.

<sup>74</sup> Depending on the portfolio of some financial institutions, it may be appropriate to differentiate between the vehicle and the propulsion system of that vehicle. In this case, it is possible to apply the methodology for the vehicle as a whole, but also to the propulsion system on its own. An example of this are financial institutions that have boats on their portfolio. In this case it is common to have loans for boats but also loans for outboard motors alone.

<sup>75</sup> Note that this aligns with the Science-Based Target (SBT) approach for transport activities.

## Attribution of emissions

The attribution (i.e., attribution factor) depends on whether the loan is a consumer or a business motor vehicle loan, in a similar way that the attribution is different for mortgages than for commercial real estate. The following rules apply:

1. **Consumer motor vehicle loans:** Where consumer loans are used to finance motor vehicles, 100% of annual vehicle emissions are attributed to the financial institution when calculating the finance emissions (i.e., attribution factor is 100%). The reason for this is twofold: it is highly unlikely that multiple financial institutions are providing a single consumer multiple motor vehicle loans for the purchase of one vehicle. In addition, similar to mortgages, it is best for financial institutions to assume 100% of the vehicle's emissions until it is feasible for individuals to take ownership of the emissions from the equity stake in their vehicles.
2. **Business motor vehicle loans:** Where business loans are used to finance motor vehicles, the attribution factor is calculated by dividing the outstanding loan amount by the total value of the purchased fleet (i.e., equity plus debt). For business loans, it is highly likely that multiple financial institutions are providing a single company multiple motor vehicle loans. Borrower's equity is considered here, as companies must take ownership of the emissions from the equity stake in their vehicles. If the total value of the purchased fleet is unknown, financial institutions are encouraged to take a conservative approach and assume 100% attribution.

## Equations to calculate financed emissions

The financed emissions of a single consumer motor vehicle loan correspond to 100% of the vehicle's emissions. For business motor vehicle loans, the emissions are calculated by multiplying the attribution factor by the emissions of the vehicle. For both types of motor vehicle loans, the emissions can be calculated by multiplying the vehicle efficiency (e.g., l diesel/km) with the vehicle distance traveled (e.g., km) and the vehicle fuel's respective emission factor (e.g., kg CO<sub>2</sub>e/l diesel). The total financed emissions from multiple motor vehicle loans are calculated as follows:

$$\text{Financed emissions} = \sum_v \left( \frac{\text{Outstanding amount}_v}{\text{Total value at origination}_v} \right)^* \times \text{Vehicle emissions}_v$$

$$\text{Financed emissions} = \sum_v \left( \frac{\text{Outstanding amount}_v}{\text{Total value at origination}_v} \right)^* \times \text{Efficiency}_v \times \text{Distance travel}_v \times \text{Emission factor}_f$$

(with  $v$  = vehicle or vehicle fleet,  $f$  = fuel type)

\* This part of the equation is only needed for business motor vehicle loans. For consumer loans, the value is 100%.

The financed emissions from motor vehicle loans can be calculated in several ways, depending on the availability of data to derive the financed vehicle's emissions. Overall, PCAF distinguishes three options to calculate the financed emissions from motor vehicle loans, depending on the data used<sup>76</sup>:

76 Note that for all options the attribution factor is calculated in the same way, the only thing changing is the way how vehicle emissions are calculated.

- **Option 1: Actual vehicle-specific emissions**,<sup>77</sup> where emissions are calculated based on actual vehicle fuel consumption or actual vehicle distance traveled for a known vehicle make and model, with data directly collected from the borrower.
  - **Option 1a:** Vehicle emissions are calculated based on primary data on **actual fuel consumption**.
  - **Option 1b:** Vehicle emissions are calculated based on vehicle efficiency and fuel type (fossil or electricity) from **known vehicle make and model**<sup>78</sup> and primary data for **actual vehicle distance traveled**.
  
- **Option 2: Estimated vehicle-specific emissions**, where emissions are calculated based on estimated vehicle distance traveled for a known vehicle make and model, with data collected from official statistics.
  - **Option 2a:** Vehicle emissions are calculated based on vehicle efficiency and fuel type (fossil or electricity) from **known vehicle make and model** and **estimated vehicle distance** traveled derived from **local statistical data**.<sup>79</sup>
  - **Option 2b:** Vehicle emissions are calculated based on vehicle efficiency and fuel type (fossil or electricity) from **known vehicle make and model** and **estimated vehicle distance** traveled derived from regional statistical data.<sup>80</sup>
  
- **Option 3: Estimated vehicle-unspecific emissions**, where emissions are calculated based on estimated vehicle distance traveled for an unspecified vehicle, with data collected from official statistics.
  - **Option 3a:** Vehicle emissions are calculated based on vehicle efficiency and fuel type (fossil or electricity) from **known vehicle type**<sup>81</sup> and estimated vehicle distance traveled derived from **local or regional statistical data**.
  - **Option 3b:** Vehicle emissions are calculated based on vehicle efficiency and fuel type (fossil or electricity) from an **average vehicle** (i.e., vehicle make and model and vehicle type is unknown)<sup>82</sup> and **estimated vehicle distance** traveled derived from **local or regional statistical data**.

77 For consumer motor vehicle loans, this approach seems highly unrealistic as consumers are unlikely to report their actual fuel consumption or distance travelled to a financial institution. However, for business motor vehicle loans (in particular for financing of company-owned staff cars), investee companies often collect information on actual fuel consumption or distance travelled already and could therefore share such information with financial institutions.

78 Vehicle make and model refers to the name of the company that manufactures the vehicle and the product name of the vehicle. For example, Toyota Prius.

79 Local statistical data refers to statistical data at province/state or small country level.

80 Regional statistical data refers to statistical data at large country or a subcontinental level.

81 Vehicle type, for example, refers to an overall vehicle class such as passenger car, bus or light commercial truck.

82 If it is not possible to know the vehicle type, then an average vehicle can be assumed.

**Data required**

PCAF distinguishes three options with six sub-options to calculate the financed emissions from motor vehicle loans, depending on the data used. Although Option 1b, Option 2a, and Option 2b are all based on known vehicle characteristics on vehicle efficiency and fuel type, the data used for vehicle distance travel is of higher quality for Option 1b than it is for Option 2a, and it is of higher quality for Option 2a than it is for Option 2b. In this sense, while there are several options to calculate financed emissions, the quality of the results is not the same for all these options. For this reason, PCAF gives a higher score to results obtained with a higher data quality and a lower score to results obtained with a lower data quality (Score 1 = highest data quality; Score 5 = lowest data quality). In case a financial institution uses a mix of options to calculate the emissions of a borrower (e.g., actual distance traveled and vehicle type is known while vehicle make and model is unknown, which means that Option 1b and Option 3a are mixed), the data score for the lower-rated option should be assumed for this borrower (i.e., score 4 from Option 3a).

Table 5-10 provides data quality scores for each of the described options that can be used to calculate the financed emissions for motor vehicle loans.

**Table 5-10. General description of the data quality score table for motor vehicle loans**  
**(Score 1 = highest data quality; score 5 = lowest data quality).**

Data Quality	Options to estimate the financed emissions	When to use each option	
Score 1	Option 1: Actual vehicle-specific emissions	1a	Outstanding amount and total value of vehicle or vehicle fleet are known (needed only for business motor vehicle loans). Primary data on <b>actual vehicle fuel consumption</b> is available. Emissions are calculated using actual fuel consumption and fuel type specific emission factors.
		1b	Outstanding amount and total value of vehicle or vehicle fleet are known (needed only for business loans). Vehicle efficiency and fuel type (fossil and/or electricity) are available from <b>known vehicle make and model</b> . <sup>83</sup> Primary data on <b>actual vehicle distance</b> traveled is available. Emissions are calculated using estimated fuel consumption and fuel type specific emission factors.
Score 2	Option 2: Estimated vehicle-specific emissions	2a	Outstanding amount and total value of vehicle or vehicle fleet are known (needed only for business loans). Vehicle efficiency and fuel type (fossil and/or electricity) are available from <b>known vehicle make and model</b> . <b>Distance traveled is estimated based on local statistical data</b> . <sup>84</sup> Emissions are calculated using estimated fuel consumption and fuel type specific emission factors.
Score 3		2b	Outstanding amount and total value of vehicle or vehicle fleet are known (needed only for business loans). Vehicle efficiency and fuel type (fossil and/or electricity) are available from <b>known vehicle make and model</b> . <b>Distance traveled is estimated based on regional statistical data</b> . <sup>85</sup> Emissions are calculated using estimated fuel consumption and fuel type specific emission factors.
Score 4	Option 3: Estimated vehicle-unspecific emissions	3a	Outstanding amount and total value of vehicle or vehicle fleet are known (needed only for business loans). Vehicle efficiency and fuel type (fossil and/or electricity) are estimated from <b>known vehicle type (vehicle make and model is unknown)</b> . <sup>86</sup> <b>Distance traveled is estimated based on local or regional statistical data</b> . Emissions are calculated using estimated fuel consumption and fuel type specific emission factors.
Score 5		3b	Outstanding amount and total value of vehicle or vehicle fleet are known (needed only for business loans). Vehicle efficiency and fuel type (fossil and/or electricity) are estimated for an <b>average vehicle (i.e., vehicle make and model as well as vehicle type is unknown)</b> . <sup>87</sup> <b>Distance traveled is estimated based on local or regional statistical data</b> . Emissions are calculated using estimated fuel consumption and fuel type specific emission factors.

83 Vehicle make and model refers to the name of the company that manufactures the vehicle and the product name of the vehicle. For example, Toyota Prius.

84 Local statistical data refers to data at province/state or small country level.

85 Regional statistical data refers to data at large country or a subcontinental level.

86 Vehicle type, for example, refers to a passenger car, bus or light commercial truck.

87 If it is not possible to know the vehicle type, then an average vehicle can be assumed.



A detailed summary of the data quality score table, including data needs and equations to calculate financed emissions, is provided in the Annex (Table 9-6).

Data for all three options can be derived from different data sources.

Data on vehicle efficiency and fuel type per vehicle make and model, for example, can be derived from official statistical data sources such as the US Environmental Protection Agency's Federal Test Procedure (US EPA's FTP)<sup>88</sup> and the EU European Environmental Agency's Worldwide Harmonized Light Vehicles Test Procedure (EU EEA's WLTP).<sup>89</sup> Both data sources provide detailed vehicle efficiency and fuel type information per make and model. Note that Option 1b, Option 2a, and Option 2b require such information. If make and model is unknown to the reporting financial institution (Option 3), vehicle efficiency and fuel type can be estimated on vehicle type level (e.g., passenger car) using, for example, the International Council on Clean Transportation's (ICCT) Transportation Roadmap<sup>90</sup> or the OECD International Transport Forum (ITF-OECD).<sup>91</sup>

If no actual distance traveled is known to the reporting financial institution, data on vehicle distance traveled can be estimated based on data sources such as the ICCT Transportation Roadmap or the OECD ITF-OECD. There are also several local statistical data sources that provide geography-specific vehicle distances traveled. For the US and Canada, for example, state- or province-level distance per year can be retrieved from [carinsurance.com](http://carinsurance.com)<sup>92</sup> and the Canadian Office of Energy Efficiency.<sup>93</sup>

PCAF expects that the financed emissions for motor vehicle loans can be derived through either actual vehicle-specific emissions (Option 1), estimated vehicle-specific emissions (Option 2), or estimated vehicle-unspecific emissions (Option 3). However, PCAF allows the use of alternative approaches to calculate emissions if none of the options specified above can be used, or in the case that new approaches are developed. The reporting financial institution shall always explain the reasons for using an alternative approach if it deviates from the options defined above.

88 The United States Environmental Protection Agency's Federal Test Procedure are a series of drive cycle tests to measure the tailpipe emissions and fuel efficiency of passenger cars. Because these tests are used to verify that cars sold in the U.S. meet EPA regulatory standards, their results reflect the road performance of passenger cars in the U.S. The results for more than 4,000 make-and-models are publicly available on [fuelconomy.gov](http://fuelconomy.gov), downloadable in .csv format.

89 The World harmonized Light-duty vehicles Test Procedure is a global, harmonized standard of drive cycle tests to determine the tailpipe emissions and fuel efficiency of passenger cars. It was developed by the United Nations Economic Commission for Europe (UNECE) to replace the old New European Driving Cycle (NEDC) as the European vehicle homologation procedure. The NEDC was indeed shown to be flawed, enabling manufacturers to meet EU environmental standards during lab tests but not on the road (Dieselgate). The WLTP was conceived to rectify this. The WLTP is fairly recent: its final version was published in 2015. Hence, even though it will in time become a truly international standard, it is for now only used in the European Union, and its results only reflect the performance of cars sold within the EU. These results are published by the European Environment Agency in .csv format and can be downloaded at <https://www.eea.europa.eu/data-and-maps/data/co2-cars-emission-16>

90 The International Council on Clean Transportation (ICCT)'s Transportation roadmap has been a global reference for environmental performance data on all major transportation modes, fuel types and vehicle technologies since 2012. Over the past decade, the ICCT has extended its Roadmap model to cover eleven of the largest vehicle markets (Australia, European Union, Brazil, Canada, China, India, Japan, Mexico, South Korea, Russia and the United States) and five aggregate regions (Africa, Other Asia-Pacific, Other Europe, Other Latin America and the Middle-East). The most recent results of the model (2017) are downloadable in .xlsx format on the ICCT website: <https://theicct.org/transportation-roadmap#about>

91 The OECD iLibrary maintains a database of Transport Statistics collected by the International Transport Forum on the transport of freight (maritime, air and surface) and passengers (car, rail and air) in its member states. [https://www.oecd-ilibrary.org/transport/data/itf-transport-statistics\\_trsprt-data-en](https://www.oecd-ilibrary.org/transport/data/itf-transport-statistics_trsprt-data-en)

92 More information can be found at: <https://www.carinsurance.com/Articles/average-miles-driven-per-year-by-state.aspx>

93 More information can be found at: <http://oee.nrcan.gc.ca/publications/statistics/cvs08/appendix-1.cfm?graph=6&attr=0>

## Other considerations

### CO<sub>2</sub> vs CO<sub>2</sub>e Data

Many vehicle emissions data include only CO<sub>2</sub> emissions. As other GHGs are often negligible, focusing on CO<sub>2</sub> only is accepted by PCAF.

## Limitations of the method

### Data Availability

Information regarding actual vehicle distance traveled may not be easily available. If actual data is unavailable, PCAF proposes the use of local or regional averages on vehicle distance traveled by state, province, country, or region.

PCAF proposes that financial institutions collect the actual vehicle make and model to determine the exact vehicle efficiency and fuel type. If the financial institution does not track the vehicle make and model, PCAF proposes that the financial institutions determine the vehicle efficiency using the weighted average vehicle efficiency by vehicle type (e.g., passenger car, motorcycle, light commercial truck, medium/heavy commercial truck, bus).

### Dual Fuel Vehicles

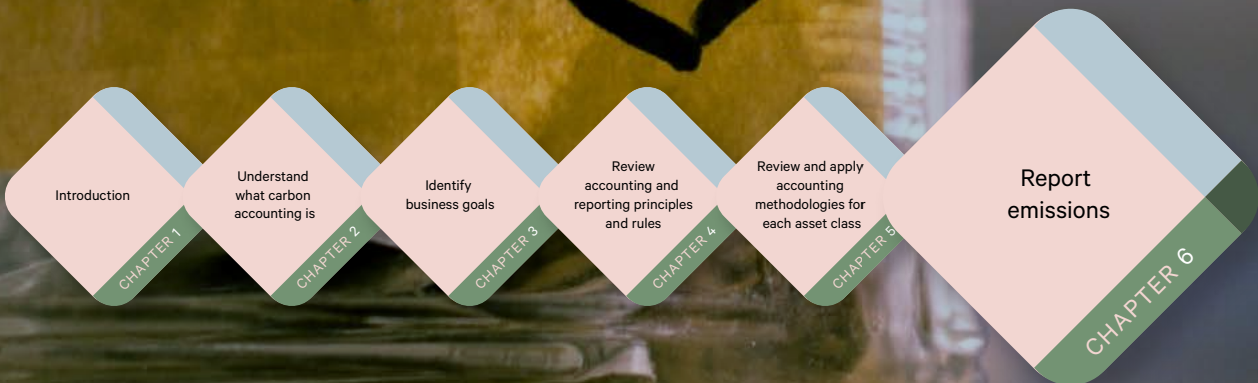
For dual fuel vehicles, the percentage of usage per fuel may be unknown. If the vehicle make and model is unknown and no information is available on the usage per fuel, PCAF proposes to use the average split between fuels by vehicle type.

### Electricity Grid Estimates

Exact electricity source data will not be known for each vehicle in a financial institution's portfolio (e.g., where does the borrower source electricity? Does the borrower source gray or green electricity?). Where possible, the most common regional electricity grid mix data for the borrower's location should be used. If unavailable, the most common regional electricity grid mix data for the financial institution's branch should be used (i.e., location of the financial institution where the loan was issued). If also unavailable, country-level electricity grid mix emissions data should be used.

# 6. Recommendations and requirements for disclosure

TIP: 



It is crucial that the financial sector report GHG emissions of loans and investments for transparency and accountability. The following reporting recommendations and requirements guide financial institutions to disclose the GHG emissions associated with their loans and investments. Rather than creating a new framework, PCAF developed these reporting guidelines to complement existing frameworks such as TCFD, GRI, SASB, GAAP, and IFRS.<sup>94</sup> It adheres to and builds upon the reporting requirements set out by the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard.

All financial institutions that commit to using this Standard shall fulfil certain requirements when disclosing their financed emissions publicly. However, they do have the flexibility to decide where they want to start with measuring and disclosing their financed emissions, for instance, at a specific asset-class level or for a specific sector within a certain asset class. Flexibility in reporting is allowed largely as a consequence of limitations in data availability and quality. PCAF recognizes that data for many asset classes may not be available to financial institutions and that a financial institution may not be able to disclose 100% of its portfolio. However, financial institutions shall be transparent in their coverage and justify any exclusions.

The requirements for disclosure of financed emissions describe a minimum disclosure level with room for institutions to report beyond this level. Any requirements not fulfilled must be accompanied by an explanation. Minimum reporting requirements are described in this chapter using the word “**shall**.” Where certain aspects of reporting are not required but encouraged as best practice, the word “**should**” is used.

### **Report using the operational control consolidation approach<sup>95</sup>**

The asset class methods in this Standard are used to calculate the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard scope 3, category 15 emissions from financial investments. According to the GHG Protocol, three consolidation approaches can be applied by financial institutions to account for their scope 1, 2, and 3 emissions, namely equity, operational control, and financial control. For PCAF reporting, financial institutions **shall** use the operational control approach, and all financed emissions **shall** be accounted for in their scope 3, category 15 reporting.

---

94 Abbreviations: Task Force on Climate-related Financial Disclosures (TCFD), Generally Accepted Accounting Principles (GAAP), International Financial Reporting Standards (IFRS)

95 Additional information on consolidation approaches can be found in Chapter 4.

## Overall reporting guidelines

- **Principles:** GHG accounting and reporting of financial institutions **shall** be based on the following principles: relevance, completeness, consistency, transparency, and accuracy.
- **Purpose:** A financial institution's reporting **should** align with its specific business goals; for instance, for identifying and managing climate-related transition risks or for steering toward a specific emission reduction target.
- **Frequency:** Financial institutions **shall** disclose at least annually and at a fixed point in time in line with the financial accounting cycle.
- **Form of reporting:** Financial institutions **shall** disclose in publicly available reports such as (semi-) annual reports, website articles, or other publicly available sources, as deemed appropriate by the financial institution.
- **Past performance:** Where appropriate and relevant for their business goals, financial institutions **should** disclose their financed emissions for multiple comparable time periods (e.g., years).

## Coverage

- Financial institutions **should** aim to disclose 100% of absolute emissions for all of the relevant asset classes covered in Chapter 5, and **shall** disclose and justify any exclusions in the public report. Potential justification criteria for exclusion are:
  - Data availability: Required data is not available to the financial institutions.
  - Size: The activities are insignificant to the institution's total anticipated financed emissions.
  - Stakeholders: The activities are not deemed critical by key stakeholders (e.g., customers, shareholders, or civil society).
  - Methodology: There is no global methodology to quantify the financed emissions of specific activities, i.e., asset classes not covered in this standard.
  - Financial institutions **shall** disclose the percentage of their total loans and investments covered in their financed emissions inventories (e.g., a financial institution's total outstanding loans and investments by asset class noting any limitations and exclusions).

## Gases and units

- Financial institutions **shall** account for the seven gases under the Kyoto Protocol that are also mandated under the UNFCCC to be included in national inventories if they are emitted in the value chain. These are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF<sub>6</sub>), and nitrogen trifluoride (NF<sub>3</sub>).
- These seven gases **shall** be converted to carbon dioxide equivalents (CO<sub>2</sub>e) using the 100-year time horizon global warming potentials (GWP) published by the IPCC—either the AR5 values published by the GHG Protocol,<sup>96</sup> or the IPCC’s most recently published assessment report.<sup>97</sup>
- Financial institutions **shall** express their financed emissions in metric tonnes of carbon dioxide equivalents (tCO<sub>2</sub>e), or another appropriate metric conversion, e.g., kilotonnes (ktCO<sub>2</sub>e), megatonnes (MtCO<sub>2</sub>e). When emissions from a specific GHG (e.g., methane emissions) are material and relevant, financial institutions **should** consider a separate disclosure of these emissions.
- Biogenic CO<sub>2</sub> emissions that occur in the value chain **shall** not be included in the scopes but **shall** be included and separately reported in the public report.

## Absolute emissions

- Institutions **shall** disclose the absolute emissions (scope 1 and 2 combined) of their loans and investments. If it serves the financial institutions’ business goals, absolute scope 1 and scope 2 emissions of loans and investments **should** be reported separately from each other.
- Where required by the relevant methodology in Chapter 5, financial institutions **shall** separately disclose the absolute scope 3 emissions of their loans and investments, including the specific sectors covered. Financial institutions **shall** explain if they are not able to provide scope 3 information because of data availability or uncertainty.
- Financial institutions **shall** disaggregate and disclose absolute emissions data at the asset class level and may disclose absolute emissions data at the sector level as well, particularly for the most carbon intensive sectors (e.g. energy, power, cement, steel, automotive).

## Avoided emissions and emissions removals<sup>98</sup>

- In addition to absolute emissions, financial institutions **should** report avoided emissions and emissions removals where relevant to their loans and investments.
- If financial institutions choose to disclose avoided and removed emissions, they **shall** disclose absolute generated, avoided, and removed emissions separately from the financial institution’s scope 1, scope 2, and scope 3 inventories.

<sup>96</sup> (GHG Protocol, 2014)

<sup>97</sup> The IPCC reports can be found at: <https://www.ipcc.ch>

<sup>98</sup> As defined in chapter 3, removed emissions are those related to projects or technologies that can result in carbon dioxide being sequestered by trees or removed from the atmosphere and stored in solid or liquid form.

## Emissions intensity

- Financial institutions **should** report financial emission intensities if these values are relevant to their business goals.
- Financial emission intensities **shall** be expressed in metric tonnes of carbon dioxide equivalents per million euro/dollar invested or loaned: tCO<sub>2</sub>e/M€ or tCO<sub>2</sub>e/M\$.
- When relevant to their business goals, financial institutions **should** consider reporting emission intensities per sector using sector-specific activity (e.g., tCO<sub>2</sub>e/m<sup>2</sup> for real estate, tCO<sub>2</sub>e/MWh for power utilities, tCO<sub>2</sub>e/tonne of steel produced for steel companies).

## Data and data quality

- Financial institutions **shall** use the most recent data available to them.
- Financial institutions **shall** provide a description of the types and sources of data—including activity data, assumptions, emission factors and all relevant publication dates—used to calculate emissions. Descriptions **shall** be written with an aim to create transparency.
- Financial institutions **shall** publish a weighted score by outstanding amount of the data quality of reported emissions data or **shall** explain why they are unable to do so. An example is provided in box 5.
- Where financial institutions are reporting scope 3 emissions, the weighted data quality score **shall** be reported separately from scopes 1 and 2.
- The data hierarchy tables provided in each asset class section in Chapter 5 **should** be used as a guide for disclosing data quality. Financial institutions **should** include an explanation of how data quality is assessed, acknowledging that it will improve over time.
- Over time and where possible, data **should** be audited to at least a level of limited assurance. Financial institutions **should** disclose whether data is audited and to what level.

**Box 5. An illustrative example for calculating weighted data quality scores**

It is likely that data quality will differ across asset classes, sectors, companies, and scopes. To disclose the best representation of data quality, the Global Carbon Accounting Standard requires that financial institutions normalize the data quality scores for each asset class and sector to the total outstanding loan or investment amount.

The equation for calculating weighed averages for an asset class or sector is:

$$\frac{\sum_{c=1}^n \text{Outstanding amount}_c \times \text{Data quality score}_c}{\sum_{c=1}^n \text{Outstanding amount}_c}$$

(with  $c$  = company)

An illustrative example of a financial institution's lending is provided below:

Asset class	Sector	Company	Outstanding loan	Attributed scope 1/2 absolute emissions (kton CO <sub>2</sub> e)	Data quality score (1=high, 5=low)
Business loans	Oil & Gas	Company A	522,425	15	3
Business loans	Oil & Gas	Company B	187,449	7	5
Business loans	Cattle farming	Company C	82,778	8	1
Business loans	Cattle farming	Company D	108,997	11	1
Business loans	Cattle farming	Company E	67,556	7	2
Business loans	Cattle farming	Company F	54,762	5	5

**Weighted data score for business loans scope 1/2 emissions:**

$$\frac{((522,425 \times 3) + (187,449 \times 5) + (82,778 \times 1) + (108,997 \times 1) + (67,556 \times 2) + (54,762 \times 5))}{((522,425 + 187,449 + 82,778 + 108,977 + 67,556 + 54,762))}$$

**=3.03**

**Weighted data score for oil & gas sector scope 1/2 emissions:**

$$\frac{((522,425 \times 3) + (187,449 \times 5))}{((522,425 + 187,449))}$$

**=3.53**





# 7. Glossary

<b>Absolute emissions</b>	Emissions attributed to a financial institution's lending and investing activity. Expressed in tonnes CO <sub>2</sub> e.
<b>Asset class</b>	A group of financial instruments which have similar financial characteristics.
<b>Attribution share or attribution factor</b>	The share of total greenhouse gas emissions of the borrower or investee that are allocated to the loan or investments.
<b>Avoided emissions</b>	Emission reductions that the financed project produces versus what would have been emitted in the absence of the project (the baseline emissions). In the context of the Standard, avoided emissions are only from renewable energy and energy efficiency projects.
<b>Biogenic CO<sub>2</sub> emissions</b>	Emissions from a stationary source directly resulting from the combustion or decomposition of biologically-based materials other than fossil fuels.
<b>Business loan</b>	On-balance sheet loans and lines of credit with unknown use of proceeds to businesses, non-profits, and any other structure of organization. Revolving credit facilities and overdraft facilities as well as business loans secured by real estate, such as commercial real estate-secured lines of credit, are also included in the business loans asset class. For detail information on this asset class see section 5.2.
<b>Carbon accounting</b>	A means of measuring the direct and indirect emissions to the Earth's biosphere of carbon dioxide and its equivalent gases from industrial activities.
<b>Carbon accounting of financial portfolios</b>	The annual accounting and disclosure of GHG emissions associated with loans and investments at a fixed point in time in line with financial accounting periods. This is also called "portfolio carbon accounting".
<b>Climate impact</b>	In the context of this Standard, climate impact refers to the emissions financed by loans and investments.
<b>Climate risk</b>	The potential for adverse effects on lives, livelihoods, health status, economic, social and cultural assets, services (including environmental), and infrastructure due to climate change.
<b>CO<sub>2</sub>-equivalent (CO<sub>2</sub>e)</b>	The amount of CO <sub>2</sub> 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 GHG or mixture of GHGs. Conversion factors vary based on the underlying assumptions and as the science advances. As a baseline, PCAF recommends using 100-year Global Warming Potentials without climate-carbon feedback from the most recent IPCC Assessment report.
<b>Commercial real estate</b>	On-balance-sheet loans for the purchase, refinance, construction, or rehabilitation of commercial real estate (CRE). This definition implies that the property is used for commercial purposes. For detail information on this asset class see section 5.3.
<b>Consolidation approach</b>	Refers to how an organization sets boundaries for GHG accounting. Types include equity approach, financial control and operational control.
<b>Consumer loan</b>	A loan given to consumers to finance specific types of expenditures. A consumer loan is any type of loan made to a consumer by a creditor. For example, a mortgage or a motor vehicle loan.
<b>Corporate debt</b>	Money that is owed by companies rather than by governments or individual people.
<b>Debt</b>	A financing instrument that requires repayment by the borrower.
<b>Direct emissions</b>	Emissions from sources that are owned or controlled by the reporting entity and/or the borrower or investee.
<b>Double counting</b>	Occurs when GHG emissions (generated, avoided or removed) are counted more than once in a GHG inventory or toward attaining mitigation pledges or financial pledges for the purpose of mitigating climate change.
<b>Emission intensity metric</b>	Emissions per a specific unit, for example: tCO <sub>2</sub> e/\$M invested, tCO <sub>2</sub> e/MWh, tCO <sub>2</sub> e/ton product produced, tCO <sub>2</sub> e/\$M company revenue.
<b>Emission removal</b>	The action of removing GHG emissions from the atmosphere and store it through various means, such as in soils, trees, underground reservoirs, rocks, the ocean and even products like concrete and carbon fiber.

<b>Emission scopes</b>	The GHG Protocol Corporate Standard classifies an organization's GHG emissions into three scopes. Scope 1 emissions are direct emissions from owned or controlled sources. Scope 2 emissions are indirect emissions from the generation of purchased energy. Scope 3 emissions are all indirect emissions (not included in scope 2) that occur in the value chain of the reporting organization, including both upstream and downstream emissions.
<b>Enterprise Value Including Cash (EVIC)</b>	The sum of the market capitalization of ordinary shares at fiscal year end, the market capitalization of preferred shares at fiscal year-end, and the book values of total debt and minorities' interests. No deductions of cash or cash equivalents are made to avoid the possibility of negative enterprise values.
<b>Environmentally-extended input output (EEIO) data</b>	EEIO data refers to EEIO emissions factors that can be used to estimate scope 1, 2 and upstream scope 3 GHG emissions for a given industry or product category. EEIO data is particularly useful in screening emissions sources when prioritizing data collection efforts.
<b>Equity</b>	Bank's or investor's ownership in a company or project. There are various types of equity, but equity typically refers to shareholder equity, which represents the amount of money that would be returned to a company's shareholders if all of the assets were liquidated and all of the company's debt were paid off.
<b>EXIOBASE</b>	A global, detailed Multi-Regional Environmentally Extended Supply-Use Table (MR-SUT) and Input-Output Table (MR-IOT). It was developed by harmonizing and detailing supply-use tables for a large number of countries, estimating emissions and resource extractions by industry.
<b>Federal Test Procedure (FTP)</b>	The United States Environmental Protection Agency's Federal Test Procedures are a series of drive cycle tests to measure the tailpipe emissions and fuel efficiency of passenger cars.
<b>Financed emissions</b>	Absolute emissions that banks and investors finance through their loans and investments.
<b>Financial institutions</b>	A company engaged in the business of dealing with financial and monetary transactions such as deposits, loans, investments, and currency exchange. Financial institutions encompass a broad range of business operations within the financial services sector including: commercial banks, investment banks, development banks, asset owners/managers (mutual funds, pension funds, close-end funds, investment trusts) and insurance companies.
<b>Greenhouse gas (GHG) emissions</b>	The seven gases mandated under the Kyoto Protocol and to be included in national inventories under the United Nations Framework Convention on Climate Change (UNFCCC)—carbon dioxide (CO <sub>2</sub> ), methane (CH <sub>4</sub> ), nitrous oxide (N <sub>2</sub> O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF <sub>6</sub> ) and nitrogen trifluoride (NF <sub>3</sub> ).
<b>Greenhouse Gas (GHG) Protocol</b>	Comprehensive global standardized frameworks to measure and manage greenhouse gas (GHG) emissions from private and public sector operations, value chains and mitigation actions. The GHG Protocol supplies the world's most widely used greenhouse gas accounting standards. The Corporate Accounting and Reporting Standard provides the accounting platform for virtually every corporate GHG reporting program in the world.
<b>Global Trade Analysis Project (GTAP) database</b>	GTAP is a global network of researchers and policy makers conducting quantitative analysis of international policy issues. GTAP is coordinated by the Center for Global Trade Analysis in Purdue University's Department of Agricultural Economics. The centerpiece of the Global Trade Analysis Project is a global data base describing bilateral trade patterns, production, consumption and intermediate use of commodities and services
<b>Indirect emissions</b>	Emissions that are a consequence of the activities of the reporting entity but occur at sources owned or controlled by another entity.
<b>Investment</b>	The term investment (unless explicitly stated otherwise) is used in the broad sense: "Putting money into activities or organizations' with the expectation of making a profit." 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, among other risks.

<b>Listed corporate finance</b>	Finance provided to companies that is traded on a market such as listed equity and corporate bonds.
<b>Listed equity and bonds</b>	This asset class includes all corporate bonds without known use of proceeds and all listed equity on the balance sheet and/or actively managed by the financial institution. Listed equity refers to equity that is traded on a stock exchange or another securities exchange. For detail information on this asset class see section 5.1.
<b>Mortgage</b>	On-balance sheet loans used to purchase residential property, including multifamily properties with no limit on the number of units. This definition implies that the property is used for residential purposes. For detail information on this asset class see section 5.5.
<b>Motor vehicle loan</b>	On-balance sheet loans that are used to finance one or several motor vehicles. For detail information on this asset class see section 5.6.
<b>Non-listed corporate finance</b>	Finance provided to companies that is not traded on a market such as business loans or commercial real estate.
<b>Paris Agreement</b>	The Paris Agreement, adopted within the United Nations Framework Convention on Climate Change (UNFCCC) in December 2015, commits participating all countries to limit global temperature rise to well-below 2°C above pre-industrial levels and pursue efforts to limit warming to 1.5°C, adapt to changes already occurring and regularly increase efforts over time.
<b>Project finance</b>	On-balance sheet loan or equity with known use of proceeds that are designated for a clearly defined activity or set of activities, such as the construction of a gas fired power plant, a wind or solar project or energy efficiency projects. For detail information on this asset class see section 5.3.
<b>Scenario analysis</b>	A process of analyzing future events by considering alternative possible outcomes.
<b>Science-based reduction targets (SBTs)</b>	Targets adopted by companies to reduce greenhouse gas (GHG) emissions are considered “science-based” if they are in line with what the latest climate science says is necessary to meet the goals of the Paris Agreement—to limit global warming to well-below 2°C above pre-industrial levels and pursue efforts to limit warming to 1.5°C.
<b>Scope 3, category 15 (investments) emissions</b>	This category includes scope 3 emissions associated with the reporting company’s loans and investments in the reporting year, not already included in scope 1 or scope 2.
<b>Sequestered emissions</b>	Refers to atmospheric carbon dioxide (CO <sub>2</sub> ) emissions that are captured and stored in solid or liquid form, thereby removing their harmful global warming effect.
<b>Total balance sheet value</b>	A balance sheet is a financial statement that reports a company’s assets, liabilities and shareholders’ equity. The balance sheet value refers to the value of total debt plus equity.
<b>Vehicle make</b>	The name of the company that manufactures the vehicle.
<b>Vehicle model</b>	The product name of the vehicle.
<b>World Input-Output Database (WIOD)</b>	World Input-Output Tables and underlying data, covering 43 countries, and a model for the rest of the world for the period 2000-2014. Data for 56 sectors are classified according to the International Standard Industrial Classification revision 4 (ISIC Rev. 4). The tables adhere to the 2008 version of the SNA.
<b>World harmonized Light-duty vehicles Test Procedure (WLTP)</b>	The World harmonized Light-duty vehicles Test Procedure is a global, harmonized standard of drive cycle tests to determine the tailpipe emissions and fuel efficiency of passenger cars.

The background features a dark green gradient with several bright, glowing green and yellow light trails that curve across the frame. A white pen nib is visible in the upper left corner, pointing towards the center. The overall aesthetic is modern and digital.

# 8. References

- CDP. (2020). CDP Climate Change 2020 Questionnaire. Retrieved from CDP: <https://bit.ly/39d9zoE>
- CRO Forum. (2020). Carbon Footprinting Methodology for Underwriting Portfolios. Retrieved from The CRO Forum: <https://www.thecroforum.org/wp-content/uploads/2020/05/CRO-Carbon-Foot-Printing-Methodology.pdf>
- EU Technical Expert Group on Sustainable Finance. (2019). Financing a Sustainable European Economy: Report on Benchmarks: Handbook of Climate Transition Benchmarks, Paris Aligned Benchmark, and Benchmarks' ESG Disclosure. Retrieved from European Commission: [https://ec.europa.eu/info/sites/info/files/business\\_economy\\_euro/banking\\_and\\_finance/documents/192020-sustainable-finance-teg-benchmarks-handbook\\_en\\_0.pdf](https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/192020-sustainable-finance-teg-benchmarks-handbook_en_0.pdf)
- GHG Protocol. (2014). Global Warming Potential Values. Retrieved from The Greenhouse Gas Protocol: [https://www.ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29\\_1.pdf](https://www.ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf)
- IFI. (2020). Methodological Approach for the Common Default Grid Emission Factor Dataset. Retrieved from United Nations Framework Convention on Climate Change: [https://unfccc.int/sites/default/files/resource/IFITWG\\_Methodological\\_approach\\_to\\_common\\_dataset.pdf](https://unfccc.int/sites/default/files/resource/IFITWG_Methodological_approach_to_common_dataset.pdf)
- PCAF. (2019, December). Accounting for and Steering Carbon: Harmonised Approach for the Financial Sector. Retrieved from Partnership for Carbon Accounting Financials: <https://carbonaccountingfinancials.com/files/downloads/1911-pcaf-report-nl.pdf?6253ce57ac>
- PCAF. (2019, November). Harmonizing and Implementing a Carbon Accounting Approach for the Financial Sector in North America. Retrieved from Partnership for Carbon Accounting Financials: <https://carbonaccountingfinancials.com/files/2019-10/20191028-pcaf-report-2019.pdf>
- PCAF. (2019). Shaping the climate action journey for financial institutions: navigating through the cluster of climate initiatives. Retrieved from Partnership for Carbon Accounting Financials: <https://carbonaccountingfinancials.com/files/2020-01/overview-initiatives-shaping-climate-action-journey-for-fis.pdf?ae36ae7be6>
- TCFD. (2017). Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures. Section D: Supplemental Guidance for the Financial Sector. Retrieved from Task Force on Climate-related Financial Disclosures: <https://www.fsb-tcf.org/wp-content/uploads/2017/12/FINAL-TCFD-Annex-Amended-121517.pdf>
- UNFCCC. (2015). International Financial Institution Framework for a Harmonised Approach to Greenhouse Gas Accounting. Retrieved from United Nations Framework Convention on Climate Change: [https://unfccc.int/sites/default/files/resource/International%20Financial%20Institution%20Framework%20for%20a%20Harmonised\\_rev.pdf](https://unfccc.int/sites/default/files/resource/International%20Financial%20Institution%20Framework%20for%20a%20Harmonised_rev.pdf)
- WRI and WBCSD. (2004). GHG Protocol Corporate Accounting and Reporting Standard, Revised Edition, Chapter 2. Retrieved from The Greenhouse Gas Protocol: <https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf>
- WRI and WBCSD. (2011). GHG Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard, Supplement to the GHG Protocol Corporate Accounting and Reporting Standard. Retrieved from Greenhouse Gas Protocol: [https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporting-Standard\\_041613\\_2.pdf](https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporting-Standard_041613_2.pdf)



# Annex

## 9. Annex

### LISTED EQUITY AND BONDS - DETAILED SUMMARY OF DATA NEEDS AND EQUATIONS TO CALCULATE FINANCED EMISSIONS

Table 9-1. Detailed description of the data quality score table for listed equity and bonds<sup>1</sup>

Description					Data Quality	
Options	Attribution		Emission factor		Financed emissions calculation	Highest to Lowest
	Financial data		Emission data		Equations	
Option 1a	Outstanding investment in the company	EVIC	Audited GHG emissions data from the company, in accordance with the GHG Protocol		$\sum_c \frac{Outstanding\ investment_c}{EVIC_c} \times Audited\ company\ emissions_c$	Score 1
Option 1b			Unaudited GHG emissions data calculated by the company, in accordance with the GHG Protocol		$\sum_c \frac{Outstanding\ investment_c}{EVIC_c} \times Unaudited\ company\ emissions_c$	
Option 2a			Primary physical activity data for the company's energy consumption by energy carrier (e.g. MWh of electricity) plus	Emission factors specific to that primary data (e.g. energy carrier specific emission factors)	$\sum_c \frac{Outstanding\ investment_c}{EVIC_c} \times Energy\ consumption_c^{*2} \times Emission\ factor$	

<sup>1</sup> Where c=company and s=sector.

<sup>2</sup> Where this option is used, process emissions must be added to the calculated consumption emissions before multiplying by the attribution share.



Description						Data Quality
Options	Attribution		Emission factor		Financed emissions calculation	Highest to Lowest
	Financial data		Emission data		Equations	
			any process emissions			
Option 2b			Primary physical activity data for the company's production (e.g. tons of rice produced)	Emission factors specific to that primary data (e.g. emission factor per ton of rice)	$\sum_c \frac{Outstanding\ investment_c}{EVIC_c} \times Production_c \times Emission\ factor$	Score 3
Option 3a	Outstanding investment in the company	EVIC	GHG emissions per sector	Turnover per sector	$\sum_c \frac{Outstanding\ investment_c}{EVIC_c} \times Turnover_c \times \frac{GHG\ emissions_s}{Turnover_s}$	Score 4
		Turnover of the company				
Option 3b			GHG emissions per sector	Assets per sector	$\sum_c Outstanding\ investment_c \times \frac{GHG\ emissions_s}{Assets_s}$	Score 5
Option 3c		Asset turnover ratio per sector	GHG emissions per sector	Turnover per sector	$\sum_c Outstanding\ investment_c \times Asset\ turnover\ ratio_s \times \frac{GHG\ emissions_s}{Turnover_s}$	

**BUSINESS LOANS - DETAILED SUMMARY OF DATA NEEDS AND EQUATIONS TO CALCULATE FINANCED EMISSIONS**

Table 9-2. Detailed description of the data quality score table for business loans<sup>3</sup>

		Description			Data Quality	
Options	Attribution		Emission factor		Financed emissions calculation	Highest to Lowest
	Financial data		Emission data		Equations	
Option 1a	Outstanding investment in the company	EVIC or Total company equity + debt	Audited GHG emissions data from the company, in accordance with the GHG Protocol		$\sum_c \frac{Outstanding\ investment_c}{(EVIC\ or\ Total\ company\ equity\ +\ debt)_c} \times Audited\ company\ emissions_c$	Score 1
Option 1b			Unaudited GHG emissions data calculated by the company, in accordance with the GHG Protocol		$\sum_c \frac{Outstanding\ investment_c}{(EVIC\ or\ Total\ company\ equity\ +\ debt)_c} \times Unaudited\ company\ emissions_c$	
Option 2a			Primary physical activity data for the company's energy consumption by energy carrier (e.g. MWh of electricity) plus any process emissions	Emission factors specific to that primary data (e.g. energy carrier specific emission factors)	$\sum_c \frac{Outstanding\ investment_c}{(EVIC\ or\ Total\ company\ equity\ +\ debt)_c} \times Energy\ consumption_c^{*4} \times Emission\ factor$	

<sup>3</sup> Where c=company and s=sector.

<sup>4</sup> Where this option is used, process emissions must be added to the calculated consumption emissions before multiplying by the attribution share.

	Description				Data Quality	
Options	Attribution		Emission factor		Financed emissions calculation	Highest to Lowest
	Financial data		Emission data		Equations	
Option 2b			Primary physical activity data for the company's production (e.g. tons of rice produced)	Emission factors specific to that primary data (e.g. emission factor per ton of rice)	$\sum_c \frac{Outstanding\ investment_c}{(EVIC\ or\ Total\ company\ equity\ +\ debt)_c} \times Production_c \times Emission\ factor$	Score 3
Option 3a	Outstanding investment in the company	EVIC or Total company equity + debt	GHG emissions per sector	Turnover per sector	$\sum_c \frac{Outstanding\ investment_c}{(EVIC\ or\ Total\ company\ equity\ +\ debt)_c} \times Turnover_c \times \frac{GHG\ emissions_s}{Turnover_s}$	Score 4
		Turnover of the company				
Option 3b			GHG emissions per sector	Assets per sector	$\sum_c Outstanding\ investment_c \times \frac{GHG\ emissions_s}{Assets_s}$	Score 5
Option 3c		Asset turnover ratio per sector	GHG emissions per sector	Turnover per sector	$\sum_c Outstanding\ investment_c \times Asset\ turnover\ ratio_s \times \frac{GHG\ emissions_s}{Turnover_s}$	

**PROJECT FINANCE - DETAILED SUMMARY OF DATA NEEDS AND EQUATIONS TO CALCULATE FINANCED EMISSIONS**

Table 9-3. Detailed description of the data quality score table for project finance<sup>5</sup>

		Description			Data Quality	
Options	Attribution		Emission factor		Financed emissions calculation	Highest to Lowest
	Financial data		Emission data		Equations	
Option 1a	Outstanding investment in project	Total project equity + debt	Audited GHG emissions data of the project, in accordance with the GHG Protocol		$\sum_c \frac{Outstanding\ investment_p}{(Total\ project\ equity + debt)_p} \times Audited\ company\ emissions_p$	Score 1
Option 1b			Unaudited GHG emissions data calculated by the project, in accordance with the GHG Protocol		$\sum_c \frac{Outstanding\ investment_p}{(Total\ project\ equity + debt)_p} \times Unaudited\ company\ emissions_p$	
Option 2a			Primary physical activity data for the project's energy consumption by energy carrier (e.g. MWh of electricity) plus any process emissions	Emission factors specific to that primary data (e.g. energy carrier specific emission factors)	$\sum_c \frac{Outstanding\ investment_p}{(Total\ project\ equity + debt)_p} \times Energy\ consumption_p^{*6} \times Emission\ factor$	

<sup>5</sup> Where p=project and s=sector.

<sup>6</sup> Where this option is used, process emissions must be added to the calculated consumption emissions before multiplying by the attribution share.

	Description				Data Quality	
Options	Attribution		Emission factor		Financed emissions calculation	Highest to Lowest
	Financial data		Emission data		Equations	
Option 2b			Primary physical activity data for the project's production (e.g. tons of rice produced)	Emission factors specific to that primary data (e.g. emission factor per ton of rice)	$\sum_c \frac{Outstanding\ investment_p}{(Total\ project\ equity + debt)_p} \times Production_p \times Emission\ factor$	Score 3
Option 3a	Outstanding investment in the project	Total project equity + debt	GHG emissions per sector	Turnover per sector	$\sum_c \frac{Outstanding\ investment_p}{(Total\ project\ equity + debt)_p} \times Turnover_p \times \frac{GHG\ emissions_s}{Turnover_s}$	Score 4
		Turnover of the project				
Option 3b			GHG emissions per sector	Assets per sector	$\sum_c Outstanding\ investment_p \times \frac{GHG\ emissions_s}{Assets_s}$	Score 5
Option 3c		Asset turnover ratio per sector	GHG emissions per sector	Turnover per sector	$\sum_c Outstanding\ investment_p \times Asset\ turnover\ ratio_s \times \frac{GHG\ emissions_s}{Turnover_s}$	

**COMMERCIAL REAL ESTATE - DETAILED SUMMARY OF DATA NEEDS AND EQUATIONS TO CALCULATE FINANCED EMISSIONS**

Table 9-4. Detailed description of the data quality score table for commercial real estate<sup>7</sup>

Formula 3	Description			Data Quality	
Options	Attribution*	Emission factor		Financed emissions calculation	Highest to Lowest
	Financial data	Emissions data		Equations	
Option 1a	Outstanding amount and a) total construction costs (for buildings under development, construction, rehabilitation) OR b) project value at origination (for existing buildings)	Verified emission factors specific to the energy source	Primary data on actual building energy consumption	$\sum_b \left( \frac{\text{Outstanding amount}_b}{\text{Total construction cost}_b} \right)^* \times \text{Actual energy consumption}_b \times \text{Actual emission factor}_e$	Score 1
Option 1b		Average/standard emission factors specific to the energy source	Primary data on actual building energy consumption	$\sum_b \left( \frac{\text{Outstanding amount}_b}{\text{Total construction cost}_b} \right)^* \times \text{Actual energy consumption}_b \times \text{Average emission factor}_e$	Score 2
Option 2a			Estimated building energy consumption per floor area based on official building energy labels and floor area financed	$\sum_b \left( \frac{\text{Outstanding amount}_b}{\text{Total construction cost}_b} \right)^* \times \text{Estimated energy consumption from energy labels}_b \times \text{Floor area}_b \times \text{Average emission factor}_e$	Score 3
Option 2b			Estimated building energy consumption per floor area based on building type and location specific statistical data and floor area financed	$\sum_b \left( \frac{\text{Outstanding amount}_b}{\text{Total construction cost}_b} \right)^* \times \text{Estimated energy consumption from statistics}_b \times \text{Floor area}_b \times \text{Average emission factor}_e$	Score 4

<sup>7</sup> Where b=building and e=energy source or energy carrier.

Formula 3	Description			Data Quality
Options	Attribution*	Emission factor	Financed emissions calculation	Highest to Lowest
	Financial data	Emissions data	Equations	
Option 3		Estimated building energy consumption per building based on building type and location specific statistical data and number of buildings financed	$\sum_b \left( \frac{\text{Outstanding amount}_b}{\text{Total construction cost}_b} \right)^* \times \text{Estimated energy consumption from statistics}_b$ $\times \text{Number of buildings}_b \times \text{Average emission factor}_e$	Score 5

\* For existing buildings, the denominator is defined as the project value at origination and not the total construction cost.

**MORTGAGES - DETAILED SUMMARY OF DATA NEEDS AND EQUATIONS TO CALCULATE FINANCED EMISSIONS**

Table 9-5. Detailed description of the data quality score table for mortgages<sup>8</sup>

Formula 3	Description			Data Quality
Options	Attribution*	Emission factor	Financed emissions calculation	Highest to Lowest
	Financial data	Emissions data	Equations	
Option 1a	Outstanding amount and a) total construction costs (for buildings under development, construction, rehabilitation) OR b) project value at origination (for existing buildings)	Verified emission factors specific to the energy source	Primary data on actual building energy consumption $\sum_b 100\% \times Actual\ energy\ consumption_b \times Actual\ emission\ factor_e$	Score 1
Option 1b		Average/standard emission factors specific to the energy source	Primary data on actual building energy consumption $\sum_b 100\% \times Actual\ energy\ consumption_b \times Average\ emission\ factor_e$	Score 2
Option 2a			Estimated building energy consumption per floor area based on official building energy labels and floor area financed $\sum_b 100\% \times Estimated\ energy\ consumption\ from\ energy\ labels_b \times Floor\ area_b \times Average\ emission\ factor_e$	Score 3
Option 2b			Estimated building energy consumption per floor area based on building type and location specific statistical data and floor area financed $\sum_b 100\% \times Estimated\ energy\ consumption\ from\ statistics_b \times Floor\ area_b \times Average\ emission\ factor_e$	Score 4
Option 3			Estimated building energy consumption $\sum_b 100\% \times Estimated\ energy\ consumption\ from\ statistics_b \times Number\ of\ buildings_b \times Average\ emission\ factor_e$	Score 5

<sup>8</sup> Where b=building and e=energy source or energy carrier.



Formula 3	Description			Data Quality	
<b>Options</b>	<b>Attribution*</b>	<b>Emission factor</b>		<b>Financed emissions calculation</b>	<b>Highest to Lowest</b>
	Financial data	Emissions data		Equations	
			per building based on building type and location specific statistical data and number of buildings financed		

**MOTOR VEHICLE LOANS - DETAILED SUMMARY OF DATA NEEDS AND EQUATIONS TO CALCULATE FINANCED EMISSIONS**

Table 9-6. Detailed description of the data quality score table for motor vehicle loans<sup>9</sup>

Formula 3	Description			Data Quality	
Options	Attribution*	Emission factor		Financed emissions calculation	Highest to Lowest
	Financial data	Emissions data		Equations	
Option 1a	Outstanding investment and total value of vehicle or vehicle fleet	Emission factors specific to the fuel type	Primary data on actual vehicle fuel consumption	$\sum_v \left( \frac{\text{Outstanding investment}_v}{\text{Total value}_v} \right)^* \times \text{Fuel consumption}_v \times \text{Emission factor}_f$	Score 1
Option 1b			Vehicle efficiency and fuel type from known vehicle make and model + primary data on actual vehicle distance travelled	$\sum_v \left( \frac{\text{Outstanding investment}_v}{\text{Total value}_v} \right)^* \times \text{Efficiency}_v \times \text{Distance travel}_v \times \text{Emission factor}_f$	
Option 2a			Vehicle efficiency and fuel type from known vehicle make and model + local statistical data for distance travelled	$\sum_v \left( \frac{\text{Outstanding investment}_v}{\text{Total value}_v} \right)^* \times \text{Efficiency}_v \times \text{Distance travel}_l \times \text{Emission factor}_f$	Score 2
Option 2b			Vehicle efficiency and fuel type from known vehicle make and model + regional statistical data for distance travelled	$\sum_v \left( \frac{\text{Outstanding investment}_v}{\text{Total value}_v} \right)^* \times \text{Efficiency}_v \times \text{Distance travel}_r \times \text{Emission factor}_f$	Score 3

<sup>9</sup> Where v=vehicle or vehicle fleet with known make and model for that vehicle, t=vehicle or vehicle fleet with known vehicle type, a=assumed average vehicle or vehicle fleet, l=local estimation of distance travelled, r=regional estimation of distance travelled, s=local or regional estimation of distance travelled, f=fuel type (note that fuel type in case of electric or hybrid vehicles can also refer to electricity).

Formula 3		Description		Data Quality
Options	Attribution*	Emission factor	Financed emissions calculation	Highest to Lowest
	Financial data	Emissions data	Equations	
Option 3a		Vehicle efficiency and fuel type from known vehicle type + local or regional statistical data for distance travelled	$\sum_t \left( \frac{\text{Outstanding investment}_t}{\text{Total value}_t} \right)^* \times \text{Efficiency}_t \times \text{Distance travel}_s \times \text{Emission factor}_f$	Score 4
Option 3b		Vehicle efficiency and fuel type from unknown vehicle type + local or regional statistical data for distance travelled	$\sum_a \left( \frac{\text{Outstanding investment}_a}{\text{Total value}_a} \right)^* \times \text{Efficiency}_a \times \text{Distance travel}_s \times \text{Emission factor}_f$	Score 5

\* Needed only for business motor vehicle loans. 100% for consumer motor vehicle loans.