General Council for Islamic Banks and Financial Institutions

CIBAFI

المجلس العام للبنوك والمؤسسات المالية الإسلامية

Development of a Greenhouse Gas Measurement Tool to

REINFORCE THE ROLE OF ISLAMIC FINANCIAL INSTITUTIONS IN SUPPORTING CLIMATE ACTION

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About the General Council for Islamic Banks and Financial Institutions (CIBAFI)

CIBAFI is an international organisation established in 2001 and headquartered in the Kingdom of Bahrain. CIBAFI is affiliated with the Organisation of Islamic Cooperation (OIC).

CIBAFI represents the Islamic financial services industry (IFSI) globally, defending and promoting its role, consolidating co-operation among its members, and with other institutions with similar interests and objectives.

With over 130 members from more than 30 jurisdictions, representing market players, international intergovernmental organisations, professional firms, and industry associations, CIBAFI is recognised as a key piece in the international architecture of Islamic finance.

Its mission is to support the IFSI's growth by providing specific activities and initiatives that leverage current opportunities while preserving the value proposition of Islamic finance, CIBAFI is guided by its Strategic Objectives, which are:

1) Advocacy of Islamic Finance Values and Related Policies & Regulations;

2) Sustainability and Innovation Integration;

3) Industry Research and Analysis; and

4) Professional Development.

Contents

Acronyms

CDP	Carbon Disclosure Project
CH^4	Methane
CIBAFI	General Council for Islamic Banks and Financial Institutions
CO_2	Carbon Dioxide
CO^2e	Carbon Dioxide Equivalent
CRREM	Carbon Real Estate Monitor
2DII	2 Degree Investing Initiative
EVIC	Enterprise Value including Cash
FSB	Financial Stability Board
FI	Financial Institution
GHG	Greenhouse Gases
Gt	Gigatonne
HFC	Hydrofluorocarbon
IFI	Islamic Financial Institution
IFRS	International Financial Reporting Standards
IPCC	Intergovernmental Panel on Climate Change
IsDB	Islamic Development Bank
IFSI	Islamic Financial Services Industry
ISO	International Organisation for Standardisation
ISSB	International Sustainability Standards Board
NF_3	Nitrogen Trifluoride
NGFS	Network for Greening Financial Systems
NGO	Non-Governmental Organisations
N_2O	Nitrous oxide
OIC	Organisation of Islamic Cooperation
PACTA	Paris Agreement Capital Transition Assessment
PCAF	Partnership for Carbon Accounting Financials
PFC	Perfluorocarbons
RMI	Rocky Mountain Institute
SASB	Sustainability Accounting Standards Board
SBT	Science Based Targets
SDGs	Sustainable Development Goals
SF_6	Sulfur Hexafluoride
tCO_2e	Metric tons of carbon dioxide equivalent
TCFD	Task Force on Climate Related Financial Disclosures
USD	United States Dollar
WACI	Weighted Average Carbon Intensity
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute
$M	Million USD

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Statement by the Secretary General

As the global community increasingly acknowledges the urgent need for climate action, the role of financial institutions in driving sustainability has never been more critical. The General Council for Islamic Banks and Financial Institutions (CIBAFI) remains at the forefront of promoting environmental stewardship within the Islamic financial services industry.

Our commitment to sustainability is both broad and deep, encompassing various initiatives aimed at integrating the principles of Islamic finance with global environmental goals. This report is a testament to our ongoing efforts to address climate-related challenges and to support the Islamic financial services industry in its journey towards sustainability.

Developed through a collaborative and inclusive process involving diverse stakeholders, this document provides a comprehensive methodology for greenhouse gas (GHG) measurement tailored to the unique characteristics of Islamic financial institutions. By aligning with international best practices and adapting them to the specific needs of our industry, this initiative not only enhances our understanding of GHG emissions but also sets a foundation for actionable climate strategies.

We believe that accurate measurement of GHG emissions is a critical step in mitigating climate risks and fostering a resilient financial system. CIBAFI is committed to supporting the industry through capacity-building programs, workshops, and platforms for dialogue, ensuring the effective implementation and widespread adoption of these methodologies.

This initiative is part of a broader agenda that underscores our dedication to sustainable finance, responsible business practices, and global climate action. We are confident that this report will catalyze significant progress in the Islamic financial services industry's approach to addressing climate-related risks and opportunities.

Dr. Abdelilah Belatik
Secretary General

Acknowledgements

The Secretariat sincerely thanks the members of the CIBAFI Sustainability Working Group (SWG) for their active participation and extensive input in the development of this project. We greatly appreciate their time, guidance, and contributions extended throughout the different development stages.

We would also like to express our gratitude to the individuals who have contributed to the success of this report. Special appreciation goes to Dr. Muhammad Bilal, Rachid Ettaai, and Zainab Al Owainaty from the CIBAFI Secretariat, as well as Dr. Wael Mohamed Aaminou and Dr. Ahmed Tahiri Jouti, CIBAFI consultants, for their efforts at various stages of the report's production.

We are also thankful for the valuable comments and suggestions provided by CIBAFI members, Bank Negara Malaysia and the Responsible Finance & Investment (RFI) Foundation.

Furthermore, we extend our thanks to the Islamic Development Bank (IsDB) for their unwavering support throughout this project. We also acknowledge the Partnership for Carbon Accounting Financials (PCAF) for their technical assistance, as outlined in the memorandum of understanding (MOU) signed with CIBAFI in 2020.

We trust that this report will offer valuable insights to Islamic financial institutions worldwide on the measurement and reporting methodologies of financial institutions' financed emissions currently in use globally. It will also serve as the first step towards taking initiatives to mitigate climate change risks.

Dr. Abdelilah Belatik
Secretary General

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About the Project

As part of its commitment to reinforce the value proposition of Islamic finance, promote sustainability and responsible business practices within the Islamic financial services industry (IFSI), CIBAFI, with the support of the Islamic Development Bank (IsDB), is leading an initiative aiming at establishing a comprehensive methodology to develop a global greenhouse gas (GHG) measurement and reporting tool that considers the characteristics of Islamic Financial Institutions' (IFIs) portfolios and the environments in which these institutions operate. This initiative is aligned with CIBAFI's strategic objectives to address and support global initiatives such as the Paris Agreement and strive to reinforce IFIs' role in addressing global challenges such as reducing the risk and impact of climate change. The IFIs' GHG measurement and reporting tool will help IFIs to:

- Identify to what extent their investment financing portfolios are responsible for GHG emissions as per the scope 3 methodology.
- Establish a clear and structured action plan to address and manage climate risks and opportunities in line with the Paris Agreement and international standards.
- Reinforce their role in supporting climate action.

To ensure the project's success, the milestones and deliverables have been clearly defined according to the sequences presented below:

Table 1: Milestones of the IFIs' GHG accounting and reporting methodology project

Project phase	Details
Phase 1: In-depth literature review of existing methodologies and their limitations	This provides a clear understanding of the scope of existing GHG accounting methodologies, their strengths as well as their limitations.
Phase 2: GHG measurement tool with details on the selected asset classes that will be covered by the methodology (first draft)	Proposal of a GHG measurement tool that appropriately reflects the GHG emissions of IFIs financings and investments as well as supports the decision-making needs of internal and external stakeholders.
Phase 3: Data providers and technical resources needed to develop the technical part of the GHG measurement tool report	Identifying data providers and technical resources needed to develop the technical part of the GHG measurement methodology in a context where high-quality data is often not available to the financial institutions for all asset classes in most Islamic finance hubs.

Phase 4: Second draft of the report (GHG measurement tool approaches based on asset classes, process, obstacles, practical and technical tools, and examples of use)	Consolidating the findings of phase 2 and phase 3 into an integrated methodology for GHG measurement tool.
Phase 5: Public consultation of the second draft	Involving the public in providing their views and feedback on the second draft of the GHG measurement tool.
Phase 6: Revision and final draft	Releasing the final draft of GHG measure-ment tool report.
Phase 7: Workshops	Facilitating IFIs ownership and awareness of the GHG measurement and reporting tool methodologies.

This document is part of the project's Phases 3, 4, 5, and 6. It first proposes a mapping of Islamic and conventional asset classes. Secondly, it outlines a methodology for sourcing the necessary data for GHG measurement and calculations. Thirdly, the document provides recommendations for the successful implementation of GHG accounting in Islamic financial institutions. The report was finalised after a consultation process that considered the views of the stakeholders.

This document is based on the outcomes of the report "A Comprehensive Review of Existing Methodologies", which presents FI's financed emissions measurement and reporting methodologies currently in use globally. Starting the project with a review of global GHG measurement and reporting methodologies (before proposing a specific methodology for IFIs) is extremely important for two reasons. First, these methodologies have existed for quite a few years and many lessons have been learned since their conception and inception. Benefitting from the learning experience accumulated in this perspective is hence of utmost importance. Second, although some may argue that these experiences have been developed in the context of conventional finance whose principles are quite different from the Islamic one, the two industries share many things in common from a GHG measurement and reporting standpoint. This realisation entails that the adopted methodology will need to draw from conventional finance's experience while adapting in parallel to the specificities of Islamic finance.

As stated in the conclusion of the report "A Comprehensive Review of Existing Methodologies", PCAF's global GHG standard provides the most comprehensive and practical methodology to measure and disclose Scope 3 emissions for financial institutions because of two main factors. First, PCAF's methodology strongly leverages the GHG protocol and aligns with TCFD. Second, PCAF's standards are designed specifically for financial institutions. For this reason, this document mainly seeks to adapt the PCAF standards to the characteristics of Islamic financial institutions and to the environments where they operate.

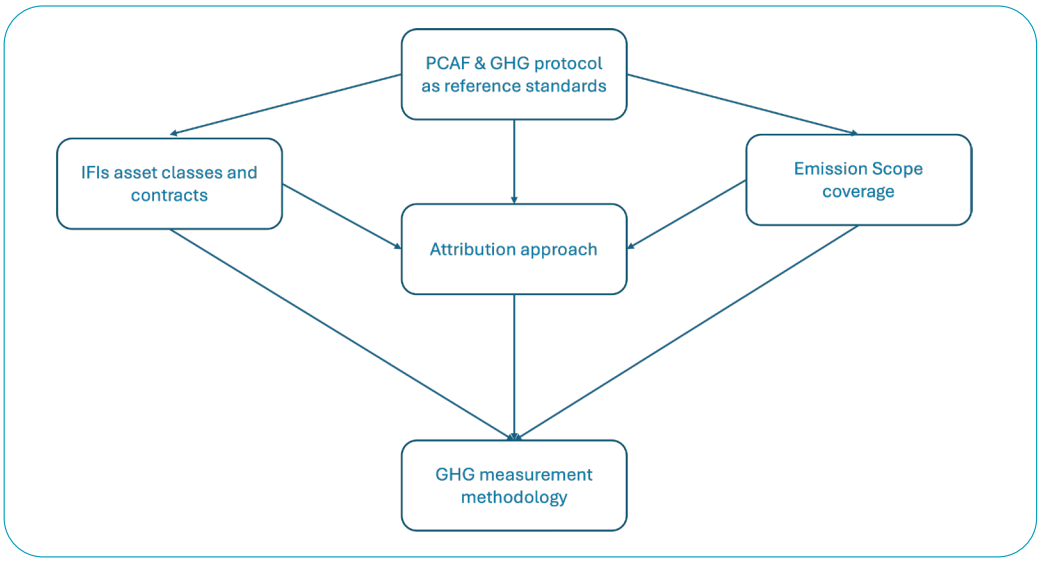
This document interchangeably uses the terms 'Greenhouse Gases' (GHG) and 'carbon'. However, GHG is technically a broader category than carbon alone. Whilst carbon often refers specifically to carbon dioxide (CO_2), the principal greenhouse gas emitted by human activities, GHGs also encompass methane (CH_4), nitrous oxide (N_2O), and fluorinated gases. Each of these contributes to the greenhouse effect and global warming, albeit with varying degrees. Thus, although CO_2 is a primary target for reduction efforts, employing the term GHGs captures a broader array of emissions critical to addressing climate change comprehensively.

SECTION I: ASSET CLASSES MAPPING

Chapter I. I
Methodology

This section proposes an approach to align the standard GHG measurement and reporting methodologies with the characteristics of Islamic finance practices. The following figure summarizes the methodology adopted in this document.

Figure 1. Description of the adopted methodology in this section



In this methodology, PCAF and GHG protocol are deemed the reference standards to adapt to the context of Islamic financial institutions. The adaptation efforts cover the IFIs asset classes and contracts, the emission scope coverage, and the attribution approach. Based on these three elements, the GHG measurement methodology is defined according to the specificities of Islamic financial institutions.

Reference standards

As highlighted in the first part of the report "A Comprehensive Review of Existing Methodologies", GHG Protocol Corporate Value Chain Accounting and Reporting Standard (Scope 3) and PCAF are the most comprehensive standards on GHG measurement and reporting for financial institutions. In the context of Islamic financial institutions, it is possible to rely on those two standards. However, given the nature of the Islamic finance industry and the current GHG measurement practices, GHG and PCAF guidelines need to be adapted to better fit with the context of the industry. Adaptation is conducted through three perspectives:

- Identifying IFIs Asset classes.
- Specifying emissions' scope.

- Adjusting the standards' attribution approach.

Furthermore, emission data are needed to measure the GHG emissions from IFIs for the selected asset classes. For instance, vehicles' fuel type-specific emission factors (e.g., kg CO2e/l diesel, kg CO2e/kWh electricity) and consumed energy at the household level (e.g., gas, electricity, heating oil). Data providers and technical resources needed for the development of the technical part of the GHG measurement tool will be covered in the second part of the report.

IFIs Asset classes

The proposed methodology in this document starts by identifying the most significant asset classes in Islamic Finance, which are currently:

1. Real estate financing.
2. Consumer financing.
3. Vehicle financing.
4. Investment financing.
5. Working capital financing.
6. Sukuk certificates and other Investments.

Then, these selected asset classes are matched with the PCAF asset classes to identify GHG measurement and reporting methodologies that need to be adapted to the context of Islamic finance (Cf. Chapter 3). The adaptation covers mainly the calculation of the attribution factor, which depends on the nature of the underlying asset, the structure of the contract, and whether the use of proceeds is known (Cf. Chapter 4).

Adopting a phased-in approach allows for a progressive implementation of the methodology depending on the evolution of Islamic finance assets and the expansion of PCAF standards in terms of asset class coverage.

GHG Financed Emissions Metrics

The metrics for GHG-financed emissions are essential tools for financial institutions to assess and manage their environmental impact. These metrics can be categorised into several types, each serving a unique purpose[1 2]:

• ***Absolute Emissions:*** This metric calculates the total GHG emissions of an asset class or portfolio, measured in tonnes of CO2 equivalent. It serves as a baseline for understanding the climate impact of loans and investments, helping to set targets for climate action. Absolute emissions provide a comprehensive view of the emissions footprint of a financial portfolio.

• ***Economic Emissions Intensity:*** Economic emissions intensity measures the GHG emissions per monetary unit of investment or loan. It is expressed as tonnes of CO2 equivalent per million monetary unit invested or loaned. This metric helps compare the emissions intensity of different portfolios or parts of portfolios and for managing climate transition risks. It links emissions to the economic output, comparing emissions efficiency across different companies or sectors.

• ***Physical Emissions Intensity:*** This metric involves the calculation of GHG emissions per unit of a common output, such as per MWh of energy produced or per tonne of product produced. It's particularly relevant in sectors where emissions can be directly related to physical output, like manufacturing or energy production. This metric is useful for setting science-based targets (SBTs) and comparing the emissions intensity of companies operating in the same sector.

• ***Weighted Average Carbon Intensity (WACI):*** WACI calculates the portfolio's exposure to carbon-intensive companies. It is expressed as tonnes of CO2 equivalent per million Euros of company revenue. WACI is a nuanced metric that offers an average carbon intensity of an investment portfolio, weighted by the investment size in each asset. It is instrumental in understanding a portfolio's overall risk and exposure to high-carbon industries.

• ***Avoided Emissions:*** Avoided emissions quantify the GHG emissions that are prevented due to certain investments, especially in renewable energy or energy efficiency projects, compared to a baseline scenario. This baseline typically represents a 'business as usual' situation where no intervention occurs. Avoided emissions are crucial for demonstrating the positive impact of investments in sustainable projects and technologies by showing the emissions that would have occurred without these investments.

[1] (PCAF, 2022)
[2] (McKinsey, 2022)

• ***Removed Emissions:*** This refers to the GHG emissions that are actively removed from the atmosphere through various means, such as carbon capture and storage technologies or natural processes like reforestation. Removed emissions are essential for achieving net-zero targets as they help offset a portion of the emissions that are harder to eliminate. Financial institutions can report removed emissions associated with their investments in projects or technologies that contribute to active carbon removal.

Emission scopes coverage

As per PCAF and GHG protocol guidelines, financial institutions shall report counterparties' absolute scope 1 and scope 2 emissions across all sectors for the selected asset classes. For reporting counterparties' scope 3 emissions, PCAF follows a gradual approach, which requires scope 3 reporting for lending to and making investments in companies depending on the sector in which they are active (i.e., where they earn revenues).

In the context of Islamic Finance, given that most IFIs do not report GHG emissions, this report recommends adopting a phased-in approach that requires GHG reporting only to counterparties scope 1 and scope 2 and leave scope 3 reporting optional depending on the sector, data availability, and GHG maturity practices at the level of IFIs and of the countries where they operate. Even in environments where GHG measurement is more advanced, PCAF acknowledges that, to date, the comparability, coverage, transparency, and reliability of scope 3 data still varies greatly per sector and data source.

The same reasoning applies to measuring and reporting avoided and removed emissions. The proposal focuses on absolute financed emissions, that is, the volume of GHG emissions emitted and financed by an institution. The measurement and reporting of avoided and removed emissions by Islamic financial institutions is optional. However, these emissions shall always be reported separately from the Islamic financial institution's scope 1, 2, and 3 GHG inventories.

It should be emphasised that IFIs aiming to comply with PCAF guidelines will find that PCAF offers transitional provisions for greenhouse gas elements beyond mere absolute emissions. This includes, for instance, considerations for GHG Scope of counterparties, as well as for emissions that are avoided or removed. It is important to note that these transitional provisions are intended to be temporary, and PCAF has established a timeline for their application.

Attribution approach

According to the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard, GHG emissions from financings 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 the annual emissions of the counterparties, as a result, GHG emissions are reported on at least a yearly basis.

The proposed methodologies follow the same general attribution principles across the selected

asset classes:

A. Financed emissions are always calculated by multiplying an attribution factor (specific to that asset class) by the emissions of the counterparty.

B. The attribution factor is defined as the share of total annual GHG emissions of the borrower or investee that is allocated to the loans or investments.

C. The attribution factor is calculated by determining the share of the outstanding amount of loans and investments of a financial institution over the total equity and debt of the company, project, etc., that the financial institution invested in.

In the specific case of Islamic financial institutions, the above attribution approach was adapted to the nature of IFI asset classes, the types of financial contracts used and the nature of the proceeds.

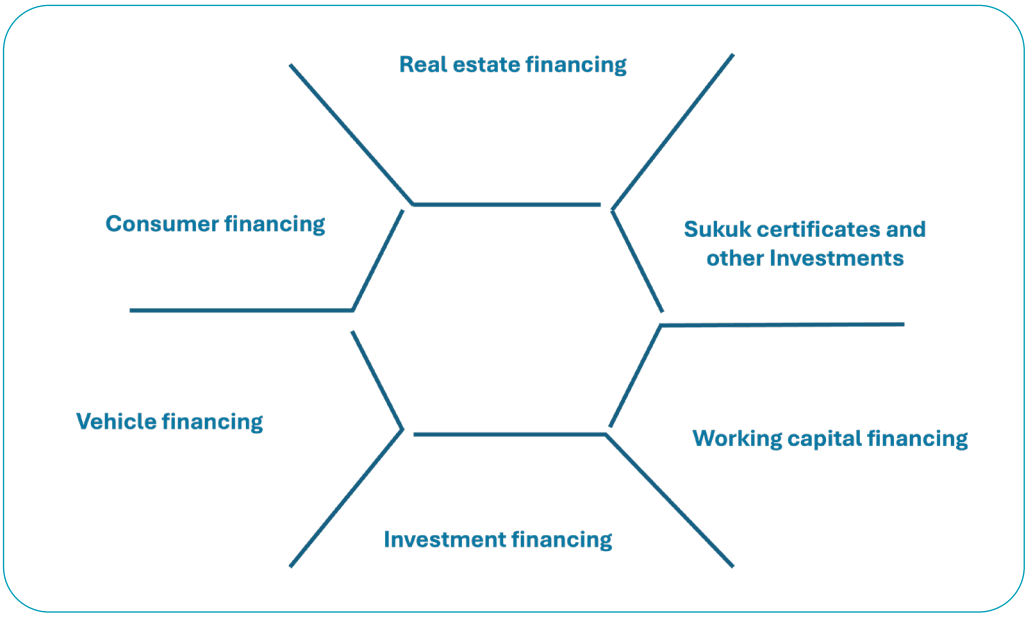
Chapter I.II

Main assets classes in Islamic financial institutions

This second chapter discusses the main asset classes covered in the Islamic finance industry (Figure 2). The data on the asset classes were compiled through desk research covering the principal markets where Islamic financial institutions operate (Cf. Appendix A for further details).

The GHG measurement methodologies presented in chapters 1.3 and 1.4 are based on these assets. It is worth mentioning that Islamic financial institutions' balance sheet presentations vary considerably across the different jurisdictions where they are operating.

Figure 2. Main asset classes in the Islamic finance industry



1.2.1 Real Estate financing

Mortgages

Mortgage in its conventional definition, is a loan from a financial institution that allows a borrower to acquire a home, with the collateral being the property itself. A mortgage duration is typically 30, 20 or 15 years. Over this period (known as the loan's "term"), the client will repay the amount borrowed (the principal) in addition to the interest charged for the loan[3]. According to Shariah standard No 39 issued by AAOIFI, to mortgage means to make a financial asset, or so, tied to a debt so that the asset or its value is used for repayment of the debt in case of default[4].

[3] (CFPB, 2022)
[4] (AAOIFI, 2015)

In this context, Shariah-compliant mortgages are Riba-free mortgage where the mortgaged assets are Shariah permissible property. Although there are several variations (such as Ijara, Diminishing Musharaka and Murabaha) on the market, the common concept is that the bank buys the property on behalf of the client and becomes the legal owner. The monthly payments work more like rent, with part of it going to buy out gradually the banks' shares. At the end of the term, the client must either have redeemed the property or have a remaining sum to settle before he becomes the legal owner[5]. Generally, Interest rate indices such as EURIBOR are often referenced in defining the profit rate for the Shariah-compliant mortgage[6]. Whether in a conventional or an Islamic bank, a mortgage falls under the category of real estate financing and is considered on-balance sheet financing for the purchase of individual homes. This implies that the property is not used for income-generating activities, as is the case with commercial real estate. This asset class typically represents a significant portion of commercial banks' balance sheets across various jurisdictions.

Commercial real estate

Commercial real estate (CRE) is real estate used exclusively for business purposes or to provide workspace rather than living space, which would instead constitute residential real estate. CRE categories are large; they range from simple storefronts and office buildings to shopping malls and warehouses. Individuals and companies can benefit from commercial real estate by renting it out or owning it and reselling it. This asset class represents a lower share in Islamic banks' balance sheets compared to mortgages.

1.2.2 Consumer finance

Consumer finance is defined as the provision of financial services to satisfy the financial functions of households. Consumer finance conventionally refers to short-term loans for consumption purposes. In parallel, Islamic banks tend to offer their clients financing solutions based on Shariah-compliant contracts. This mode of financing covers all the financial services that consumers need. It can take many forms and can be provided through various channels such as Credit cards. This asset class has recently taken an important part of Islamic banks' balance sheets.

1.2.3 Vehicle financing

This is a financing facility provided by financial institutions to help their customers finance the acquisition of vehicles. In this case, the customer agrees to pay monthly instalments and ownership of the vehicle will only be transferred to him upon payment of all the instalments. In Islamic banks, this product is based on different Shariah principles such as Al Ijarah Thumma Al Bai or Murabaha. This asset class takes a significant portion on the balance sheet of Islamic banks in some jurisdictions.

[5] (Unbiased, 2023)
[6] (IFSB, 2022)

1.2.4 Working capital financing

Successful businesses often experience considerable strain on available finance due to time lags in cash inflows and outflows, upgrades to existing facilities and business expansion. Therefore, several banks offer these businesses working capital financing, which is a financing facility for working capital purposes. When funds are needed for the working capital of a running business, Islamic banks provide instruments based on different Shariah-compliant principles (such as Murabaha, Musharaka, Istisna and Salam[7]). Through working capital financing, Islamic banks around the world provide businesses with the extra cash needed to buy business-related merchandise in terms of goods and services.

1.2.5 Investment financing

Islamic financial institutions provide investment financing to support investments in different assets or ventures. This type of financing is mainly used for long-term investments like acquiring fixed assets, expanding business operations, or launching new ventures. In Indonesia for example, Islamic banks allocate 13.64% of their balance sheet to this asset class.

1.2.6 Sukuk certificates and other Investments

AAOIFI defines Sukuk as financial instruments that represent ownership shares of an eligible portfolio of assets, with each share having an identical denomination[8]. Sukuk differ from conventional interest-based securities or bonds in several ways: The issuance of sukuk requires that the funds raised be allocated towards specific assets rather than being used for general or unspecified purposes. Therefore, the underlying assets must be identifiable in order to provide a basis for Sukuk issuance. As the Sukuk are linked to the actual assets, the returns generated from them must be directly linked to the purpose for which the funds were raised. For the duration of the Sukuk's term, which ends upon maturity, ownership rights are transferred from the original owner (or originator) to the Sukuk holders.

[7] (BankAlFalah, n.d)
[8] (AAOIFI, 2003)

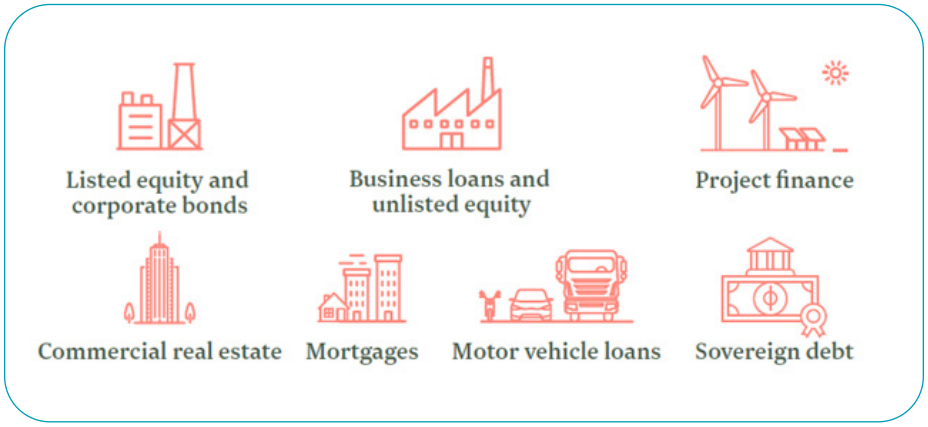
Chapter I.III

Summary of PCAF and GHG Protocol covered asset classes, measurement methodology, and the organisational boundary approach

1.3.1 Asset classes covered by PCAF

The PCAF standard covers the following seven asset classes below[9]:

Figure 3. Assets classes covered by the PCAF standard



- Listed equity and corporate bonds category encompasses all publicly traded corporate bonds and equity, which includes common and preferred stocks. These securities are recorded on the balance sheet of the financial institution and are utilized for general corporate purposes, without any specific designated use of proceeds.

  Green bonds, sovereign bonds, and derivative financial products (e.g., futures, options, swaps) are not covered by this asset class. The same holds for short and long positions or special cases of underwriting such as IPO underwriting.

- Business loans and unlisted equity. This includes:

  ► Loans and lines of credit extended to businesses, nonprofits, and other types of organisations for general corporate purposes, without any specific designated use of proceeds, are classified as business loans. These loans are not traded on the market and are recorded on FI's balance sheet.

  ► Revolving credit facilities, overdraft facilities, and business loans secured by real estate such as CRE (Commercial Real Estate) secured lines of credit are also included. Any off-balance sheet loans and lines of credit are excluded. For financing products such as revolving credit facilities, bridge loans, and letters of credit, which are commonly provided by financial institutions, only those loans outstanding on the year-end balance sheet of the financial institution are covered by this asset class.

[9] (PCAF, 2020)

Methods for financed emissions from business loans for specific corporate purposes (i.e., with known use of proceeds) are not included in this asset class but are instead covered by the project finance asset class, even if they may not be structured as project finance per se.

► Equity investments in private companies include all equity investments for general corporate purposes to businesses, non-profits, and any other structure of an organisation that are not traded on the market and are on the balance sheet of the financial institution. Private equity, which refers to investment funds, is not included in this asset class (and will be covered by future guidance of the PCAF standard).

- Project finance refers to loans or equities that are provided to finance specific activities or projects and are recorded on the FI's balance sheet. The financing is specifically designated for a defined set of operations, such as the construction and running of a wind farm, and only the activities that are financed (or "ring-fenced") are included in this category. Emissions and financials associated with existing activities outside the scope of the financed project, but within the same organisation, are not taken into consideration.
- Commercial real estate comprises on-balance sheet loans that are specifically intended for purchasing and refinancing commercial real estate, as well as on-balance sheet investments in commercial real estate. This definition is applicable to properties that are used for commercial purposes, such as retail spaces, hotels, office buildings, industrial properties, or large multifamily rental units. In all cases, the building owner or investor leases the property to tenants to conduct income-generating activities. CRE investments by asset owners are also included in this method (where the asset owner fully owns the building or partially owns it jointly with another party). CRE investments listed in the stock market are classified as listed equity.
- The Mortgage asset class pertains to on-balance sheet loans that are specifically intended for consumer purposes, which include the purchase and refinance of residential properties. The property is used solely for residential purposes and is not utilized for any income-generating activities. In case the loan is utilized to refinance an existing mortgage and is provided by the original mortgage provider, the new loan supersedes the original mortgage. At present, the PCAF Standard does not mandate the reporting of mortgages used for constructing or renovating a house since the homeowner is not directly accountable for construction emissions as the construction is often performed by a third party. However, if off-balance sheet mortgages are significant and relevant, they can be reported separately.
- The Motor vehicle loans asset class pertains to on-balance sheet loans and lines of credit that are specifically designated for financing one or more motor vehicles and are utilized for specific purposes by businesses or consumers. These loans have a known use of proceeds and are recorded on the FI's balance sheet.

- Sovereign debt: The asset class in question comprises sovereign bonds and sovereign loans issued in either domestic or foreign currencies with varying maturities. These financial instruments enable the transfer of funds to a particular country, resulting in a debt obligation that must be repaid by the borrowing country.

The term "known use of proceeds" relates to investments and loans for specific (corporate or consumer) purposes (i.e., the FI knows for what activity the money is used), while "unknown use of proceeds" refers to investments and loans for general (corporate or consumer) purposes (i.e., the FI does not know exactly for what activity the money is used, which holds for general purposes loans).

1.3.2 Mapping conventional asset classes covered by PCAF standard and IFI asset classes

Table 2: Mapping PCAF and IFI asset classes

IFIs asset classes	Corresponding PCAF asset classes	Adaptation
Real estate financing	• Commercial real estate • Mortgage	Depending on the nature of Shariah-compliant contracts used
Consumer financing	PCAF has not developed a standard covering this specific asset class	In the case of Shariah-compliant consumer financing, the proceeds could either be known (as in the case of Murabaha financing for electronic appliances for instance) or unknown (as in the case of credit cards based on Tawarruq). However, given the diversity of the underlying assets when they are known and the absence of a specific PCAF standard treatment, consumer financing would be excluded from this release
Vehicle financing	• Motor vehicle loans	Depending on the nature of Shariah-compliant contracts used
Investment financing	• Project finance • Business loans and unlisted equity	Depending on the nature of Shariah-compliant contracts used and on whether the proceeds are known
Working capital financing	• Project finance • Business loans and unlisted equity	Depending on the nature of Shariah-compliant contracts used and on whether the proceeds are known
Sukuk certificates and other Investments	• Listed equity, sovereign bonds, and corporate bonds • Business loans and unlisted equity • Sovereign debt	Depending on the nature of Shariah-compliant contracts used

The table above outlines various asset classes that can be used to quantify GHG emissions associated with a wide range of Islamic finance instruments. While the table does not provide an exhaustive list of Islamic finance instruments, the listed asset classes serve as a foundation for calculating emissions. For example, trade finance transactions often involve Murabaha and Tawarruq contracts. Therefore, the methodology used to calculate emissions for investment and working capital financing can be adapted to these transactions.

1.3.3 The organisational boundary approach

The Greenhouse Gas (GHG) Protocol provides guidelines for organisations to measure and manage their greenhouse gas emissions, and it distinguishes between three main organisational boundaries: Scope 1, Scope 2, and Scope 3.

The organisational boundary approach involves determining which emissions sources fall within each scope of an organisation. This assessment helps to identify the emissions that are directly controlled or influenced by the organisation and those that are more indirect and associated with the organisation's activities but occur outside its immediate control. The GHG Protocol proposes three approaches to define an organisation's operational boundary in GHG accounting. The Operational Control Approach, the Equity Share Approach, and the Financial Control Approach.

- According to the operational control approach, a company is responsible for accounting for 100% of the GHG emissions that it has operational control over. However, it does not need to account for GHG emissions from operations in which it has an ownership interest but lacks operational control.
- When using the equity share approach, a company calculates its greenhouse gas emissions based on its equity share in the operation. This share represents the company's economic interest and determines its level of rights to the rewards and risks associated with the operation.
- Under the financial control approach, a company accounts for 100% of the GHG emissions over which it has financial control. It does not account for GHG emissions from operations in which it owns an interest but does not have financial control.

When aggregating GHG information to the portfolio level, the choice of organisational boundaries and consolidation approach cannot be determined by the individual assets and companies. Instead, a single method must be imposed upon each asset so that the emission scopes retain their physical meanings upon aggregation.

1.3.4 Categorizing leases as operating or financial

In terms of accounting, leases are categorized as either operating leases or financial leases, depending on specific accounting criteria, including control, ownership, term and purchase options.

The International Financial Reporting Standard 16 categorizes a lease as a finance lease if it satisfies any of the following conditions:

- Transfer of Ownership: The lease transfers ownership of the underlying asset to the lessee by the end of the lease term. This criterion is met when the lessee has the option to purchase the leased asset at a price that is expected to be sufficiently lower than its fair value at the end of the lease term.
- Bargain Purchase Option: The lease includes a bargain purchase option, which allows the lessee to acquire the leased asset for a price significantly lower than its expected fair value at the end of the lease term. If the lessee is reasonably sure to exercise this option, the lease is classified as a finance lease.
- Lease Term: The lease term covers a major part of the economic life of the leased asset, even if the ownership is not transferred. The major part is typically defined as 75% or more of the asset's economic life.
- Present Value: The present value of the lease payments, along with any guaranteed residual value, amounts to substantially all of the fair value of the leased asset. If the present value threshold is met, it indicates that the lessee effectively has substantially all the risks and rewards associated with ownership of the asset.
- Specialized Asset: The leased asset is of such a specialized nature that it is expected to have no alternative use to the lessor at the end of the lease term. In this case, even if the lessee does not meet the transfer of ownership or bargain purchase option criteria, the lease is classified as a finance lease.

1.3.5 GHG protocol guidance on leased assets (Lessor's Perspective)

Whether emissions from leased assets should be categorized by the lessor as direct (scope 1) or indirect (scope 2 or 3) depends on the **organisational boundary approach** and **the type of leasing arrangement** because ownership and financial and operational control—in the case of finance or capital leases—and operational control—in the case of operating leases—is transferred to the lessee. The following matrix summarizes the four GHG accounting options from the lessor perspective. It is worth noting that when emissions are classified as Scope 3 from the lessor perspective, the attribution factor is 100%.

	Finance/Capital Lease	Operating Lease
Equity Share or Financial Control Approach	Lessor does not have an ownership or financial control, therefore emissions associated with fuel combustion are scope 3 and with use of purchased electricity are scope 3.	Lessor does have ownership and financial control, therefore emissions associated with fuel combustion are scope 1 and with use of purchased electricity are scope 2.
Operational Control Approach	Lessor does not have operational control, therefore emissions associated with fuel combustion are scope 3 and with use of purchased electricity are scope 3.	Lessor does not have operational control, therefore emissions associated with fuel combustion are scope 3 and with use of purchased electricity are scope 3.

Source: GHG Protocol Corporate Standard, Corporate Value Chain (Scope 3) Accounting and Reporting Standard

1.3.6 The specific case of real estate leasing

According to the report "Accounting and reporting of financed GHG emissions from real estate operations" published by PCAF in 2022, the operational control approach is commonly used in the real estate sector to determine the organisational boundary for GHG emissions reporting because it allows property owners and managers to include emissions from properties they directly operate, regardless of ownership or financial control.

Therefore, to delineate emissions Scopes for accounting of financed emissions in the real estate sector, PCAF encourages financial institutions to follow an operational control approach for the real estate assets within their portfolios. Since the operational control consolidation approach is to be used to allocate financed emissions, tenant-related emissions shall be categorized as Scope 3 from the lessor's perspective (cf. the above matrix).

1.3.7 The specific case of vehicle leasing

The reasoning applied to real estate assets is also relevant to vehicles. The operational control approach seems more appropriate when assessing and reporting greenhouse gas (GHG) emissions associated with vehicle assets. It focuses on the entity with the authority to direct the operation and use of the vehicles, regardless of ownership or financial control. By applying the operational control approach, organizations include the GHG emissions from the vehicles they directly control and operate within their reporting boundary.

Chapter I.IV

Adjusting the Attribution Factors

1.4.1 The attribution factor in the PCAF standard

The PCAF Standard applies the same methodology to calculate financed emissions across all asset classes:

- Financed emissions are always calculated by multiplying an attribution factor (specific to that asset class) by the emissions of the borrower or investee.
- The attribution factor is defined as the share of total annual GHG emissions of the borrower or investee that is allocated to the loans or investments.
- The attribution factor is calculated by determining the share of the outstanding amount of loans and investments of a financial institution over the total equity and debt of the company, project, etc., that the financial institution is invested in.

Formulas for measurement of financed emissions using the PCAF Standard of each asset class are presented in the table below:

Table 3: Financed emissions calculation formulas by asset class according to the PCAF Standard

Asset class	Formula for calculating financed emissions
Listed equity and corporate bonds[10]	Listed equity: $\sum_c \frac{Outstanding\ amount\ c}{Enterprise\ Value\ Including\ Cash\ c} x\ company\ emissions\ c$ Enterprise Value Including Cash is the sum of 1) the market capitalisation of ordinary shares and preferred shares, 2) the book value of total debt, and 3) the book value of and minorities' interests. Cash or cash equivalents are not deducted. Corporate bonds: $\sum_c \frac{Outstanding\ amount\ c}{Total\ equity + debt\ c} x\ company\ emissions\ c$ (c: Borrower or investee company)
Business loans and unlisted equity	Business loans and equity investments: Private companies: $\sum_c \frac{Outstanding\ amount\ c}{Total\ equity + debt\ c} x\ company\ emissions\ c$ Business loans: Listed companies $\sum_c \frac{Outstanding\ amount\ c}{EVIC\ c} x\ company\ emissions\ c$ (c: Borrower or investee company)

[10] In the PCAF standard (Listed equity and corporate bonds section), the formula corresponds to Option 1 when reported emissions from the company are available.

Project finance[11]	$\sum_p \frac{Outstanding\ amount\ p}{Total\ equity + debt\ p}\ x\ Project\ emissions\ p$ (p: project)
Commercial real estate[12]	$\sum_{b,e} \frac{Outstanding\ amount\ b}{Property\ value\ at\ origination\ b}\ x\ Energy\ consumption\ b,e\ x\ Emission\ factor\ e$ (b: building; e: energy source)
Mortgages[13]	$\sum_{b,e} \frac{Outstanding\ amount\ b}{Property\ value\ at\ origination\ b}\ x\ Energy\ consumption\ b,e\ x\ Emission\ factor\ e$ (b: building; e: energy source)
Motor vehicle loans	$\sum_{v,f} \frac{Outstanding\ amount\ v}{Total\ value\ at\ origination\ v}\ x\ Distance\ travel\ v\ x\ Efficiency\ v,f\ x\ Emission\ factor\ f$ (v: vehicle, f: fuel type)
Sovereign debt[14]	$\sum_s \frac{Exposure\ to\ Sovereign\ Bond\ (USD)}{PPP-adjusted\ GDP\ (international\ USD)}\ x\ Sovereign\ Emissionsfficiency\ v,f\ x\ Emission\ factor\ f$ (s: sovereign borrower)

Calculating financed emissions of the above-mentioned asset classes can be conducted in several ways depending on the availability of data. Indeed, the quality of the latter is one of the most critical inputs to financed emissions' estimation and FIs are consequently required to use the highest quality data available and improve this quality over time.

In the context of Islamic financial institutions, the methodology adapts the above attribution approach to the nature of IFI asset classes, to the types of financial contracts used and the nature of the proceeds. The following table presents the cases covered by the methodology.

[11] In the PCAF standard (Project finance section), the formula corresponds to Option 1 when reported emissions from the project are available.
[12] In the PCAF standard (Commercial real estate), the formula corresponds to Options 1 and 2.
[13] In the PCAF standard (Mortgage), the formula corresponds to Options 1 and 2.
[14] In the PCAF standard (Sovereign debt) the formula corresponds to data quality scores 1 and 2.

Table 4: Adjusting the attribution factors depending on the cases

IFIs asset classes	Cases	Sub Cases
Real estate financing	Murabaha	Before the selling transaction
	Ijarah	After the selling transaction
	Tawarruq	-
	diminishing Musharaka	-
	Istisna	-
Vehicle financing	Murabaha	-
	Ijarah	-
	Tawarruq	-
Investment financing	Known proceeds	Murabaha
		Ijarah
		Tawarruq
		Musharaka / Mudaraba
	Unknown proceeds	Tawarruq
Working capital financing	Known proceeds	Murabaha
		Musharaka / Mudaraba
		Tawarruq
	Unknown proceeds	Tawarruq
		Salam
Sukuk certificates and other Investments	Corporate and sovereign Sukuk	Known proceeds
		Unknown proceeds
	Listed equity	-
	Unlisted equity	-

1.4.2 Adjusting the attribution factor: Real estate financing

Real estate (RE) financing comprises the financing of mortgages, commercial real estate and RE's construction and renovation. In the context of Islamic finance, RE financing is conducted using several contracts.

Covered scope

For properties already built, IFIs shall cover the absolute scope 1 and 2 emissions related to the energy use of the financed property. In the case of mortgages, energy use includes the energy consumed by the building occupant. In the case of commercial real estate, energy use includes the energy consumed by the building's occupant and shared facilities. Reporting financed emissions from the construction or renovation of buildings is optional.

Standard Calculation formula

The attribution factor is calculated in the PCAF Methodology as follows:

$$\sum_b \frac{Outstanding\ amount\ b}{property\ value\ at\ origination\ b}$$

(With b = building)

Thus, the formula to calculate financed emissions of mortgages is as follows:

$$Financed\ emissions = \sum_{b} \quad Attribution\ factor\ b\ x\ Building\ emissions\ b$$

The emissions associated with buildings are determined by their energy consumption and the specific emission factors that correspond to each energy source utilized. As a result, the emissions formula for mortgages that are financed is as follows:

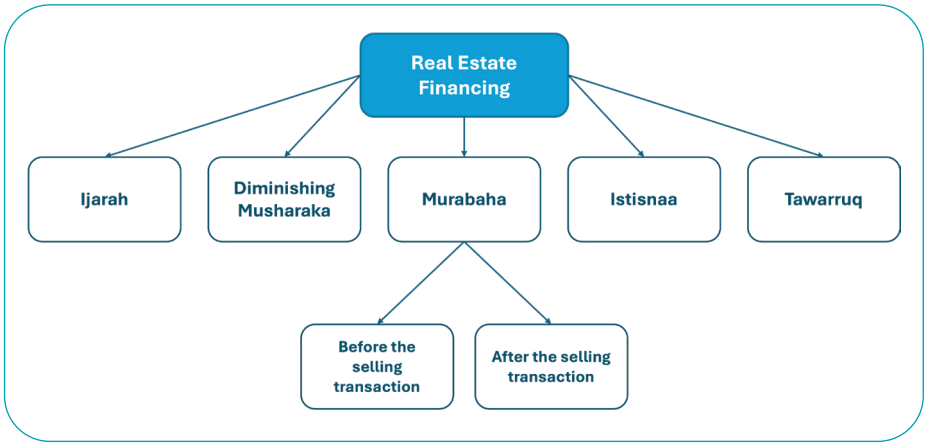
$$Financed\ emissions\ = \sum_{b,e} \frac{Outstanding\ amount\ b}{Property\ value\ at\ origination\ b}\ x\ Energy\ consumption\ b,e\ x\ Emission\ factor\ e$$

(With b = building, e = energy source)

Cases

The real estate financing cases covered in this section are the following:

Figure 4: Cases covered in real estate financing



1.4.2.1 Case of Murabaha financing

After the IFI purchases the property and before Murabaha sale transaction

The commodity becomes the ownership of the Islamic financial institution. In this case, the attribution factor would be equal to 100%

After Murabaha sale transaction

The attribution factor is calculated as follows:

$$\sum_{b} \frac{Outstanding\ amount\ b}{property\ value\ at\ origination\ b}$$

(With b = building)

Where:

- Outstanding amount is defined as total receivables recorded at gross amount minus deferred profits (This formula should be applied when the outstanding amount of Murabaha financings in the balance sheet is reported as the principal amount plus the deferred profits).
- Property value is defined as the face value of purchase price plus any direct acquisition costs supported by the IFI, including registration, valuation, and transfer fees (if these fees are part of the outstanding amount b).

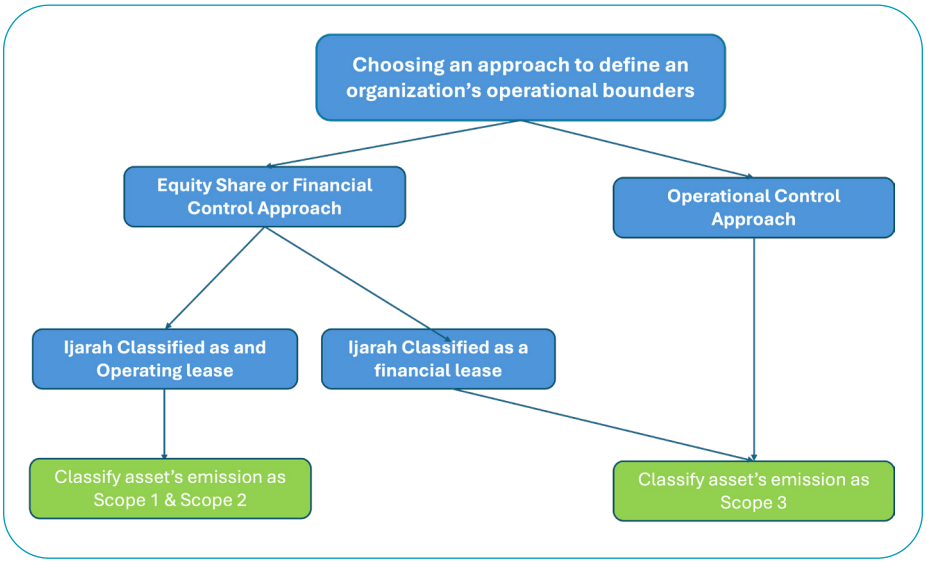
1.4.2.2 Case of Ijarah

According to AAIOFI accounting standard 32 on Ijarah, "There are no significant differences between an operating ijarah and an operating lease" and that "Ijarah in essence are considered to be similar to an operating lease because of the "risk and reward" factor".

In regards to Ijarah Muntahiya bi Tamleek (MBT), AAOIFI Accounting Standard 32 distances Ijarah IMT from a conventional financial lease and highlights various differences from a Sharia perspective, specifically in regards to termination and renewal, ownership, risk, and responsibility.

Globally, the classification of ijarah into a financial or operating lease varies depending on specific terms and conditions of the Ijarah agreement, local regulations, and accounting standards applicable in every jurisdiction. For instance, according to the criteria outlined in Section 3, Ijarah MBT would meet the classification of a financial lease according to IFRS.

As a result the decision tree for ijarah GHG treatment is as follows:



Appendix 6 provides a selection of GHG Calculation examples for Ijarah transactions.

1.4.2.3 Case of Diminishing Musharaka

The attribution factor is calculated as follows:

$$\sum_b \frac{Islamic\ financial\ institution\ share\ b}{property\ value\ at\ origination\ b}$$

(With b = building)

Where:

- The Islamic financial institution's share in the property is measured at the end of the financial period at historical cost after deducting the historical cost of any share transferred to the client (partner)
- Property value is defined as the face value of purchase price plus any direct acquisition costs supported proportionally by the IFI and the client(partner) including registration, valuation, and transfer fees (if these fees are added to the value of the property)

1.4.2.4 Case of Tawarruq

The attribution factor is calculated as follows:

$$\sum_b \frac{Outstanding\ amount\ b}{property\ value\ at\ origination\ b}$$

(With b = building)

Where

- Outstanding amount is defined as the Tawarruq debt at the end of the financial period. The Tawarruq Outstanding amount does not include the deferred profit of the transaction.
- Property value is defined as the face value of the purchase price.

1.4.2.5 Case of Istisna

In the context of real estate, Istisna is applied to finance the construction and renovation of buildings. Reporting GHG emissions for such projects is optional under PCAF. PCAF justifies this decision by the difficulty for financial institutions to measure financed emissions of construction or renovation financing unless the project developer reports construction emissions.

1.4.3 Adjusting the attribution factor: Vehicle financing

Comprises motor vehicle financing for businesses and consumers. In the context of Islamic finance, vehicle financing is conducted using Murabaha, Ijarah and Tawarruq contracts.

Covered scope

IFIs must calculate and report the annual scope 1 emissions (direct emissions from fuel combustion vehicles) and scope 2 emissions (indirect emissions from electricity generation consumed in electric vehicles). It is not necessary to calculate Scope 3 emissions as they can be difficult to obtain and are often insignificant. However, if a financial institution wants to account for the production emissions of new vehicles (i.e., embodied emissions) for any reason, they should report the emissions in the following manner:

- In the initial financing year, the Islamic financial institution has the possibility to report the production emissions of the respective vehicle as a lump sum under scope 3 emissions, while the operation emissions in the respective year shall be reported under scope 1 or 2 emissions.
- In the following financing years, the financial institution shall not report any production emissions of the respective vehicle (if they chose to do it in the first year); they shall only report the operation emissions under scope 1 or 2 emissions.

The optional approach on scope 3 emissions only holds for new vehicles, not used vehicles.

Standard calculation formula

Calculation of the attribution factor in the PCAF methodology is as follows:

$$\sum_v \frac{Outstanding\ amount\ v}{Total\ value\ at\ origination\ v}$$

(With v = vehicle)

Value at origination corresponds to the price of the vehicle when the transaction was concluded. If this value is unknown, IFIs should take a conservative approach and assume 100% attribution.

Calculation of financed emissions of multiple vehicle financing is done by the following formula:

$$Financed\ emissions = \sum_v Attribution\ factor\ v\ x\ Vehicle\ emissions\ v$$

With vehicle emissions being the product of the vehicle distance travelled, the vehicle's fuel efficiency (e.g., l diesel/km, kWh electricity/km) and the vehicle's fuel type-specific emission factor (e.g., kg CO_2e/l diesel, kg CO_2e/kWh electricity), the above formula becomes:

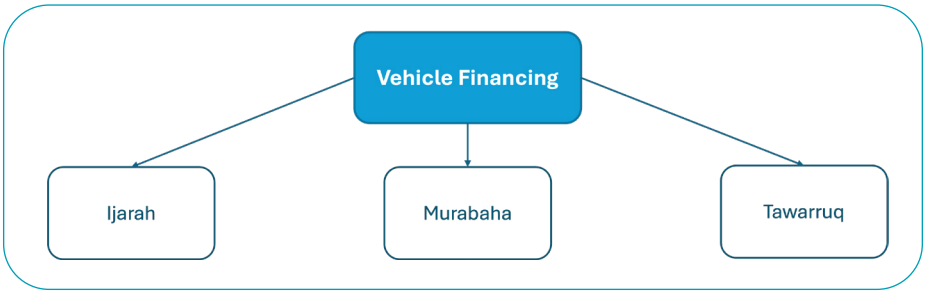
$$Financed\ emissions = \sum_{v,f} \frac{Outstanding\ amount\ v}{Total\ value\ at\ origination\ v}\ x\ Distance\ travel\ v\ x\ Efficiency\ v,f\ x\ Emission\ factor\ f$$

(With v = vehicle, f = fuel type)

Cases

The vehicle financing cases covered in this section are the following:

Figure 5: Cases covered in vehicle financing



1.4.3.1 Case of Murabaha Financing

The attribution factor is calculated as follows:

$$\sum_{v} \frac{Outstanding\ amount\ v}{Total\ value\ at\ origination\ v}$$

(With v = vehicle)

Where:

- Outstanding amount is defined as total receivables recorded at gross amount minus deferred profits
- Total value at origination is defined as the face value of the vehicle purchase price. If costs such as insurance are part of outstanding amount, they should be added to the vehicle's total value at origination

1.4.3.2 Case of Ijarah

Same approach as in real estate financing.

1.4.3.3 Case of Tawarruq

The attribution factor is calculated as follows:

$$\sum_{v} \frac{Outstanding\ amount\ v}{Total\ value\ at\ origination\ v}$$

(With v = vehicle)

Where:

- Outstanding amount is defined as the Tawarruq debt at the end of the financial period.
- Total value at origination is defined as the face value of the vehicle purchase price.

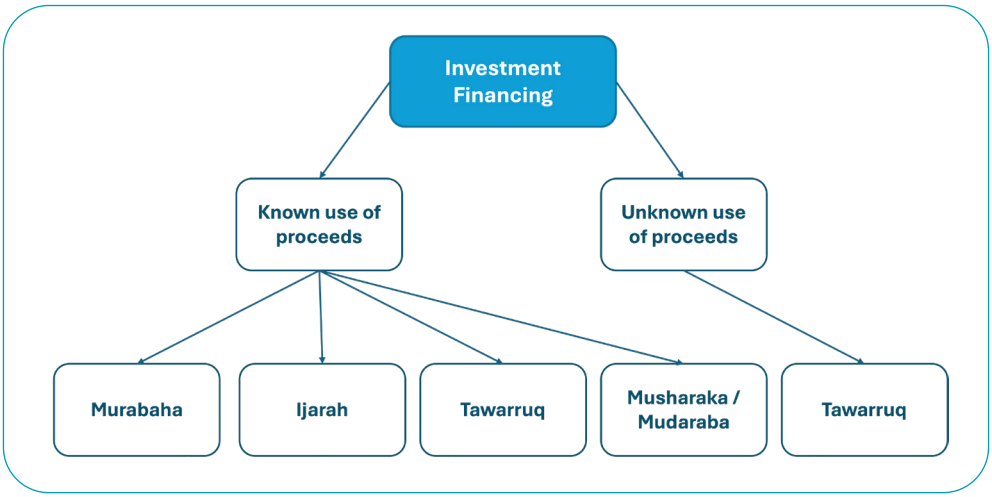
1.4.4 Adjusting the attribution factor: Investment financing

Investment financing comprises long-term financing of equipment or investment, excluding real estate and vehicles. The proceeds could either be known (as in the case of Murabaha and Ijarah financing) or unknown (as in the case Tawarruq)

Cases

The investment financing cases covered in this section are the following:

Figure 6: Cases covered in investment financing



1.4.4.1 Known use of proceeds

The financing institution knows to which activities the proceeds from financing are allocated.

Calculation scope:

IFIs are required to report the absolute scope 1 and 2 emissions associated with their activities. Reporting scope 3 emissions is not mandatory, although it is an option. If applicable, avoided and removed emissions may be reported as well, but they must be distinguished from absolute emissions and reported separately.

Standard calculation formula

The total financed emissions from multiple activities are calculated using the following equation:

$$Financed\ emissions = \sum_{a} \quad Attribution\ factor\ a\ x\ Activity\ emissions\ a$$

(With a = activity)

Calculation of attribution factors is as follows:

$$\sum_a \frac{Outstanding\ amount\ a}{Total\ financing\ a}$$

The numerator in this context refers to the outstanding amount of financing provided by a specific financier. It is important to note that guarantees do not factor into this calculation until they are actually called upon and converted into financing.

Case of Murabaha financing

The attribution factor is calculated as follows:

$$\sum_v \frac{Outstanding\ amount\ a}{Total\ value\ at\ origination\ a}$$

(With a = activity)

Where:

- Outstanding amount is defined as total receivables recorded at gross amount minus deferred profits.
- Total value at origination is defined as the face value of the activity's assets purchase price.

Case of Ijarah

Same approach as in real estate financing.

Case of Tawarruq

The attribution factor is calculated as follows:

$$\sum_v \frac{Outstanding\ amount\ a}{Total\ value\ at\ origination\ a}$$

(With a = activity)

Where:

- Outstanding amount is defined as the Tawarruq debt at the end of the financial period.
- Total value at origination is defined as the face value of the activity's assets purchase price.

Case of Musharaka / Mudaraba

The attribution factor is calculated as follows:

$$\sum_a \frac{Islamic\ financial\ institution\ share\ a}{Total\ value\ at\ origination\ a}$$

(With a = activity)

Where:

- The Islamic financial institution share in the asset is measured at the end of the financial period at historical cost after deducting the historical cost of any share transferred to the client (partner).
- Asset value is defined as the face value of the purchase price.

1.4.4.2 Unknown use of proceeds

The financing institution does not know to which activities the proceeds from financing are allocated when using the Tawarruq contract.

Calculation scope:

IFIs must report the counterparties' absolute scope 1 and scope 2 emissions across all sectors. Reporting counterparties' scope 3 emission is optional.

Calculation formula

The total financed emissions from financings with unknown proceeds are calculated as follows:

$$Financed\ emissions = \sum_c Attribution\ factor\ c\ x\ Company\ emissions\ c$$

(With c = company)

Calculation of attribution factors is as follows:

The numerator:

Is defined as the outstanding value of the Tawarruq debt that the borrower owes to the financial institution.

The denominator:

The sum of total company equity and debt, which can be found on the client's balance sheet. For business loans to listed companies, this is the company EVIC (Enterprise Value Including Cash) of the respective client.

Thus, attribution factors for investment financing to private companies are as follows:

$$\sum_c \frac{Outstanding\ amount\ c}{Total\ equity + debt\ c}$$

While the attribution factor for investment financing to listed companies is as follows:

$$\frac{Outstanding\ amount\ c}{EVIC\ c}$$

(With c = client)

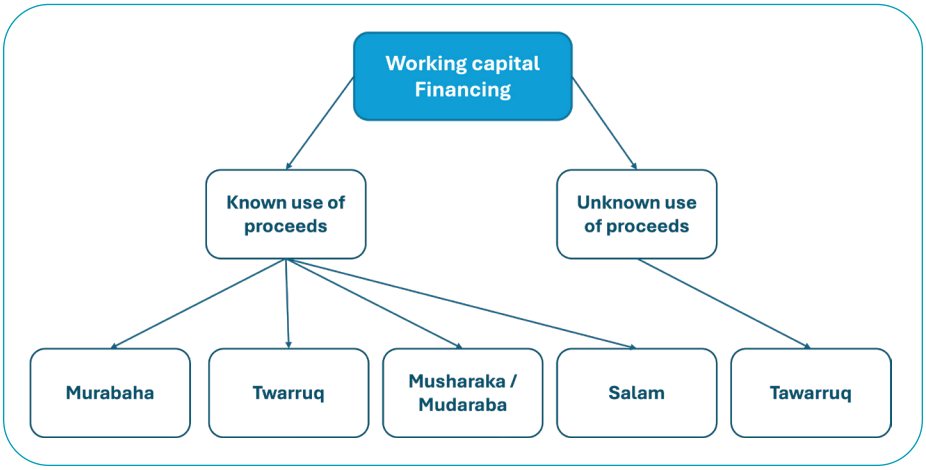
1.4.5 Adjusting the attribution factor: Working capital financing

Comprises financial instruments that cover firms' day-to-day operations. In the case of working capital financing, the proceeds could either be known (as in the case of Murabaha financing) or unknown (as in the case of Salam and Tawarruq). In both cases, IFIs should use the same approach as 'Investment financing' when reporting financed emissions.

Cases

The working capital financing cases covered in this section are the following:

Figure 7: Cases covered in Working Capital Finance financing



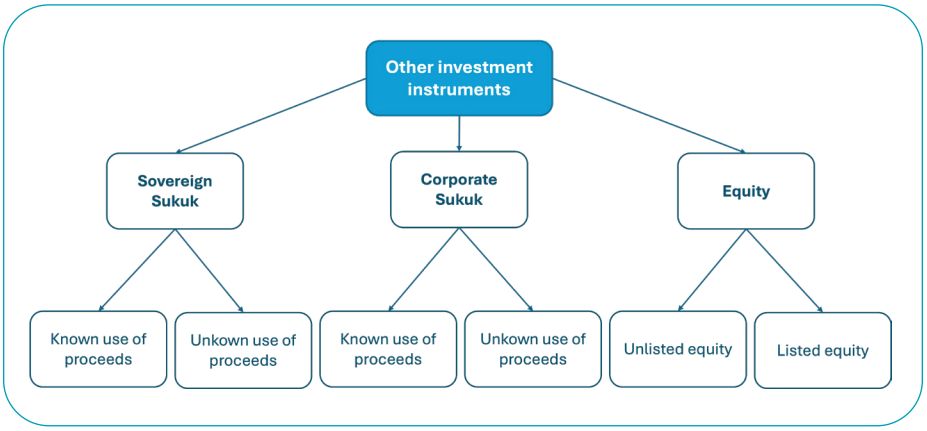
1.4.6 Adjusting the attribution factor: Sukuk certificates and other investment instruments

These investment instruments include sovereign and corporate Sukuk, public equity and unlisted equity.

Cases

The other Investment instruments cases covered in this section are the following:

Figure 8: Cases covered in "Sukuk Certificate and other investment instruments".



1.4.6.1 Corporate Sukuk with unknown use of proceeds

Calculation scope

IFIs must always report Scope 1 and Scope 2 emissions of companies, regardless of their respective sectors. Reporting counterparties' scope 3 emissions is optional.

Standard calculation formula

The total financed emissions of a Sukuk portfolio is calculated as follows:

$$Financed\ emissions = \sum_s \quad Attribution\ factor\ s\ x\ Company\ emissions\ s$$

(With s = Sukuk issuer)

The numerator of the attribution factor (formula below) is the book value for outstanding Sukuk.

For traded Sukuk to private companies, this is the sum of total company equity and debt, which can be found on the client's balance sheet, as no market value for equity is available.

The attribution factor for Sukuk from listed companies is calculated as follows:

$$\sum_s \quad \frac{Outstanding\ amount\ s}{Entreprise\ Value\ Including\ Cash\ s}$$

While the attribution factor for Sukuk from private companies is calculated as follows:

$$\sum_s \quad \frac{Outstanding\ amount\ s}{Total\ equity + debt\ s}$$

(With s = Sukuk issuer)

1.4.6.2 Sovereign Sukuk with unknown use of proceeds

Calculation scope

The PCAF defines the GHG scope of sovereign debt as follows:

- Scope 1: Refers to domestic GHG emissions from sources located within the country's territory.
- Scope 2: Refers to GHG emissions resulting from the domestic use of grid-supplied electricity, heat, steam, and/or cooling imported from another territory.
- Scope 3: Refers to emissions attributed to non-energy imports resulting from activities taking place within the country's territory.

Standard calculation formula

The financed emissions of sovereign debt are calculated by multiplying the attribution factor by the emissions of the respective sovereign counterparty.

$$Financed\ emissions = \sum_{s} \quad Attribution\ factor\ s\ x\ Sovereign\ Emissions\ s$$

(With s = Sovereign Sukuk issuer)

PCAF defines the attribution factor for sovereign debt as follows[15]:

$$\sum_{s} \quad \frac{Exposure\ to\ Sovereign\ Bond\ (USD)}{PPP-adjusted\ GDP\ (international\ USD)}$$

Likewise, the attribution factor for sovereign Sukuk can be calculated as follows:

$$\sum_{s} \quad \frac{Exposure\ to\ Sovereign\ Sukuk\ (USD)}{PPP-adjusted\ GDP\ (international\ USD)}$$

1.4.6.3 Corporate and sovereign Sukuk with known use of proceeds

IFIs should follow a similar approach as the one described in the case of investment financing (Known use of proceeds) based on the emissions of the underlying assets.

1.4.6.4 Equity

Covered scope

IFIs must report investees' absolute scope 1 and scope 2 emissions across all sectors. Reporting scope 3 emissions is optional.

[15] (PCAF, 2022)

Standard calculation formula

The total financed emissions from unlisted and listed equity are calculated as follows:

$$Financed\ emissions = \sum_c \quad Attribution\ factor\ c\ x\ Company\ emissions\ c$$

(With c = investee company)

The attribution factors for investments in private companies are as follows:

$$\sum_c \quad \frac{Outstanding\ amount\ c}{Total\ equity + debt\ c}$$

(With c = investee company)

The outstanding amount refers to the current value of equity that a financial institution possesses in a private company. It is calculated as follows:

$$\frac{Number\ of\ shares\ of\ FI\ c}{Number\ of\ total\ shares\ c}\ x\ total\ equity\ c$$

The denominator represents the sum of total company equity[16] and debt[17], which can be found on the client's balance sheet.

In the calculation of the attribution factor for listed companies, the numerator considers the market value of outstanding listed equity. Meanwhile, the denominator for listed companies is determined using the EVIC (Enterprise Value Including Cash) formula. The EVIC is the total of market capitalization of ordinary shares and preferred shares at the end of the reporting period and total debt and minorities' interests book value. It is important to note that cash or cash equivalents are not deducted to avoid the potential for negative enterprise values[18].

[16] When equity is negative, total equity is set to 0 meaning that all emissions are attributed to debt.
[17] Includes both long term and current debt.
[18] Includes all debt as listed on the company balance sheet (including non-interest-bearing debt).

Chapter I.V
Presentation of the GHG reporting

When Islamic financial institutions measure and report their GHG-financed emissions, they have significant flexibility in structuring their reports depending on their specific portfolio characteristics and stakeholder requirements.

One approach to structuring GHG reports is to group emissions based on the types of clients. This can include categorisations such as retail, corporate, or government-related organisations. This client-based approach helps in understanding the emissions profiles of different client segments and how they contribute to the institution's overall emissions footprint.

Another method is to group emissions based on the nature of each asset class. For example, in the case of vehicle financing, emissions can be presented by the type of vehicles, such as combustion engines, electric, or hybrid vehicles. Similarly, for real estate financing, emissions can be categorised by property type, like residential buildings, office spaces, or warehouses. This asset-class-based approach provides insights into the emissions intensity of different investment areas and helps identify high-emission sectors within the portfolio.

Conclusion

This first part of the document proposed a methodology to align standard GHG measurement and reporting guidelines with the characteristics of Islamic finance practices. Given the nature of the Islamic finance industry and the current GHG measurement practices, GHG and PCAF guidelines needed to be adapted to better fit with the context of the Islamic finance industry. Adaptation was conducted through three perspectives: Identifying IFI asset classes, specifying emissions' scope and adjusting the standards' attribution approach.

The proposed methodology advocates for a phased-in approach that allows for a progressive implementation of the methodology depending on the evolution of Islamic finance maturity regarding GHG reporting, data availability and the expansion of international GHG standards in terms of asset class coverage. One illustration of such an approach is focusing on absolute scope 1 and scope 2 emissions in the short run.

Finally, the proposed methodology discussed adapting the attribution approach to the context of Islamic financial institutions, considering the nature of IFI asset classes, to the types of financial contracts used and the nature of the proceeds.

Based on these findings, the following section identifies data providers and technical resources required to develop the technical aspects of the GHG measurement tool. It acknowledges the challenge of limited high-quality data access for financial institutions across various asset classes in many Islamic finance centres. To address this, the section explores the use of estimated or proxy indicators, even if they have limitations. Additionally, it emphasises focusing on the most carbon-intensive elements within a portfolio and outlines strategies to improve data quality in the long term.

SECTION II: DATA PROVIDERS AND TECHNICAL RESOURCES

Section's objectives and Methodology

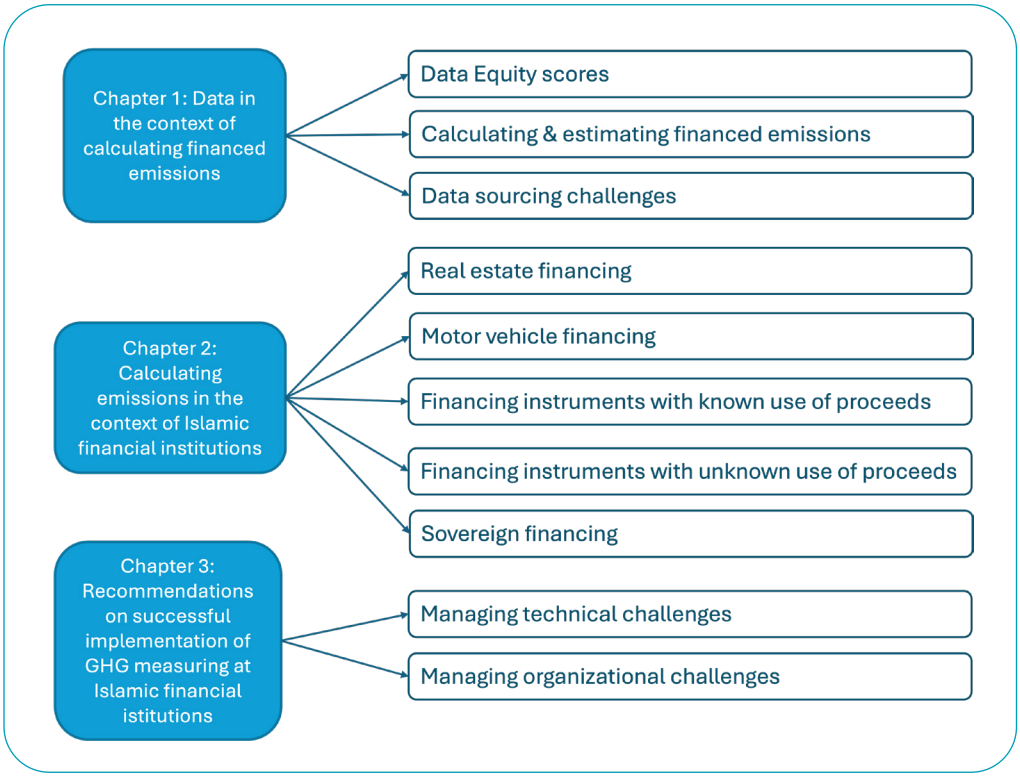
The second part of the document provides methodologies for Islamic financial institutions to identify data providers and technical resources needed for the development of the technical aspect of the GHG accounting tool. These methodologies consider contexts where high-quality data is usually unavailable to Islamic financial institutions for all asset classes.

This section is composed of the following chapters:

- The first chapter discusses data quality scores and summarizes the main approaches for calculating and estimating financed emissions for the main asset classes. The chapter also highlights the common data sourcing challenges globally.
- The second chapter presents the methodologies for calculating emissions in the context of Islamic financial institutions. It covers emissions from the following asset classes: real estate financing, motor vehicle financing, financing instruments with known use of proceeds, financing instruments with unknown use of proceeds, and sovereign financing. Appendix 5 complements this second chapter by providing GHG calculation examples related to IFIs.
- The third chapter recommends specific technical and organizational measures to successfully implement GHG measuring and reporting at the level of Islamic financial institutions.

The following figure summarizes the methodology:

Figure 9: Description of the adopted methodology



Chapter II.I

Data in the context of calculating financed emissions

2.1.1 Context

One of the objectives of international standards on climate disclosures is to standardize financed emissions measurement and disclosure. Eventually, this will reduce climate-related risk in the financial sector and mitigate global climate change.

More specifically, the benefits of measuring GHG emissions in the finance industry are manifold[19]:

- Investors can track and control the emissions they finance while striving to achieve their goal of net-zero emissions by conducting carbon footprinting across portfolios that span multiple asset classes.
- Assessing the emissions that are financially supported by different asset classes, sectors, and projects within an investment portfolio can assist in making informed choices related to the reduction of carbon emissions.

Improving financed emissions disclosure is necessary for the financial industry, as these emissions are challenging to collect data and measure. Obtaining data for calculating financed emissions necessitates collaborating with multiple businesses and organizations, some of whom may not be actively monitoring their carbon footprint[20].

2.1.2 Data quality scores

Data quality scores in the PCAF methodology guide stakeholders in accurately understanding and communicating reported emissions. These quality scores adapt to the potential inconsistencies of data sources from company to company and market to market.

A score of 1 represents the highest quality data, which corresponds to the verified emissions reported by the investee or borrower. A third party conducts verification. If investee or borrower emissions data are unavailable, methodologies should estimate financed emissions using the company's emissions factors, financial information, and physical or economic activity indicators.

Although the standards for data quality may differ across asset classes, financial institutions are required to adhere to PCAF's guidelines and clarify their approach for evaluating data quality. Additionally, financial institutions must report a separate data quality score for their Scope 1 and 2 emissions as compared to their Scope 3 emissions. In addition, financial institutions must develop a policy for recalculating the base-year financed emissions. The base-year financed emissions serve as a foundation for various purposes, such as target setting and scenario analysis. Recalculating this figure may become necessary to enhance the data's relevance and comparability. Financial institutions must also explicitly designate relevant events leading to a recalculation in this policy. Finally, financial institutions should develop strategies to improve

[19] (Persefoni, 2023)
[20] (Guidehouse, 2022)

data over time[21].

2.1.3 Calculating/estimating financed emissions

Depending on data availability, the PCAF methodology proposes various approaches for calculating or estimating financed emissions. Reported emissions have the highest data quality, while emissions estimated using physical or economic activity indicators have lower levels of data quality. Even though activity indicators may not correlate directly to real emissions, they present the advantage of estimating emissions hotspots where reported emissions of counterparties are unavailable. The equations and tables in this section explain the approaches to reporting and estimating financed emissions.

The three main approaches to calculating financed emissions are as follows. It is worth mentioning that the data points for real estate, vehicle, and sovereign financing differ from corporate financing and project finance.

- Calculating financed emissions using counterparties' emissions data.
- Calculating financed emissions using counterparties' physical activity indicators.
- Calculating financed emissions using counterparties' economic indicators.

Calculating financed emissions using counterparties' emissions data

In this approach, financial institutions use emissions indicators reported by counterparties to calculate their financed emissions, as shown in the formula below:

$$Financed\ emissions = \sum_{c} Attribution\ factor\ x\ Emissions\ c$$

$$\blacktriangledown$$

$$Reported\ Emissions\ c$$

(With c=the counterparty)

Table 5: Calculating financed emissions based on counterparties' reported emissions

Input	Description	Sources
Reported emissions	Scope 1, 2, and 3 resulting from the counterparty activities (tCO2e)	Potential sources include national databases, CDP, companies' sustainable reports, and data providers (e.g., CapIQ, S&P, MSCI, and Moody)

[21] (PCAF, 2022)

Calculating financed emissions using counterparties' physical activity indicators

In this approach, financial institutions use economic activity indicators reported by counterparties to calculate their financed emissions, as shown in the formula below:

$$Financed\ emissions = \sum_{c} Attribution\ factor\ x\ Emissions\ c$$

$$\blacktriangledown$$

$$Physical\ Activity\ c * \frac{Emissions}{Physical\ Activity}$$

(With c=the counterparty)

Table 6: Calculating financed emissions based on counterparties' physical activity indicators

Input	Description	Sources
Physical activity c	Counterparty primary physical activity data based on energy consumption and production output	Counterparty's reports, website, and statistics
Emissions / Physical activity	Scope 1, 2, and 3 emission factors per physical activity indicator (tCO2e/MWh of electricity consumer or tCO2e/ton of cement produced)	PCAF database (free for signatories), as well as publicly available and private data sources

Calculating financed emissions using counterparties' economic indicators

In this approach, financial institutions rely on economic activity indicators reported by counterparties to calculate their financed emissions, as shown in the formula below:

$$Financed\ emissions = \sum_{c} Attribution\ factor\ x\ Emissions\ c$$

$$\blacktriangledown$$

$$Revenue\ c * \frac{Sectoral\ Emissions}{Sectoral\ revenue}$$

OR

$$Assets\ c * \frac{Sectoral\ Emissions}{Sectoral\ Assets}$$

(With c=the counterparty)

Table 7: Calculating financed emissions based on counterparties' economic indicators

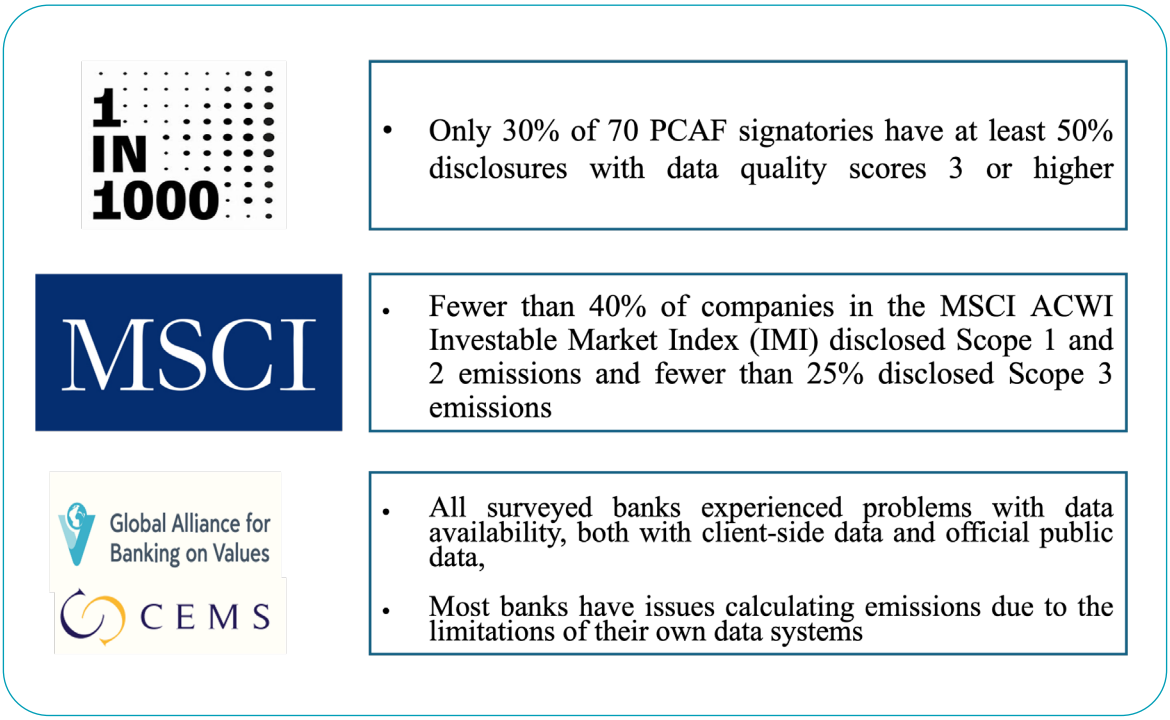
Input	Description	Sources
Revenue c	Counterparty revenue, ideally split by per production output	Counterparty's reports, financial statements, or potentially other sources such as data providers
Sectoral Emissions / Sectoral Revenue or Assets	Sectoral Scope 1, 2, and 3 emissions per generated revenue or asset	PCAF database, as well as publicly available and private data sources

Appendices 2 and 3 provide further details on emissions data sourcing based on the PCAF methodology.

2.1.4 Data sourcing challenges

Several studies confirm that financial institutions face data availability and quality issues when measuring their portfolios' carbon footprint (Cf. Figure 10). The quality of sourced data often varies depending on whether financial institutions use reported or estimated emissions. Indeed, evidence shows that most GHG disclosures from financial institutions rely on high-level regional/sectoral allocations, especially for corporate financing, and, therefore, do not necessarily accurately represent actual emissions linked to their investment and financing portfolios. Mainly, GHG emissions data from non-listed companies (especially in emerging countries) are widely unavailable due to the absence of regulatory obligations to report such data, which makes measuring GHG emissions more challenging for financial institutions.

Figure 10: Summary of the findings of a selection of studies on GHG accounting by financial institutions



1in1000

1in1000, a research program by 2° Investing Initiative (2DII) that aims to integrate future risks and challenges into financial processes and regulations, reviewed the compliance of disclosures of 70 PCAF signatories with the PCAF standard in 2022. The review sought to identify institutions where at least 50% of disclosures had data quality scores of 3 or higher. Results show that less than 30% of PCAF disclosures reached this standard during the study[22].

MSCI

A study on carbon footprinting of portfolios was released by MSCI on July 18, 2022. According to the findings, as of January 20, 2022, less than 40% of companies listed on the MSCI All Country World Index had reported their Scope 1 and 2 emissions, and less than 25% had disclosed their Scope 3 emissions. Nevertheless, the study emphasizes that there is a continuous improvement in the issuers' climate-related data quality[23].

GABV & CEMS

GABV and CEMS conducted GHG accounting case studies of the world's leading values-based banks. According to this study, all surveyed banks experienced problems with data availability, both with client-side data and official public data, which increases the difficulty in calculating GHG emissions. Much of the data needed to calculate GHG emissions accurately is not collected from clients or available from accessible data sources. The study indicates that most banks have issues calculating emissions due to the limitations of their data systems. Some of the banks' data systems are not very flexible. They cannot be easily adapted to measure financed emissions as they require more different information about the clients than customarily collected. Moreover, some banks reported collecting the information they need manually and failing to store it in a database, which leads to significant inefficiencies. Finally, some surveyed banks mentioned storing data via different and sometimes technically incompatible systems, making it difficult and time-consuming to processrelevant data[24].

2.1.5 Dealing with data availability and quality

In the absence of a legal or regulatory duty to disclose, financial institutions have to shoulder the burden of collecting and reporting emissions data of the companies included in their respective portfolios. One way to find new data sources is to survey clients and develop questionnaires that provide data required to measure financed emissions. According to the GABV previously mentioned study, some banks are incentivizing their borrowers to do so, for example, by warning clients that they will be cut off from their services if they fail to provide the information, with implications for business activities.

In the absence of primary data, many banks rely on alternative sources, such as country-specific statistics or databases from academic journals, which can provide a somewhat valid use case proxy, yet also holds some limitations. In general, relying on assumptions and generalizations leads to lower data quality and measurement accuracy by increasing error margins and, consequently, the likelihood of over or underestimating emissions.

[22] (2DII, 2022)
[23] (MSCI, 2022)
[24] (GABV & CEMS, 2022)

For instance, a bank can rely on business-specific codes such as the International Standard Industrial Classification and the North American Industry Classification System, which provide emission factors for different industries as a proxy for its clients' emissions. However, that may lead to overestimating actual financed emissions for clients with better-than-average environmental performance. However, in the North American Industry Classification System database, for example, there are many industries for which data is available only at a generic level and, in some sectors, is missing entirely.

Chapter II.II

Calculating emissions in the context of Islamic financial institutions

2.2.1 Emissions from real estate financing

Standard formula:

The formula to calculate financed emissions of real estate financing is as follows:

$$Financed\ emissions = \sum_{b} Attribution\ factor\ b\ x\ Building\ emissions\ b$$

Building emissions are computed using 1) the energy consumption for each source of energy consumed (electricity, natural gas, and others), and 2) the emission intensity factors for these energy sources. The mortgages financed emissions formula becomes:

$$Financed\ emissions\ = \sum_{b,e} Attribution\ factor\ b\ x\ Energy\ consumption\ b,e\ x\ Emission\ factor\ e$$

(With b = building, e = energy source)

Based on the PCAF data quality scorecard, banks have three options to estimate real estate emissions:

- Option 1: Using actual building emissions indicators.
- Option 2: Estimating building emissions using floor area.
- Option 3: Estimating building emissions using the number of buildings.

Option 1 supposes the availability of primary data on actual energy consumption (i.e., metered data) for financed buildings. In most cases, Islamic banks are unlikely to have access to such data. Therefore, Islamic banks are more likely to rely on Options 2 and 3.

Estimating energy consumption

Islamic Banks can estimate the annual energy consumption in Kwh per m^2 or in Kwh per unit based on the building's technical characteristics:

- Residential: Apartments, townhouses, and villas
- Commercial: Offices, warehouses, and retail store buildings
- Industrial: Factories

The subsequent tables present a range of indicators that are accessible to approximate the emissions of real estate assets in several OIC countries. However, the actual electricity usage of real estate properties may fluctuate significantly due to various factors like the size of the building, the number of inhabitants, implemented energy-efficient measures, and patterns of usage. Developing more sophisticated models to estimate a property's carbon footprint better

is possible. For instance, in the case of offices:

- Additional details about the floors and spaces, such as offices and meeting rooms
- The percent of occupancy of each building
- The geographical region of each building

Evidently, the richer the data on the IT banking systems, the better the estimation models. However, as mentioned in the GABV study, some banks do not store the floor area of properties they finance in their data systems.

Since most Islamic banks are in OIC, indicators from the PCAF European Building Emission Factor Database are not immediately applicable. This database consolidates publicly accessible real estate emission factors for all financial institutions and other stakeholders in the European Union, Norway, Switzerland, and the United Kingdom. Financial institutions can collect specific emission factors by country, building types (residential and non-residential), energy Performance Certificate ratings, and floor area or unit. Appendix 3 presents the specifications of the PCAF European Building Emission Factor Database in more depth.

Table 8: Real estate electricity consumption in a selection of OIC countries

Data class	Malaysia	United Arab Emirates	Morocco	Türkiye
Average electricity consumption per residential property	1,820 kWh per year[25]	Between 7,300 and 10,950 kWh per year[26]	1,200 kWh per year[27]	Single-family houses: 220 kWh/m2 per year Multi-family houses:175 kWh/m2 per year[28]
Average electricity consumption per commercial properties	3,640 kWh /year[17]	220-360 kWh per m2 per year[29]	20,000-30,000 kWh	Non-residential buildings consumption exceeds 270 kWh/ m2[20]

Table 9: Real estate areas in a selection of OIC countries

Data class	Malaysia	United Arab Emirates	Morocco	Türkiye
The average area of residential housing	117 m^2 [30]	103 m^2 [31]	102 m^2 [32]	N/A
The average area of commercial properties	• Retail spaces: 92 m^2 to 278 m^2 • Office spaces: 46 m^2 to 92 m^2 per workstation.	• Legal minimum office space requirements are between 7 m2 and 12.5 m^2 per employee.[33]	• Retail spaces: 100 m^2 to 300 m^2. • Office spaces: 50 m^2 to 100 m^2 per workstation.	N/A

[25] (Ponniran et al., 2012)
[26] (UAE Ministry of Energy, 2014)
[27] (ADEREE, 2013)
[28] (Turkiye Ministry of Environment and Urbanisation, 2018)
[29] (Khaleejtimes, 2022)
[30] (Kopiandproperty, 2019)
[31] (Gulfnews, 2019)
[32] (Telquel, 2016)
[33] (Cavendishmaxwell, 2021)

Finally, besides electricity consumption, when relevant, there may be a need to add Natural gas, Heating oil, Liquefied petroleum gas (LPG), and Propane consumption.

Estimating emission factors

The carbon emissions per kWh of electricity vary depending on each country's energy mix composition. Countries that rely heavily on fossil fuels will generally generate substantially more carbon emissions per unit of electricity produced than countries using more renewable and nuclear energy sources.

The below table presents examples of emissions intensity of the power sector in a selection of OIC countries.

Table 10: Emissions intensity of the power sector in some OIC countries

Country	Production mix factor (kg-CO2e per kWh)	Source	Year
Malaysia	0.758	Malaysia Energy Information Hub[34]	2021
Indonesia	0.7177	Climate Transparency[35]	2020
Saudi Arabia	0.5059	Climate Transparency[26]	2020
Türkiye	0.3750	Climate Transparency[26]	2020
United Arab Emirates	0.542	Dubai Electricity & Water Authority[32]	2020

2.2.2 Emissions from motor vehicle financing

Standard formula:

The following formula shows the calculation of financed emissions of multiple motor vehicle financing:

$$Financed\ emissions = \sum_{v} Attribution\ factor\ v\ x\ Vehicle\ emissions\ v$$

With vehicle emissions being the product of the vehicle distance traveled, the vehicle's fuel efficiency (e.g., l diesel/km, kWh electricity/km) and the vehicle's fuel type-specific emission factor (e.g., kg CO_2e/l diesel, kg CO_2e/kWh electricity), the above formula becomes:

$$Financed\ emissions = \sum_{v,f} Attribution\ factor\ v\ x\ Travel\ distance\ v\ x\ Efficiency\ v,f\ x\ Emission\ factor\ f$$

(With v = vehicle, f = fuel type)

Data quality

There are three options to calculate the financed emissions from motor vehicle financing depending on the data used.

- Option 1: Emissions are calculated based on actual vehicle fuel consumption or

[34] (Malaysia Energy Information Hub, 2021)
[35] (Climate Transparency, 2021)
[36] (Dubai Electricity & Water Authority, 2020)

distance traveled for an available vehicle make and model with data directly collected from the counterparty.

- Option 2: Estimated vehicle-specific emissions, calculated based on estimated vehicle distance traveled for an available vehicle make and model with data collected from official statistics.
- Option 3: Estimated vehicle-unspecific emissions, calculated based on estimated distance traveled for an unspecified vehicle with data collected from official statistics.

Except for particular cases, Islamic banks are more likely to rely on Options 2 and 3 to estimate emissions from financed motor vehicles.

Estimating distance traveled

Islamic Banks can rely on secondary information to estimate travel distances for motor vehicles by type (light-duty vehicles, trucks, heavy-duty vehicles, and motorcycles). Islamic banks can typically find such secondary information in research studies on cars, cars' selling platforms, national statistics agencies, and ministries of transportation websites.

Table 11: A selection of driving indicators in some OIC countries

Indicator	Malaysia	KSA	UAE	Morocco	Türkiye
The average mileage of passenger cars per year	28,000 km[37]	25, 750 km[38]	20,000 km[39]	Between 13,000 and 20,000 km[40]	13,325 km[41]
The average mileage for trailers and vehicles used for the carriage of goods per year.	78,140 km[42]	N/A	N/A	N/A	44,346 km[32]

Estimating vehicle efficiency and emission factors

Many publicly available data sources on emissions for new and used cars are available. The emissions unit for a vehicle's tailpipe carbon dioxide is grams per kilometer (g/km) for combined city and highway driving. These estimations depend on the following factors:

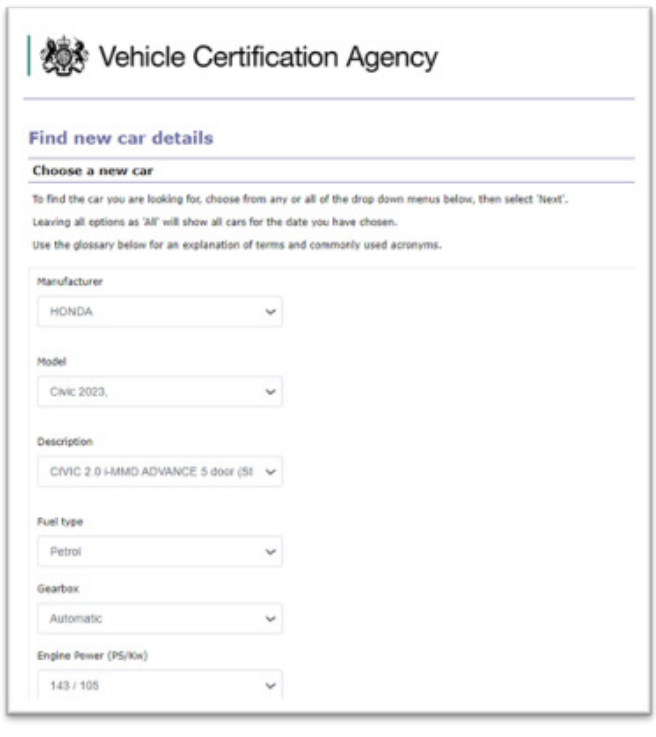
- Manufacturer
- Model
- Gearbox/transmission
- Fuel type
- Engine Power

For instance, National Resources Canada[43] and the UK Certification Agency[44] provide a user-friendly interface to calculate CO_2 emissions (g/km) by make and model.

[37] (Theedgemarkets, 2019)
[38] (KAPSARC, 2019)
[39] (Thenationalnews, 2016)
[40] (Ocarz, 2021)
[41] (TUIK, 2019)
[42] (Jamaluddin et al., 2020)
[43] (Natural Resources Canada, n.d)
[44] (UK Vehicle Certification Agency, n.d)

Figure 11: Calculating CO2 emissions (g/km) by make and model (Tool of National Resources Canada)

Figure 12: Calculating CO2 emissions (g/km) by make and model (Tool of the UK certification agency)



Alternatively, when make and model are unknown (Option 3), Islamic banks can estimate average vehicle efficiency based on the vehicle type attributes (light-duty vehicles, light-duty trucks, heavy-duty vehicles, and motorcycles) and local or international benchmarks. For example, a typical passenger vehicle emits about 2,401 grams of CO_2 for every Liter of gasoline burned, according to the US Environmental Protection Agency estimates[45].

2.2.3 Emissions from financing instruments with known use of proceeds

Financial instruments with known use of proceeds comprise project finance, Sukuk, working capital, and investment financing.

The total financed emissions of these instruments is calculated as follows:

$$Financed\ emissions = \sum_{a} Attribution\ factor\ c\ x\ Asse\ t/p\ roject\ emissions\ a$$

(With a = asset or project)

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

- Option 1: Using reported emissions. In this case, a financial institution uses verified or unverified emissions collected directly from the project's disclosures or indirectly through independent third parties.
- Option 2: Using physical activity-based emissions. In this case, a financial institution will estimate emissions using the project's primary physical activity data. For instance, fuel consumed or megawatt-hours of electricity produced. To evaluate emissions data accurately, it is essential to utilize an appropriate calculation methodology or tool. Verified emission factors must be endorsed or issued by a reputable independent entity, such as the International Energy Agency. Verified emission factors are expressed per physical activity (e.g., tCO_2e/MWh).
- Option 3: Using economic activity-based emission. In this case, a financial institution will estimate emissions based on economic activity data collected from the project (e.g., revenue or assets). Calculating emissions data using official statistical data or widely accepted EEIO tables that estimate average emission factors per unit of economic activity is recommended. (e.g., tCO_2e/€ of assets or tCO_2e/€ of revenues).

Climate Trace is a global non-profit coalition created to accelerate and facilitate meaningful climate action by independently tracking greenhouse gas (GHG) emissions. It harnesses satellite imagery and other forms of remote sensing, artificial intelligence, and collective expertise in data science to track human-caused GHG emissions. The following tables from Climate Trace illustrate the data availability issue of GHG indicators for assets in OIC countries[46].

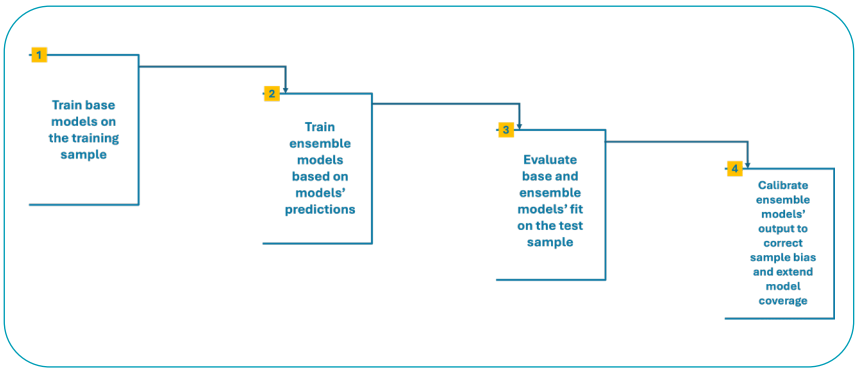
[45] (U.S. Environmental Protection Agency, 2018)
[46] (Climate trace, n.d)

Table 12: Number of physical assets reported in the Climate Trace database in a selection of OIC countries

Malaysia	UAE	Morocco	Türkiye	Egypt	Tunisia	KSA	Bahrain	Kuwait	Oman
533	115	87	815	166	57	252	19	49	43

Some data providers, such as S&P and Moody's, have developed quantitative models to predict carbon footprint metrics to overcome the data availability issue. These models bridge the disclosure gap by generating predicted GHG emissions data for virtually any public or private company based on, among others, a firm's outputs, size, industry, and location. Prediction models also allow the analysis of typical emissions patterns across sectors, geographies, and company sizes. Furthermore, thanks to APIs, climate metrics can be generated automatically by inputting the portfolio's indicators. The following figure summarizes the approach to developing prediction models.

Figure 13: Approach of generating prediction models for GHG indicators



2.2.4 Emissions from financing instruments with unknown use of proceeds

Financial instruments with unknown use of proceeds comprise listed and unlisted equity, Sukuk, working capital, and investment financing.

The total financed emissions of these instruments is calculated as follows:

$$Financed\ emissions = \sum_{c} Attribution\ factor\ c\ x\ Counterparty\ emissions\ c$$

(With c = counterparty company or issuer)

Data quality

Islamic banks can use three options to calculate financed emissions from financing instruments with unknown use of proceeds depending on the emissions data:

- Option 1 – Reported emissions: where verified or unverified emissions are collected from the company or issuer 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 – The reporting financial institution calculates emissions by gathering primary physical activity data from the company or issuer, such as the consumption of natural gas in megawatt-hours or the production of steel in tons. These emissions are then allocated to the reporting financial institution using an attribution factor. It is recommended to estimate emissions data using an appropriate calculation methodology or tool with verified emission factors expressed per physical activity, such as tCO_2e/MWh or tCO_2e/t of steel. These emission factors must be issued or approved by a reputable independent body.
- Option 3 - The reporting financial institution estimates economic activity-based emissions by collecting economic activity data from the company or issuer, such as revenues or assets. These emissions are 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 or sector-specific average emission factors expressed per economic activity (e.g., tCO_2e/€ of revenue or tCO_2e/€ of assets).

Given that most companies that are clients of Islamic financial institutions do not report their emissions as indicated in Table 13 from CDP[47], Islamic financial institutions can rely on prediction models to estimate GHG emissions of their clients (Cf. previous section covering the financing instruments with known use of proceeds).

Table 13: Number of companies that submitted climate-related reporting to CDP during 2022 for a selection of OIC countries

Malaysia	UAE	Morocco	Türkiye	Egypt	Tunisia	KSA	Bahrain	Kuwait	Oman
49	24	3	116	20	0	12	1	7	1

2.2.5 Emissions from sovereign financing

The financed emissions of sovereign debt or investment are calculated as the product of the attribution factor and the emissions of the respective sovereign counterparty.

The total financed emissions of these instruments is calculated as follows:

$$Financed\ emissions = \sum_{c} Attribution\ factor\ s\ x\ Sovereign\ Emissions\ c$$

(With s = sovereign counterparty)

Like other asset classes, there are three options to calculate the financed emissions for sovereign counterparties:

- Option 1 (reported emissions): When reported GHG emissions are available. Verified data are preferable to unverified ones.

[47] (CDP, n.d)

- Option 2 (physical activity-based emissions): When reported GHG emissions are unavailable, emissions are calculated using primary physical activity data of the country's energy consumption (domestic generated and imported) and emission factors specific to that primary data.
- Option 3 (economic activity-based emissions): When option 2 is not feasible, emissions can be calculated using sectoral revenue data of the country's production and emission factors specific to that revenue data. Alternatively, the country's GHG emissions can be estimated using similar peer countries' data.

For most OIC countries, Islamic banks can use available GHG emissions data from platforms like Climate Watch[48] and UNFCCC[49]. Indicators from the former platform are relatively recent (Cf. Tables 14 and 15).

Table 14: Last reported year for total GHG emissions in the Climate Watch platform

Malaysia	UAE	Morocco	Türkiye	Egypt	Tunisia	KSA	Bahrain	Kuwait	Oman
2021	2022	2021	2021	2022	2022	2021	2021	2021	2021

Table 15: Last reported year for total GHG emissions in the UNFCCC platform

Malaysia	UAE	Morocco	Türkiye	Egypt	Tunisia	KSA	Bahrain	Kuwait	Oman
2019	2014	2012	2020	2005	2000	2012	2000	2016	1994

2.2.6 Summary of likely GHG data sourcing options for Islamic banks

The following Table summarizes the data sources that Islamic banks will most likely use for each asset class based on previously presented elements.

The table structure is the following:

- The asset class for which the Islamic bank is calculating the GHG emissions
- GHG indicators
- Data sources that Islamic banks are most likely going to use
- The option that corresponds to the data source used to calculate financed emissions according to the PCAF classification. Option 1 provides the highest data quality

Table 16: Summary of likely data sourcing options for Islamic banks

Asset class	Indicators	Potential data sources	Option
Real estate financing	Average electricity consumption for residential and non-residential properties	National statistics offices, utility companies, and realtors	2 and 3

[48] (Climate Watch, n.d)
[49] (UNFCCC, n.d)

	Average area for residential and non-residential properties	National statistics offices, Ministries of Housing, and realtors	2 and 3
	Emissions intensity of the power sector	Ministries of Energy, utility companies and Climate Transparency	2 and 3
Vehicle financing	Average mileage per year of passenger cars, trailers, and vehicles used for the carriage of goods	National statistics offices, Ministries of transportation, cars brokerage platforms	2 and 3
	Vehicle efficiency and emission factors	International agencies such as the UK certification agency, US Environmental Protection Agency, and National Resources Canada	2
Financing instruments with known proceeds	GHG emissions of physical assets / Projects	Climate Trace, CDP, and prediction models from data providers	2 and 3
Financing instruments with unknown proceeds	GHG emissions of public and private companies	CDP and prediction models from data providers	2 and 3
Sovereign financing	Countries reported GHG emissions	UNFCC and Climate Watch	1

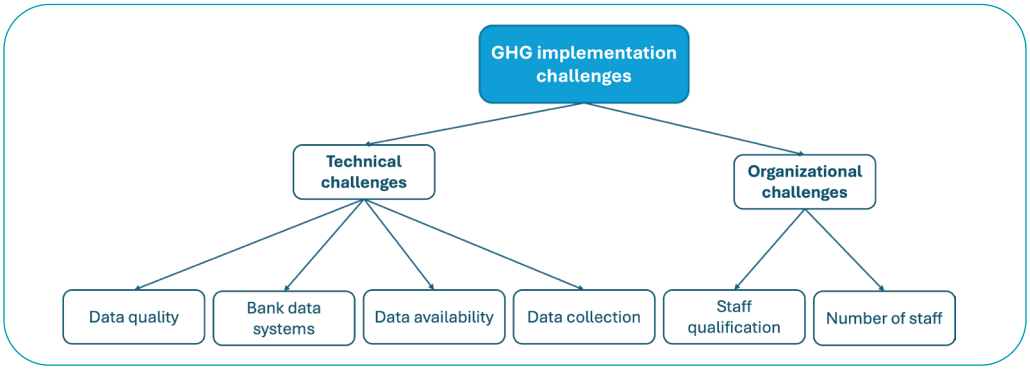
Chapter II.III

Recommendations on Successful Implementation of GHG Measuring at Islamic Financial Institutions

2.3.1 Islamic banks' challenges when implementing GHG accounting systems

IFIs should face two technical and organizational challenges when implementing GHG accounting systems. Technical challenges relate to calculating financed GHG emissions: Data availability, data quality, bank data systems, and data collection. Organizational challenges are associated with the lack of internal capacity to implement GHG Standards, especially for IFIs that haven't been exposed to GHG projects before.

Figure 14: Organizational and technical challenges related to GHG implementation in Islamic banks



2.3.2 Managing technical challenges

2.3.2.1 Finding additional data sources

Recommendation's rationale

As presented earlier in this report, Islamic banks operate in environments where access to GHG data poses several constraints. Therefore, Islamic banks must explore complementary data sources that make GHG accounting processes smoother and more accurate. Finding these alternative data sources will likely require investing time and budget. However, as indicated in Chapter 1, from a planning and design perspective, if these data sources are integrated automatically into GHG processes, this will contribute to streamlining the measurement and reporting of GHG emissions and, as a result, reduce the operational costs associated with these operations.

Recommendation's implementation

There are several ways to implement the recommendation. First, Islamic Banks can survey their clients to collect missing emissions data, if available, or physical and economic activity

indicators. The banks' customer relationship teams can conduct the surveys through interviews and digitally. While surveying all clients might be challenging, the banks can focus on clients generating higher GHG emissions. Second, Islamic banks can leverage alternative data sources published at the national level to gather more accurate GHG emission factors. Local academic journals and NDC reports, for instance, comprise valuable information that has the potential to complement banks' GHG indicators. Finally, banks can rely on prediction models supplied by data providers. As presented earlier in this report, these models estimate a corporation's or an asset's GHG emission using available peers' GHG data and analytical models.

2.3.2.2 Making informed assumptions

Recommendation's rationale

International GHG measurement and reporting standards such as PCAF provide many alternatives when data is unavailable. Relying on assumptions is an option; although it negatively impacts data quality scores, it allows for the financial institution to get started on the GHG accounting journey and improve its methodologies, commitment and impact over time.

Recommendation's implementation

PCAF guidance on data quality scores offers many possibilities for banks to make informed assumptions for the emissions' calculation when reported emissions indicators are unavailable. For example, when a bank does not have information on actual building emissions, they can either estimate building emissions based on floor area or the number of buildings. The same approach applies to vehicle financing when a bank estimates emissions based on proxies such as average annual mileage for light-duty vehicles, trucks, heavy-duty vehicles, and motorcycles. Nonetheless, when relying on assumptions, banks should be transparent about the assumptions by disclosing the emissions' calculation and being consistent when applying these methods.

2.3.2.3 Enriching bank data systems

Recommendation's rationale

Running GHG calculations requires, among others, extracting GHG-related indicators from bank data systems, for instance, companies' total assets and revenue, properties' areas and types, car models, and make. If such information is unavailable, the banks will naturally over-rely on assumptions, which undermines data quality, accuracy and increases the costs of preparing GHG reporting.

Recommendation's implementation

Banks should enrich their data systems to provide the information needed for estimating and reporting GHG emissions.

Banks must change operational processes to include GHG-related indicators when managing a client's financing cycle. To illustrate, when financing a house, the back office team should input the building's technical characteristics (type, area, and location) into the core banking system. Another case is when a company provides updated financial indicators when applying for a new financing line; these data should be included in the core banking system database.

2.3.2.4 Streamlining data collection processes

Recommendation's rationale

Calculating emissions requires data collection from several internal and external data sources for the bank. If the collection process is not automated, running the GHG calculations and preparing the reporting will take longer, and the bank's exposure to operational risks will increase.

Recommendation's implementation

Banks should make considerable progress on data governance and strive to automate GHG data collecting, treatment, and loading processes instead of relying upon manual procedures and Excel files. Typically, banks can use API with external data providers and put in place data warehousing systems that facilitate the collection and management of GHG indicators. Integrated data strategies will allow for accelerated deployment at scale, as will the decision to identify and leverage the appropriate professional providers of advanced digital solutions.

2.3.2.5 A progressive approach to data quality and asset classes' coverage

Recommendation's rationale

Impact measurement, in general, and in the case of GHG emissions, is a journey. Since most Islamic banks haven't developed a solid exposure to GHG accounting, focusing their approach on improvement and learning rather than on the starting point is critical. This progressive approach can address data quality and asset classes' coverage.

Recommendation's implementation

Most Islamic banks might find it challenging to reach high data quality scores for all asset classes at the beginning of the GHG accounting journey. For some asset classes, the banks can start with low-data quality alternatives, which will serve as a baseline from which improvements in data quality are pro-actively managed.

In the same vein, banks can begin the first financed GHG emissions measurement with relatively manageable asset classes and then extend GHG methodology to more complicated ones in the future.

In addition, it is recommended for IFIs to concentrate their efforts on asset categories that exert a considerable influence on GHG emissions. By adopting such a focused strategy, they can optimise the effectiveness of their early initiatives in diminishing their financed emissions footprint, thereby affirming their dedication to an ecological transition.

To evaluate the significance of the asset classes within their portfolio, IFIs may adopt a top-down approach to acquire a broad overview of the materiality pertaining to primary scope 1, 2, and 3 emission sources in a specific country. In this context, IFIs are encouraged to utilise the insights provided by the RFI Foundation in its "Report on the Financed Emissions Database," which encompasses data from 11 OIC (Organisation of Islamic Cooperation) countries .

This preliminary materiality assessment can be further refined and enhanced by considering the unique composition of the IFIs' portfolio asset classes alongside their specific GHG emissions data.

2.3.3 Managing organizational challenges

Islamic banks can address organizational challenges inhouse by training and hiring staff, and by mobilizing outside international expertise.

2.3.3.1 Training and hiring staff

Recommendation's rationale

GHG accounting is a relatively new field; several Islamic banks' staff haven't been trained on this topic before. It is, therefore, critical to equip staff with the necessary knowledge and skills to participate in GHG's measurement and reporting projects and operations.

Recommendation's implementation

Islamic banks need to develop customized capacity-building programs to train staff and management on GHG accounting both from strategic and operational standpoints, in order to increase the necessary culture of awareness, achievable solution orientation and sense of ownership. Moreover, banks may need to increase capacity by hiring additional staff that will be involved directly or indirectly in GHG processes.

2.3.3.2 Leveraging Capacity-Building Initiatives and External Experts

Recommendation's rationale

Training programmes, seminars, and workshops are essential for Islamic Financial Institutions (IFIs) new to GHG accounting. These initiatives, whether in person or online, build necessary expertise and understanding. Supported by key stakeholders such as development finance institutions, infrastructure organisations, regulators, banking associations, and external experts, these efforts greatly enhance the success of GHG accounting projects. This support not only provides critical knowledge but also fosters collaboration, addressing the unique challenges IFIs face in GHG accounting.

Recommendation's implementation

IFIs should integrate capacity-building activities offered by key stakeholders into their existing training programmes. These activities can be part of established programmes by banking associations or financial regulators in green and impact finance, designed with development finance institutions and impact investors. Alternatively, IFIs may create customised programmes with support from these institutions.

Collaboration between key stakeholders and internal teams is crucial for integrating external insights into the institution's operations. This ensures that external knowledge enhances internal capabilities and supports long-term goals in GHG accounting and sustainability. This approach helps refine data collection methods and improve the accuracy of GHG emissions reporting, bolstering the institution's environmental accountability and climate change efforts.

Conclusion

This section guides Islamic financial institutions in identifying data providers and technical resources needed for the development of the technical aspect of the GHG accounting tool. These methodologies consider the environments where Islamic financial institutions operate where high-quality data is usually unavailable for all asset classes.

This section complements the project's phase 3 deliverable, which proposes a methodology to align standard GHG measurement and reporting guidelines with the specificities of Islamic finance asset classes by specifying emissions' scope and adjusting the standards' attribution factors.

Finally, this section proposes specific technical and organizational measures to successfully implement GHG measuring and reporting at the level of Islamic financial institutions and expand ESG capabilities. While the report strongly recommended adhering to the international best practices in GHG accounting, it also advocates for a phased-in practical approach that allows for a progressive yet swift implementation of the GHG accounting methodology based on implementation capacity, while recognizing the climate emergency. The pace, direction and scope of the methodology implementation depend on the maturity of each Islamic financial institution in terms of GHG reporting, data availability, and the expansion of international GHG standards in terms of asset class coverage and the evolution of regulations.

APPENDICES

Appendix A: Islamic banks asset classes in selected countries

Morocco

Asset classes		Rate
Sukuk		0.49%
Interbank financing		6.80%
Shariah-Compliant Financing	Real estate Financing	71.07%
	Consumer Financing	4.78%
	Equipment Financing	11.90%
	Other Financing	0.39%
Claims on non-residents		0.06%
Receivables from the Central Administration		0.62%
Fixed assets		2.23%
Other assets		1.66%
Total		100%

Source: Bank Al-Maghrib. 2022. "Statistiques Monetaires." 1–66.

Indonesia

	Asset classes		Rate
Sukuk			16.8%
Other Shariah-compliant securities			11%
Interbank financing			0.6%
All other assets			14%
Shariah-Compliant Financing	Working Capital Loans		4.1%
	Investment Loans		7.8%
	Housing/Property		10.14%
	Motor Vehicles		8.08%
	Consumer Loans	Credit Card	8.7%
		Multi-Purpose Loans	8.85%
		Non-collateral loans	9.93%
Total			100%

Source: Bank Indonesia. 2021. Banking Survey; Prudential and Structural Islamic Financial Indicators (PSIFIs) for Islamic Banks (Indonesia)

Malaysia

Asset Classes		Rate
Sukuk		16.6%
Other Shariah-compliant securities		0.006%
Interbank financing		6.784%
All other assets		1.27%
Shariah-Compliant Financing	Purchase of securities	3.25%
	Purchase of transport vehicle	3.30%
	Purchase of residential property	6.56%
	Purchase of nonpresidential property	2.73%
	Purchase of fixed assets other than land and building	0.07%
	Personal uses	2.15%
	Credit cards	9 %
	Purchase of consumer durable goods	0.5%
	Construction	1.9%
	Working capital	42%
	Other purpose	3.9%
Total loans disbursed		100%

Source: Bank Negara Malaysia. 2021. "Monthly Highlights and Statistics Jan 2021." 106(December):1–106; Prudential and Structural Islamic Financial Indicators (PSIFIs) for Islamic Banks (Malaysia)

Pakistan

Asset Classes	Rate
Sukuk	41.26%
Other Shariah-compliant securities	1.96%
Interbank financing	3.85%
All other assets	11.74%
Shariah-Compliant Financing	41.24%
Total loans disbursed	100%

Prudential and Structural Islamic Financial Indicators (PSIFIs) for Islamic Banks (Pakistan)

Tajikistan (Tawhid bank)

Asset Classes	Rate
Consumer loan	35.41%
Auto-financing	29.93%
Business financing	33.42%
Housing	1.25%
Total	100%

Source: Tawhidbank. 2021. Financial Indicators 2021.

Türkiye

Asset Classes			Rate
Sukuk			13.05%
Other Shariah-compliant securities			5.26%
Interbank financing			6.14%
All other assets			20.25%
Shariah-Compliant Financing	Real estate	Housing Loans	16.82%
		Business Residential Loans	3.73%
	Transportations	Vehicle Loans	0.3 3%
		Vehicle Loans (instalments)	14.63%
	Consumer loans		5.8%
	Commercial instalment loans		0.15%
	Other loans		13.84%
Total			100%

Source: The Banks Association of Turkey. 2021. BANKS IN TÜRKİYE; Prudential and Structural Islamic Financial Indicators (PSIFIs) for Islamic Banks (Turkey)

KSA

Asset Classes			Rate
Sukuk			12.91%
Other Shariah-compliant securities			0.93%
Interbank financing			2.13%
All other assets			10.10%
Shariah-Compliant Financing	Real estate loans	Retail	18.33%
		Corporate	5.03%
	Residential new mortgages finance	Houses	3.93%
		Apartments	1.18%
		Land	1.18%
	Consumer and credit card loans	Credit Card Loans	17.6%
		Others	17.589%
	Private sector imports financed through commercial banks		5.4%
	Private sector exports financed through commercial banks		3.7%
Total			100%

Source: Saudi Central Bank. 2022. "Monthly Statistical Bulletin." Prudential and Structural Islamic Financial Indicators (PSIFIs) for Islamic Banks (KSA)

Appendix 2: Summary of PCAF guidelines on data quality

Financial institutions can calculate financed emissions of the assets' classes in several ways depending on the availability of data. Indeed, the quality of the latter is one of the most critical inputs to financed emissions' estimation and FIs are consequently required to use the highest quality data available and improve this quality over time.

Calculating financed emissions necessitates various data and inputs from borrowers and investees that might not be readily available to FIs. In this instance, FIs need to use the best available data whose quality will vary depending on assumptions.

Table 13: Summary of reporting requirements and recommendations of PCAF Global GHG Accounting and Reporting Standard for the Financial Industry

Data and data quality	
Requirements	• FIs must use the most recent or otherwise appropriate data available to them. • When FIs report scope 3 emissions, the weighted data quality score shall be reported separately from scopes 1 and 2.
Recommendations	• FIs should provide a description of the types and sources of data used to calculate emissions. Descriptions should be written to create transparency. • FIs should publish a weighted score by outstanding amount of the data quality of reported emissions data or should explain why they are unable to do so. • FIs should use the tools provided by PCAF standard to assess data quality. FIs should explain how data quality is assessed, acknowledging that it will improve over time. • FIs should disclose whether data is verified and to what level.

Appendix 3: Calculating financed emissions by asset class based on PCAF guidelines

As described below, PCAF distinguishes three options to calculate the financed emissions from listed equity and corporate bonds depending on the emissions data used:

- Option 1: reported emissions
- Option 2: physical activity-based emissions
- Option 3: economic activity-based emissions

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

Options 1 and 2 are preferred over Option 3 from a data quality perspective because they provide more accurate emissions results to a financial institution. Due to data limitations, financial institutions might use Options 1 or 2 for certain companies and Option 3 for others.

Listed equity and corporate bonds:

The following Table provides data quality scores for each of the described options and sub-options to calculate the financed emissions for listed equity and corporate bonds.

<table>
<tr><th>Data quality</th><th colspan="2">Options to estimate the financed emissions</th><th>When to use each option</th></tr>
<tr><td>Score 1</td><td rowspan="2">Option 1:
Reported emissions</td><td>1a</td><td>Outstanding amount in the company and EVIC are known. Verified emissions of the company are available</td></tr>
<tr><td rowspan="2">Score 2</td><td>1b</td><td>Outstanding amount in the company and EVIC are known. Unverified emissions calculated by the company are available.</td></tr>
<tr><td rowspan="3">Option 2:
Physical activity-based</td><td>2a</td><td>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 company's energy consumption and emission factors specific to that primary data. Relevant process emissions are added.</td></tr>
<tr><td>Score 3</td><td>2b</td><td>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 company's production and emission factors specific to that primary data.</td></tr>
<tr><td>Score 4</td><td>Option 3:
Economic activity-based emissions</td><td>3a</td><td>Outstanding amount in the company, EVIC, and the company's revenue are known. Emission factors for the sector per unit of revenue are known (e.g., tCO2e per euro of revenue earned in a sector).</td></tr>
</table>

Score 5		3b	Outstanding amount in the company is known. Emission factors for the sector per unit of asset (e.g., tCO2e 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 revenue (e.g., tCO2e per euro of revenue earned in a sector) and asset turnover ratios for the sector are known.

Business loans and unlisted equity

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. Verified emissions of the company are available.
Score 2		1b	Outstanding amount in the company and EVIC are known. Unverified emissions calculated by the company are available.
	Option 2: Physical activity-based	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 company's energy consumption and emission factors specific to that primary data. Relevant process emissions are added.
Score 3		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 company's production and emission factors specific to that primary data.
Score 4	Option 3: Economic activity-based emissions	3a	Outstanding amount in the company, EVIC, and the company's revenue are known. Emission factors for the sector per unit of revenue are known (e.g., tCO2e per euro of revenue 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., tCO2e 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 revenue (e.g., tCO2e per euro of revenue earned in a sector) and asset turnover ratios for the sector are known.

Project finance

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. Verified emissions of the project are available.
Score 2		1b	Outstanding amount in the company and total project equity plus debt are known. Unverified emissions calculated by the project are available.
	Option 2: Physical activity-based	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 consumption 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 production 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 project's revenue are known. Emission factors for the sector per unit of revenue or from similar projects is known (e.g., tCO_2e per euro of revenue 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 emission factors from similar projects (e.g., tCO_2e 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 revenue (e.g., tCO_2e per euro of revenue earned in a sector) and asset turnover ratios for the sector or from similar projects are known.

Commercial real estate

Data quality	Options to estimate the financed emissions		When to use each option
Score 1	Option 1: Actual building emissions	1a	Primary data on actual building energy consumption (i.e., metered data) is available. Emissions are calculated using actual building energy consumption and supplier-specific emission factors specific to the respective energy source.
Score 2		1b	Primary data on actual building energy consumption (i.e., metered data) is available. Emissions are calculated using actual building energy consumption and average emission factors specific to the respective energy source.
Score 3	Option 2: Estimated building emissions based on floor area	2a	Estimated building energy consumption per floor area based on official building energy labels AND the floor area are available. Emissions are calculated using estimate building energy consumption and average emission factors specific to the respective energy source.
Score 4		2b	Estimated building energy consumption per floor area based on building type and location-specific statistical data AND the floor area are available. Emissions are calculated using estimated building energy consumption and average emission factors specific to the respective energy source.
Score 5	Option 3: Estimated building emissions based on number of buildings	3	Estimated building energy consumption per building based on building type and location-specific statistical data AND the number of buildings are available. Emissions are calculated using estimated building energy consumption and average emission factors specific to the respective energy source.

Mortgages

Data quality	Options to estimate the financed emissions		When to use each option
Score 1	Option 1: Actual building emissions	1a	Primary data on actual building energy consumption (i.e., metered data) is available. Emissions are calculated using actual building energy consumption and supplier-specific emission factors specific to the respective energy source.
Score 2		1b	Primary data on actual building energy consumption (i.e., metered data) is available. Emissions are calculated using actual building energy consumption and average emission factors specific to the respective energy source.

Score 3	Option 2: Estimated building emissions based on floor area	2a	Estimated building energy consumption per floor area based on official building energy labels AND the floor area are available. Emissions are calculated using estimate building energy consumption and average emission factors specific to the respective energy source.
Score 4		2b	Estimated building energy consumption per floor area based on building type and location-specific statistical data AND the floor area are available. Emissions are calculated using estimated building energy consumption and average emission factors specific to the respective energy source.
Score 5	Option 3: Estimated building emissions based on number of buildings	3	Estimated building energy consumption per building based on building type and location-specific statistical data AND the number of buildings are available. Emissions are calculated using estimated building energy consumption and average emission factors specific to the respective energy source.

Motor vehicle loans

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 at origination of vehicle or vehicle fleet are known. Primary data on actual vehicle fuel consumption is available. Emissions are calculated using actual fuel consumption and fuel type specific emission factors.
		1b	Outstanding amount and total value at origination of vehicle or vehicle fleet are known. Vehicle efficiency and fuel type (fossil and/or electricity) are available from known vehicle make and model. Primary data on actual vehicle distance travelled 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 at origination of vehicle or vehicle fleet are known. Vehicle efficiency and fuel type (fossil and/or electricity) are available from known vehicle make and model. Distance traveled is estimated based on local[i] statistical data. Emissions are calculated using estimated fuel consumption and fuel type-specific emission factors.

Score 3	Option 2: Estimated vehicle-specific emissions	2b	Outstanding amount and total value at origination of vehicle or vehicle fleet are known. Vehicle efficiency and fuel type (fossil and/or electricity) are available from known vehicle make and model. Distance travelled is estimated based on regional statistical data. 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 at origination of vehicle or vehicle fleet are known. Vehicle efficiency and fuel type (fossil and/or electricity) are estimated from known vehicle type[iii] (vehicle make and model are unknown). Distance traveled is estimated based on local or regional statistical data. Emissions are calculated using estimated fuel consumption and fuel type-specific emission factors.
Score 5		3b	Outstanding amount and total value at origination of vehicle or vehicle fleet are known. Vehicle efficiency and fuel type (fossil and/or electricity) are estimated for an average vehicle (vehicle make and model and vehicle type are unknown)[iv]. Distance travelled is estimated based on local or regional statistical data. Emissions are calculated using estimated fuel consumption and fuel type-specific emission factors.

Sovereign debt

Data quality	Options to estimate the financed emissions		When to use each option
Score 1	Option 1: Reported emissions	1a	Verified GHG emissions of the country are available. These GHG emissions are reported by the country itself and can be extracted from UNFCCC181.
Score 2		1b	Unverified emissions of the country are available.
	Option 2: Physical activity-based	2a	Reported GHG emissions of the country are not known. Emissions are calculated using primary physical activity data of the country's energy consumption (domestic generated and imported) and emission factors specific to that primary data.
Score 4	Option 3: Economic activity-based emissions	3a	Reported GHG emissions of the country are not known. Emissions are calculated using sectoral revenue data of the country's production and emission factors specific to that revenue data.
Score 5		3b	Country GHG emissions are estimated by taking a proxy. GHG emissions from (a) similar (climate (zones), wealth, GDP) country are taken to estimate the country GHG emissions.

Appendix 4: PCAF Emission Factor Database

The PCAF European Building Emission Factor Database is a publicly accessible database of emission factors for all financial institutions and other interested stakeholders. Created by Guidehouse Netherlands BV on behalf of PCAF, it provides a specified set of emission factors for commercial real estate and mortgages for all European Union countries, plus Norway, Switzerland and the United Kingdom. Depending on data availability, financial institutions can distinguish between European countries, residential and non-residential building types and Energy Performance Certificate (EPC) ratings to extract the emissions or energy intensity specified by floor area or unit.

The database aims to provide clear guidance to financial institutions on how to accelerate the transition of the European building stock to enable the financial sector to measure and track the financed emissions of their European building portfolios towards net zero.

The database structure is in the form of a single database table (~9K entries, one per emissions factor). For each emissions factor the following key data are provided:

- Emission Factor ID
- Asset Class (Residential / Commercial Real Estate)
- Emission Factor Type (Emissions or Energy)
- Country
- Data Level 1 Information
- Data Level 2 Information
- EPC Rating
- Emission Factor Functional Unit (name)
- Emission Factor Functional Unit (unit)
- Emission Factor (name)
- Emission Factor (unit)
- PCAF Data Quality score (Range in 1- 5)
- Emission Factor (value)
- Emission Factor methodology description
- Emission Factor Source (Slots for up to 4 historical values)
- Emission Factor Year (Slots for up to 4 historical values)
- Link to emission factor documentation
- Status (Published)
- Inserted By (User Data)

Appendix 5: GHG calculation examples in the context of IFIs

1) Real Estate Financing

Inputs:

- Type of property: Apartment
- Location: Türkiye
- Financing contract: Murabaha
- Area: 150 m2
- Property value (book value including acquisition costs): TL 2 M
- Outstanding financing (EY balance): TL 1 M
- Apartment annual electricity consumption: Non-available
- Apartment annual GHG emissions: Non-available

Formula for financed emissions:

$$\textbf{Financed emissions} = \sum_{b} \textbf{Attribution factor b x Building emissions b}$$

$$\textbf{Financed emissions} = \sum_{b,e} \textbf{Attribution factor b x Energy consumption b, e x Emission factor e}$$

(With b = building, e = energy source)

Calculations of financed emissions:

- Average annual electricity consumption of single-family houses in Türkiye: 220 kWh per m2 (source: Türkiye Ministry of Environment and Urbanization in 2018)
- Estimated annual electricity consumption for a 150 m2 apartment: 33,000 kWh
- Emissions intensity of the power sector in Türkiye: 0.3750 kgCO2e per kWh (source: Climate Transparency in 2020)
- Estimated annual GHG emissions for a 150 m2 apartment: 12.375 tCO2e
- Attribution factor: 50%
- Financed emissions: 6.1675 tCO2e

2) Vehicle financing

Inputs:

- Make: Toyota
- Model: Corolla Hybrid
- Year: 2020
- Location: Morocco
- Financing contract: Ijarah
- Total leasing payments: MAD 280 K
- Remaining leasing payments: MAD 70 K
- Annual vehicle mileage: Non-available

Formula for financed emissions:

$$\textbf{Financed emissions} = \sum_{v} \textbf{Attribution factor } v \textbf{ x Vehicle emissions } v$$

$$\textbf{Financed emissions} = \sum_{v,f} \textbf{Attribution factor } v \textbf{ x Distance travel } v \textbf{ x Efficiency } v, f \textbf{ x Emission factor } f$$

(With v = vehicle, f = fuel type)

Calculations of financed emissions:

- Average mileage of passenger cars per year in Morocco: 16,500 Km (source: Ocarz in 2021)
- CO2 emissions for Toyota Corolla Hybrid: 75 g/Km (source: Toyota's official website)
- Estimated annual GHG emissions for Toyota Corolla Hybrid in Morocco: 1.24 tCO2e
- Attribution factor: 100%
- Financed emissions: 1.24 tCO2e

3) Investment financing

Inputs:

- Client: Cement Company
- Location: UAE
- Use of proceeds: Unknown
- Financing contract: Tawarruq
- Outstanding amount (EY balance): AED 20 M
- Client's total assets: AED 2 b
- Annual output: 3 million metric tons of cement per year
- Annual GHG emissions of the client: Non-available

Formula for financed emissions:

Calculation of financed emissions for financial instruments with unknown use of proceeds (e.g. listed and listed equity, Sukuk, working capital and investment financing) is as follows:

$$\textbf{Financed emissions} = \sum_{c} \textbf{Attribution factor } c \textbf{ x Counterparty emissions } c$$

(With c = counterparty company or issuer)

Calculations of financed emissions:

- CO2 emissions: 0.73 tCO2e per metric ton of output (source: Global Cement and Concrete Association in 2021)
- Estimated annual GHG emissions of the client per year: 2.19 M tCO2e
- Attribution factor: 1%
- Financed emissions: 21.9 K tCO2e

4) Sovereign Sukuk

Inputs:

- Issuer: Government of Malaysia
- Instrument: USD Sukuk
- Use of proceeds: Government budget
- Outstanding amount (EY balance): US$ 10 M
- Malaysia PPP-adjusted GDP: US$ 1.1 trillion (Source:IMF in 2021)
- Malaysia's annual GHG emissions: 238.8 million tCO2e (Source: Global Carbon Project in 2020).

Formula for financed emissions:

The total financed emissions of these instruments is calculated as follows:

$$\textit{Financed emissions} = \sum \textit{Attribution factor x Sovereign Emissions}$$

$$\textit{Financed emissions} = \sum \frac{\textit{Exposure to Sovereign Sukuk}}{\textit{PPP} - \textit{adjusted GDP}} \textit{x Sovereign Emissions}$$

Calculations of financed emissions:

- Attribution factor: 0.0009%
- Financed emissions: 2,171 tCO2e

Appendix 6: Ijarah GHG Calculation examples

Case 1

A piece of heating equipment that runs on fuel has been leased by an Islamic bank to an industrial client. It's estimated that the heating equipment will produce around 15 metric tons of CO2e as annual emissions. The table below presents the four different GHG accounting options available to the Islamic bank.

	Ijarah classified as Finance/Capital Lease	**Ijarah classified as operating Lease**
The Islamic bank follows an Equity Share or Financial Control Approach	Scope 1 emissions: 0 t CO2e Scope 2 emissions: 0 t CO2e Scope 3 emissions: 15 t CO2e	Scope 1 emissions: 15 t CO2e Scope 2 emissions: 0 t CO2e Scope 3 emissions: 0 t CO2e
The Islamic bank follows an Operational Control Approach	Scope 1 emissions: 0 t CO2e Scope 2 emissions: 0 t CO2e Scope 3 emissions: 15 t CO2e	Scope 1 emissions: 0 t CO2e Scope 2 emissions: 0 t CO2e Scope 3 emissions: 15 t CO2e

Case 2

An Islamic bank leases an electric car to a retail client. The estimated annual emissions from the car's electricity consumption amounts to 70 metric tons of CO2e. the following Table provides a summary of the Islamic bank's four options for accounting GHG emissions.

	Ijarah classified as Finance/Capital Lease	Ijarah classified as operating Lease
The Islamic bank follows an Equity Share or Financial Control Approach	Scope 1 emissions: 0 t CO2e Scope 2 emissions: 0 t CO2e Scope 3 emissions: 70 t CO2e	Scope 1 emissions: 0 t CO2e Scope 2 emissions: 70 t CO2e Scope 3 emissions: 0 t CO2e
The Islamic bank follows an Operational Control Approach	Scope 1 emissions: 0 t CO2e Scope 2 emissions: 0 t CO2e Scope 3 emissions: 70 t CO2e	Scope 1 emissions: 0 t CO2e Scope 2 emissions: 0 t CO2e Scope 3 emissions: 70 t CO2e

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