The GLOBAL GHG ACCOUNTING & REPORTING Standard

PART A

Financed avoided emissions & forward-looking metrics

A supplemental guidance to Part A of the PCAF Standard

PCAF®
Partnership for Carbon Accounting Financials

December 2025

Introduction

As the global financial sector increasingly aims to align with climate goals, understanding and quantifying the climate impact of investments has become essential. While financed emissions have gained prominence as a key metric for assessing portfolio-level climate impact and climate risk, several emerging greenhouse gas (GHG) accounting metrics related to transition finance have underscored the need for Partnership for Carbon Accounting Financials (PCAF) to expand its guidance to ensure harmonization and credibility of key concepts. These concepts fall into two primary categories: financed avoided emissions and forward-looking emissions metrics.

Financed Avoided emissions: Avoided emissions are defined by the GHG Protocol as the positive GHG emissions impact of a product (good or service), relative to the situation where that product does not exist. Although the GHG Protocol Corporate Standard does not currently provide a standard on avoided emissions, it has published a neutral framework for estimating and disclosing positive GHG impacts of a product. In addition, the World Business Council for Sustainable Development (WBCSD) published corporate guidance on the topic. Financed avoided emissions are avoided emissions that can be attributed to a financial institution providing capital to support the project, or a company avoiding emissions. Avoided emissions are fundamentally distinct from traditional emissions accounting and are particularly relevant for financial institutions that support climate solutions, products, services, and projects that reduce emissions across the economy. This includes financing instruments aligned with PCAF's Use of Proceeds (UoP) accounting guidance.

Forward-looking emissions metrics: These are emerging tools designed to assess the future decarbonization potential of financial exposures. The Glasgow Financial Alliance for Net Zero (GFANZ) Secretariat has proposed Expected Emissions Reductions (EER) as a forward-looking metric to support transition finance. EER, along with Expected Avoided Emissions (EAE), offers a complementary lens to evaluate the potential climate impact of investments and can be considered alongside other metrics used in net-zero transition plans.

In response to these developments and market demand, PCAF prioritized harmonizing guidance on these two types of metrics for the financial industry. PCAF recognizes that these metrics carry a risk of being misinterpreted or misused, potentially leading to greenwashing. To mitigate this risk, PCAF has developed guidance that establishes clear guardrails and standardized reporting requirements to support responsible and transparent disclosure. Given their early-stage nature and the challenges associated with data availability, aggregation, and potential double counting, reporting on the two types of metrics is optional. If financial institutions decide to report them, they have to (**shall**) report them separately from the regular financed emissions inventory.

This supplemental guidance document accompanies the PCAF Standard: Part A and is currently applicable to financed emissions across asset classes. Future work may assess the applicability to facilitated and insurance-associated emissions. The document is structured into two main sections:

- **Avoided Emissions:** Expands upon prior guidance in Part A, offering more detailed instructions for reporting avoided emissions across all asset classes. Previously, this guidance was limited to renewable power projects. Relevant elements from the existing PCAF Standard have been incorporated where applicable.
- **Forward-Looking Emissions Metrics:** Provides high-level reporting guidelines for financial institutions that choose to disclose forward-looking metrics, specifically EER and EAE.

It is important to note that both concepts are fundamentally distinct from financed (generated) emissions, which are focused on the emissions (indirectly) generated by loans and investments in the reporting year. Furthermore, these metrics should not be aggregated for portfolio-level comparisons, and shall not be used to substantiate net-zero commitments or claims. Caution is advised to avoid misrepresenting the actual climate impact of loans or investments.

Through this optional methodology, PCAF seeks to advance transparency and consistency in how avoided and forward-looking emissions are estimated and reported. By doing so, PCAF aims to foster innovation in climate-positive financing and promote alignment with broader sustainability reporting frameworks and net-zero transition strategies. This guidance is intended to support financial institutions in responsibly exploring these emerging metrics while maintaining the integrity and credibility of climate disclosures.

Avoided emissions

Corporate avoided emissions

No official standards for avoided emissions accounting exist to date. The GHG Protocol Scope 3 Standard does reference the term (in section 9.5) and specifies them as "GHG reduction opportunities (that) lie beyond a company's Scope 1, Scope 2, and Scope 3 inventories" and requires separate reporting from the regular inventory.

For companies/corporate accounting, several guidance documents were published on the topic. Their most recent and comprehensive is the WBCSD Guidance on Avoided Emissions[1]. An earlier version of this guidance[2] included the following comparison between corporate avoided emissions accounting and (generated) Scope 3 accounting.

Box **1. What is the difference between a Scope 3 reduction and avoided emissions?**
There is often confusion between accounting for Scope 3 emissions and avoided emissions. However, these two notions are very different:

- **Scope 3 emissions accounting** takes a company's point of view. In particular, emissions reductions of products are seen as changes in several Scope 3 categories, which together reflect the life cycle emissions of sold products. Further, Scope 3 emissions are only compared to the same company's Scope 3 emissions from previous years, whereas avoided emissions are compared to the most likely alternative that would have occurred without the solution, which could be a product from another company or a completely different solution altogether.
- **Avoided emissions accounting** is built from a societal context and the use of the solutions' point of view, where two situations are compared: one with the solution sold by the company, the other with the most likely scenario that would have occurred without the solution. Avoided emissions give an estimated emissions reduction in society due to the use of the solution, but outside the solution provider's Scope 1-3 emissions.

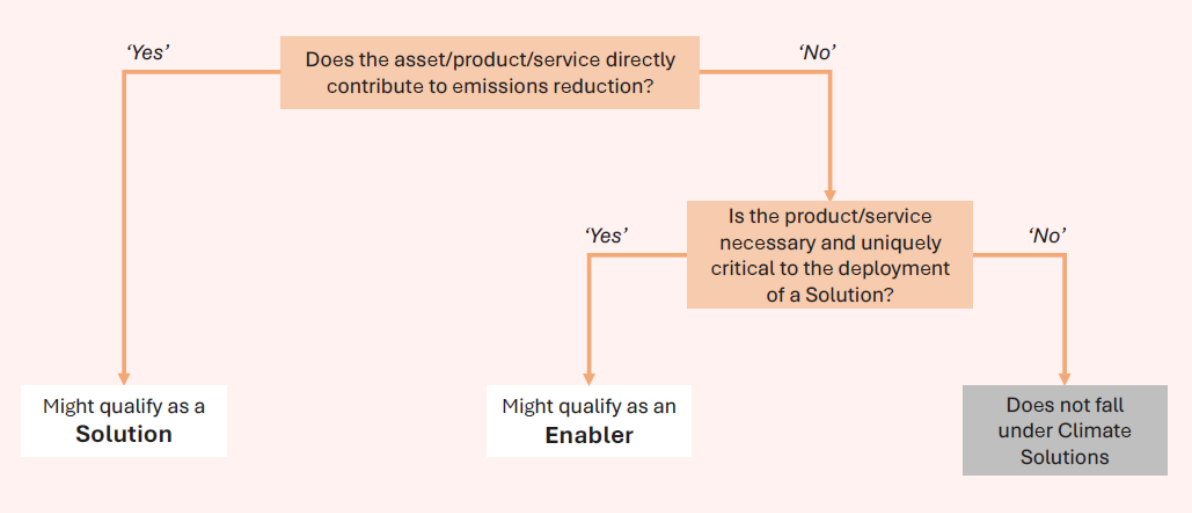
Source: (WBCSD, 2023)

Moreover, corporate products and services related to avoided emissions ('climate solutions') can be subdivided into two types, as underscored by GFANZ: solutions that directly reduce GHG emissions through the end product, so-called "solutions", or that indirectly contribute to those GHG emissions, so-called "enablers". Specific considerations and limitations apply to the latter, as there is currently no widely accepted definition of enablers, nor a methodology to attribute avoided emissions along complex value chains. There is also a risk of double counting, heightened uncertainties regarding impact, and increased complexity in establishing a counterfactual scenario. Enabling activities, in the context of this guidance,

[1] WBCSD (2025). Guidance on Avoided Emissions v2. Retrieved from: https://www.wbcsd.org/Imperatives/Climate-Action/Resources/Guidance-on-Avoided-Emissions
[2] WBCSD (2023). Guidance on Avoided Emissions. Retrieved from: https://www.wbcsd.org/wp-content/uploads/2023/09/Climate-Avoided-Emissions-guidance_WBCSD.pdf

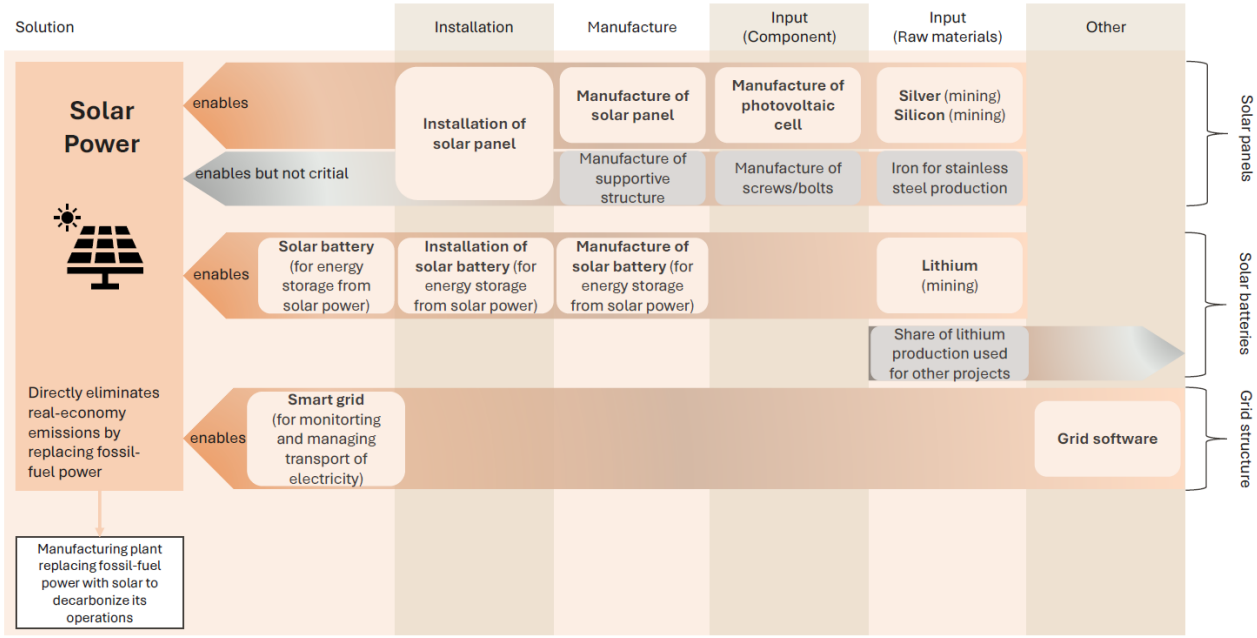
therefore solely refer to those exclusively dedicated to climate solutions (e.g., equipment and infrastructure for renewable energy, auto parts specifically designed for battery electric vehicles).

Figure 1. Solution or Enabler? Uniqueness and criticality



Source: GFANZ (2022). Scaling Transition Finance and Real-economy Decarbonization

Figure 2. Solution or Enabler? Considerations along the value chain of solar panels



Source: GFANZ (2022). Scaling Transition Finance and Real-economy Decarbonization

Financed avoided emissions

Accounting guidance for the financial sector is even more limited. Similar to companies, reporting on financed avoided emissions can also have merit for financial institutions. The 2024 WBCSD publication, in collaboration with PCAF, states that: *"Avoided emissions can support climate action in the finance sector as they provide an opportunity led approach to the current risk-dominated perspectives on climate action. Investors can use this metric to assess the environmental potential of a technology's decarbonization beyond an asset's direct footprint and examine the prospect of investing in them as a contribution to decarbonization. Avoided emissions can strengthen the ties between industry and finance decarbonization efforts when stakeholders have further advanced and aligned technical/methodological frameworks, allocation rules, practical guidance on asset classes/financial products and terminologies."*[3]

For this reason, the PCAF Standard states that financial institutions **may** report the financed avoided emissions associated with their financial services provided, while they **shall** be reported separately. Reporting avoided emissions is thus **optional** for financial institutions.

This guidance focuses on **financed** avoided emissions and when they may be calculated and attributed to a financial institution. Corporate avoided emissions calculation guidance is covered by other bodies, including the GHG Protocol and the WBSCD. This guidance is therefore intended for financial institutions only and should not be used by the non-financial corporate sector as guidance for the calculation of avoided emissions figures for their specific solutions.

Financed avoided emissions through general corporate finance (entity level) or specific instruments (UoP structures):

For the purpose of accounting for financed avoided emissions, PCAF has identified 2 distinct ways avoided emissions can be attributed to financial institutions through:

1. General corporate instruments: loans and investments to counterparties with general purposes (i.e., unknown use of proceeds as defined by the GHG Protocol).
2. Specific corporate instruments: loans and investments in projects, assets, or structures (i.e., known use of proceeds as defined by the GHG Protocol).

[3] WBCSD (2024). Avoided emissions & Sustainable Finance. Retrieved from: WBCSD_Accelerating-decarbonization-by-aligning-the-efforts-of-business-and-finance.pdf

Type	General corporate instrument	Specific corporate instrument
Use of proceeds	Unknown	Known
Level of reporting counterfactual	Company level	Project/product/service level
FI influence	More indirect, via investing in the company generating avoided emissions	More direct, by investing directly in the activity avoiding emissions
Example instrument	General equity investments, general bonds, or business loans	Project finance, green bonds
Example saving	Owning stock in a company selling insulation materials or solar energy. Business loan to a company selling meat replacement products.	Green bond investment in energy efficiency measures in commercial real estate or homes.

ASSESSMENT BOUNDARY

The following section summarizes the PCAF GHG accounting approach to financed avoided emissions. Requirements that only apply to generic or specific instruments have been noted.

- The time period over which financed avoided emissions are reported **shall** be consistent with the timeframe of the financed (generated) emissions of the counterparty[4]. This means:
  - If life cycle emissions are assessed and reported in the year of transaction in the company's GHG inventory (see Use of Sold Products –Scope 3 Category 11 in the GHG Protocol), then avoided emissions **shall** also be assessed in the year of sale for the solution (product)'s entire life cycle[5]. Therefore, avoided emissions will be related to the total sold volume of the solution for that year.
  - If absolute emissions are assessed and reported annually in a company's GHG inventory (e.g., Scope 1 or Downstream Leased Assets – Category 13 Scope 3), then avoided emissions **shall** be assessed annually.[6] The counterfactual scenario should pertain to the reporting year and not to future years.[7] E.g., if available, an annual number **shall** be used for projects.
  - Financial institutions may use forecasted estimates (e.g., before the development of the project or the issuance of the corresponding security) based on annualized figures related to lifecycle emissions, if it can be documented that this is the only option and represents a reasonable assumption. Where possible, ex-ante estimates should be updated or validated periodically with available actual data.
- Avoided emissions **shall** (1) be reported based on direct counterparty data, or (2) be calculated based on physical activity of the counterparty (collected by the financial institutions reporting the

[4] Counterparty refers to the investee, company, or other underlying investment term that the FI is providing a form of financing to.
[5] https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporing-Standard_041613_2.pdf; https://ghgprotocol.org/sites/default/files/standards/Product-Life-Cycle-Accounting-Reporting-Standard_041613.pdf
[6] https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporing-Standard_041613_2.pdf
[7] The 'EAE metric' in the section on Forward-looking emission metrics would allow FIs to calculate such 'expected avoided emissions'.

financed avoided emissions of its investments). Additionally, data quality scores, as further defined below, **shall** be calculated.

- Avoided emissions numbers **shall** be based on a credible methodology and using a credible and conservative counterfactual scenario[8] (including emissions reductions that will naturally occur without the avoided emissions activity in place).
  - When following an external methodology, the entity calculating the avoided emissions **shall** include the methodology source used (e.g. WBCSD).
- Financial institutions **may** estimate avoided emissions that have not been disclosed adequately or reported directly by their counterparties if they apply the following best practices:
  - Financial institutions **shall** disclose a clear and robust calculation methodology, including underlying assumptions and preferably built on specific (e.g. country or regional) data.
  - Financial institutions **shall not** estimate avoided emissions based on economic intensities such as input-output models due to the high uncertainty and low credibility associated with such an approach.
- Financed avoided emissions from general corporate instruments **shall** be accounted for only in cases where these have occurred outside of the counterparty's value chain.

ATTRIBUTION OF EMISSIONS

- Avoided emissions **shall** be attributed using the same method as absolute emissions based on the applicable PCAF Standard Part A asset class. For general corporate instruments this is at the company level (e.g. if it is a listed corporate, an EVIC denominator should be used in both the financed emissions and financed avoided emissions calculations). For specific corporate instruments this is at the project/product/service level (if applicable via a UoP structure).
- For general corporate instruments, financial institutions should calculate financed avoided emissions by restricting their assessment boundary to the issuer's assets not covered by integrated UoP structures. In practice, this is only feasible when the emissions and total debt of integrated UoP structures are separately disclosed. This guidance therefore recommends that when financial institutions issue an integrated UoP structure, they should report separately the financed avoided emissions (including data quality score).

A financial institution calculates the avoided emissions across the portfolio using the following formula:

$$Portfolio\text{-}wide\ avoided\ emissions = \sum_i Attribution\ factor_i * Avoided\ emissions_i$$

(with i = investment or loan)

The attribution factor depends on the relevant asset class.

[8] Additional guidelines can be found in the *Additional guidelines on methodology disclosure* and *Additional guidelines on counterfactual scenarios* starting on page 10 of this document.

REPORTING AND DATA QUALITY ASSURANCE

- Avoided emissions metrics **may** be reported but **shall** be disclosed separately from, and be additional to, absolute emissions and, where appropriate, emissions removals' disclosures. Disclosure of financed avoided emissions **shall not** obfuscate nor replace disclosures covered under Part A of the PCAF Global Standard. Financial institutions should consider including a clear statement that financed avoided emissions cannot be compared with or deducted from financed (generated) emissions.
- Financed avoided emissions from general corporate instruments **should** be reported separately from financed avoided emissions resulting from specific corporate instruments.
- In cases where a financial institution uses both reported avoided emissions and their own estimates of avoided emissions, the proportional share of each **should** be disclosed[9].
- Financial institutions **should** disclose a data quality score alongside their avoided emissions figures based on Table 1.
- Avoided emissions resulting from climate solutions **shall** be disclosed separately from those associated with enabling activities, to clearly differentiate climate impact across the value chain.
- Financial institutions **should** report avoided emissions separately based on whether they are attributed to specific use-of-proceeds instruments or to general purpose financing.

Table 1 provides data quality scores for each of the described options and sub-options that can be used to estimate avoided emissions for financed avoided emissions calculations. Unlike other PCAF methodologies, data quality scores 4 and 5 are not available, since the use of economic intensities to estimate avoided emissions are not permitted.

Table 1. General description of the data quality score table for avoided emissions
(score 1 = highest data quality; score 3 = lowest data quality)

Data Quality	Options to estimate avoided emissions	When to use each option
1	**Option 1: Reported avoided emissions**	Verified avoided emissions of the counterparty are available. Must be derived from a credible standard/framework.
2		Unverified avoided emissions calculated by the counterparty are available derived from a credible standard/framework.
	Option 2: Physical activity-based emissions	Avoided emissions are calculated using primary physical activity data of the counterparty's energy consumption as well as emission factors and a counterfactual scenario specific to that primary data.
3		Avoided emissions are calculated using primary physical activity data of the counterparty's production, as well as emissions factors and a counterfactual scenario specific to that primary data.

[9] For example, an FI could report that 70% of a total portfolio amount of 500,000 tCO_2e avoided emissions are based on data reported by counterparties and 30% was estimated by the FI.

The quality of avoided emissions reported by counterparties is a critical input to the figures that financial institutions ultimately report. Financial institutions **should** establish an internal assurance process to evaluate the consistency and quality of data used in their calculations and disclosures. Data quality assurance is of particular importance when disclosing avoided emissions, given the lack of standardization of how these are reported. As a result, reported avoided emissions will vary in quality, including the risk that the impact might be overstated. Therefore, more scrutiny of reported avoided emissions should be applied, and hence, more time should be spent on collecting evidence supporting disclosures. Financial institutions are encouraged to engage with their data vendors, counterparties, and internal teams to establish best practices.

Guardrails to consider include:

- Financial institutions **shall** establish and may disclose a data quality assurance policy for avoided emissions.
- Financial institutions **shall** assess reported avoided emissions (by their counterparties) to ensure that the calculation methodology has been adequately disclosed and aligns, at a minimum, with the 'time period' requirement outlined in this guidance (see 'Assessment Boundary' section). To address the challenge of ensuring robust and comparable calculations, institutions must clearly disclose their overall approach, with additional details on disclosure requirements available in the Technical Appendix.
- When using physical activity emissions factors, financial institutions **should** apply a conservative counterfactual scenario that uses the most granular pathway available (e.g. regional or country level). Additional guidelines to consider in relation to establishing a conservative counterfactual scenario can be found in the Technical Appendix.
- Financial institutions **should** require data reported by counterparties to:
  - Use credible methods such as the WBCSD publication on avoided emissions[10], Product Environmental/Carbon Footprint and lifecycle assessments based on established international practices and standards (e.g., ISO 14044).
  - Be verified by a third-party auditor.
  - Transparently disclose calculation assumptions, including a credible and conservative counterfactual scenario (including emissions reductions that will naturally occur without the avoided emissions activity in place), key sources, and major assumptions and uncertainties that materially impact figures and the ability to compare those (e.g., method to allocate avoided emissions across the value chain).

ADDITIONAL GUIDELINES ON METHODOLOGY DISCLOSURE

As mentioned above, financial institutions **shall** assess reported avoided emissions to ensure that the calculation methodology is adequately disclosed and meets minimum requirements for transparency. Clear methodological disclosure is critical because credible avoided emissions estimates can support informed investment decisions and strengthen the climate integrity of transition-focused portfolios. Given the challenge of achieving robust and comparable calculations across the financial sector, institutions must provide transparency regarding their overall approach to estimating avoided emissions. The purpose

[10] WBCSD_Accelerating-decarbonization-by-aligning-the-efforts-of-business-and-finance.pdf

of this additional guidance is to propose a set of minimum disclosure—covering elements like system boundaries, emission factors, and key assumptions to help ensure that avoided emissions are credible, comparable, and decision-useful and limit the risks of opaque overestimations. These elements may include, at a general level, where applicable:

- The reference frameworks, benchmarks and methods their methodology has been based on (e.g. GHG Protocol, ISO standards, academic literature, or proprietary models) and whether it has undergone a peer review process and/or third-party verifications.
- The specific system boundaries that have been used to estimate avoided emissions (e.g. cradle-to-grave, use-phase only).
- The list of emission factors used, their sources, and their geographic, sectoral and temporal relevance, as well as the data quality and insurance measures.
- The quality of data used, specifying whether it is based on primary or secondary sources, and indicating whether the calculation relies on verified Product Carbon Footprint (PCF) data. The evaluation of data quality score based on the PCAF Standard should be disclosed.
- The main assumptions underlying the calculations (e.g. utilization rates, grid mix evolution, product lifespan, etc.).
- The period over which avoided emissions are calculated as well as the discounting approach use, if any.
- How the guiding principles for conservative counterfactual scenario mentioned in the following section were considered in the development of the counterfactual scenario.

Where avoided emissions are disclosed, financial institutions shall provide a direct reference and an accessible link to the underlying methodology, ensuring it is easy to locate and review.

ADDITIONAL GUIDELINES ON COUNTERFACTUAL SCENARIOS

The credibility of avoided emissions estimates depends heavily on the choice of counterfactual scenarios, which are the baseline against which the emissions impact is measured. Overly optimistic baselines (including a high anticipate emissions increase without intervention) can lead to inflated results and undermine the integrity of disclosures. To ensure estimates remain robust and conservative, financial institutions should adopt realistic counterfactuals that reflect market norms, existing policy trajectories, and expected technological progress. Clear guidance on scenario selection, assumptions, and bounding approaches is essential to promote comparability and avoid overstatement. Guiding principles for conservative counterfactual scenario that should:

- Reflect the most likely baseline trajectory without the investment, considering:
  - Technological trends;
  - Market norms;
  - Policy developments already in place.
- Exclude benefits that would have occurred regardless (e.g., mandated grid decarbonization, efficiency improvements already underway).
- Not use historical average only without factoring material changes in the above-mentioned trends
- Use the most conservative market-average available and consider applying a discount rate as a precautionary approach.

- Use conservative estimates for both counterfactual emissions and estimates for expected emissions to avoid overstating the amount of emissions avoided.

Forward-looking emission metrics

This section seeks to provide further guidance on forward-looking emissions metrics. These metrics are primarily intended to be used in the context of transition finance[11], as it allows financial institutions to demonstrate that certain companies in the portfolio, which may currently be emission-intensive, are expected to lower their emissions or result in emissions avoidance in the future. In certain cases, companies might formally commit to such emissions reductions through sustainability-linked bonds that are tied to decarbonization expected emission changes.

Financial institutions **may** choose to report on forward-looking emissions and associated metrics. While some of these metrics, such as EER, have been suggested by other organizations[12], they have not been technically defined within PCAF. PCAF is aiming to further explore different methodological approaches to forward-looking metrics. The two metrics considered in this guidance are:

Forward-looking Metric	Main objective	Main boundaries[13]	Reference point	Benchmark
Expected absolute emissions reduction (EER)	Capture potential emissions reductions within an entity's emissions boundaries (direct and indirect emissions)	Company level metrics (aligned/aligning)	Existing or historical emissions	Projected reduction (including target)
Expected avoided emissions (EAE)	Capture potential decarbonization impact generally considered to be outside an entity's value chain (e.g. climate solutions)	Project/product level metrics (solutions/ phase out)[14]	Counterfactual scenario	Projected reduction (including solution/phase out)

Both metrics are described below, and an example for a financial institution's portfolio is provided in the Technical Appendix to illustrate the outcomes for both metrics.

GENERAL GUIDELINES ON FORWARD-LOOKING EMISSION METRICS

This section outlines a preliminary framework for the application of forward-looking emissions metrics at the entity level, which can be used in the context of transition finance. Although guidance is provided on how to aggregate these forward-looking metrics across a group of entities (at the portfolio level), it is not intended as guidance on how to manage these metrics at the portfolio level (e.g. achieving portfolio-wide expected emission changes).

[11] While still an evolving concept, transition finance tends to refer to funding aimed at facilitating the shift from high-carbon to low-carbon and resilient business models, often used to enable carbon-intensive industries to transition to the low-carbon economy over time.
[12] https://www.gfanzero.com/press/gfanz-launches-consultation-on-transition-finance-strategies-and-measuring-the-impact-on-emissions/
[13] In alignment with GFANZ definitions for transition financing strategies. Please see: https://assets.bbhub.io/company/sites/63/2022/09/Recommendations-and-Guidance-on-Financial-Institution-Net-zero-Transition-Plans-November-2022.pdf
[14] This can also be at company level for its entire climate solutions (e.g., renewables) portfolio, notably pure play companies dedicated to those.

Forward-looking emissions metrics represent best practices for financial institutions seeking to complement traditional measures such as absolute and avoided emissions. These metrics evaluate potential future emissions reductions or avoidance, providing insight into anticipated climate impacts. For instance, they may estimate the projected effect of a renewable energy development pipeline that has not yet been constructed or become operational. Additionally, forward-looking metrics enable the assessment of potential GHG reductions for counterparties that currently exhibit higher emissions but are positioned to decarbonize over time.

The following general guidelines pertain to forward-looking emissions metrics:

- Forward-looking emissions metrics **may** be reported, but **shall** be disclosed separately from, and be additional to absolute emissions, avoided emissions and emission removals. Disclosure of forward-looking metrics **shall not** obfuscate or replace disclosures covered under Part A of the PCAF Standard.
- If a financial institution chooses to report on all the forward-looking metrics presented, each metric **shall** be disclosed separately.
- The financial institutions **shall** be transparent about and disclose the definitions, assumptions, and methodologies used in accordance with the disclosure requirements delineated below.
- Forward-looking emissions metrics **shall** be attributed using the same method as absolute emissions based on the applicable PCAF Standard Part A asset class. This means that, in principle, the current attribution factor is used and not the expected share of financing.
- Financial institutions **shall** disclose the scope and coverage of forward-looking emissions metrics as a share of the total portfolio. If the entire portfolio is not covered, financial institutions **should** disclose criteria for what counterparties are included within forward-looking emissions metrics.

PCAF acknowledges that forward-looking emissions metrics are an emerging topic and that there has not yet been broad adoption of these types of metrics. For the purposes of this guidance, PCAF has chosen to focus on EER and EAE as examples of forward-looking metrics. Additional guidance on other forward-looking metrics is possible in the future, as the market further evolves, but is not included at this time.

ADDITIONAL DISCLOSURE REQUIREMENTS FOR FORWARD-LOOKING METRICS

PCAF recognizes that in the estimation of forward-looking emissions metrics the choice of assumptions and variables applied – both for an entity's estimated emissions and the counterfactual scenario - can have a significant impact on the projected emissions reduction. To enhance transparency and mitigate potential greenwashing risks, financial institutions that choose to disclose forward-looking metrics **shall** also indicate the types of data inputs used in their estimations, as well as how these inputs were applied in the calculation.

This disclosure does not have to include the quantitative metrics themselves, but rather whether the financial institution incorporates the variables listed below. These variables are not exhaustive and are meant to clarify the methodology and process used to estimate forward-looking metrics. The financial institution **shall** disclose whether it uses any of the variables below in their forward-looking estimations. These include, but are not limited to:

Variable	Description	Disclosure requirement
Expected emission changes	Absolute emissions for base year and expected year	Disclose if the absolute emissions for the base and expected year are based on company-stated expected emission changes or data, or if they were based on FI's derived values.
Credibility assessment	Where a series of factors are applied to adjust projected emissions based on the assessed quality of an entity's expected emission changes or commitments	Disclose if a credibility assessment is applied to the estimation of EER/EAE, and whether it follows recognized guidance such as GFANZ's weighted target assessment[15].
Discount rate	Rate applied to EER/EAE metrics to account for the difference in the value of emissions in the near-term vs. long-term (time value of emissions) where earlier emissions reductions/avoided have a higher impact. This rate can be based on the stage of the project, geographical considerations, cost of capital, technology maturity or other discount factors.	Disclose whether the company applies a discount rate to its EER/EAE estimations and what informs the discount rate used.
Timeframe	Time boundaries applied when computing EER/EAE estimations (e.g. 10 years, to 2030, to 2040, etc.)	Disclose if the financial institution defines a fixed timeframe applied to EER/EAE estimations or if timeframes are informed by other factors (e.g. entity-stated timeframes).

The financial institution shall be consistent in its use of these variables across all entities considered. If a variable is used in the estimation for one entity, it should be applied uniformly to others. Selective application of variables is not permitted, as consistency is essential to ensure comparability and integrity of forward-looking emissions metrics.

EXPECTED EMISSION REDUCTIONS (EER)

EER seeks to capture the financial institution's allocation of an entity's absolute GHG emissions reduction over a specified time horizon based on the financial institution's level of financing and the entity's decarbonization efforts and guidance.

The formula for calculating EER for a specific asset is:

$$EER = Absolute\ emissions_{Base\ year} - Absolute\ emissions_{Expected\ year}$$

The *base year* is the year of contracting. Financial institutions **may** choose a base year after the year of contracting but **shall not** use a base year before the year of contracting.

The *expected year* is the year by which the emissions reductions are expected to be achieved.
A financial institution calculates the EER across the portfolio using the following formula:

[15] https://assets.bbhub.io/company/sites/63/2023/11/Transition-Finance-and-Real-Economy-Decarbonization-December-2023.pdf

$$Portfolio\text{-}wide\ EER = \sum_{asset} Attribution\ factor\ in\ baseline\ year_{asset} * EER_{asset}$$

The attribution factor depends on the relevant asset class.

EERs **shall** be calculated by scope of emissions and financial institutions **shall** make clear to what scope the EER pertains to in their reporting.

The EER **shall** only be calculated in the year of contracting[16]. That said, it is likely that the attribution factor changes over time as the financial exposure of the financial institution to the entity changes. In other words, as the attribution factor changes over time, the 'attributed' EER changes. Please refer to the Technical Appendix for an example where the attribution factor changes over time.

Example: Company A has 100,000 tCO_2e Scope 1 emissions in 2025 and its expected emissions are 50,000 in 2030. Financial Institution A provides a 10MEUR loan in 2025. Company A has 100MEUR EVIC.

For the sake of this example, Financial Institution A only calculates the EER for Company A and not for the rest of the portfolio. This means financial institution *A reports portfolio-wide Scope 1 EER of (10 MEUR / 100 MEUR) * (100,000 – 50,000) = 5,000. Financial Institution A reports this number only in 2025.*

Company A	2025	2030 (Expected)
Scope 1 (tCO_2e)	100,000	50,000
EVIC (MEUR)	100	
EER Scope 1 (tCO_2e)	50,000	

Financial Institution	2025
Loan (MEUR)	10
Attribution factor	0.1
Attributed EER Scope 1 (tCO_2e)	5,000

If the financial institution chooses to disclose an EER, it **shall** report the associated metrics in subsequent years over the life of the investment:

- Calculated EER as reported in the base year, but adjusted for changes in the attribution factor
- Achieved emissions reductions (AER)
- Achieved expected emissions reductions % (% AER).

The formula for calculating AER for a specific asset is:

$$AER = Absolute\ emissions_{Base\ year} - Absolute\ emissions_{Reporting\ year}$$

The *reporting year* is the year for which the emissions are reported.

The formula for calculating % AER for a specific asset is:

[16] The year of contracting most closely reflects when an investment, from an FI, takes place. Other sources may refer to this as the 'base year.'

$$\%\ AER = \frac{Achieved\ Emissions\ Reductions\ (AER)}{Expected\ Emissions\ Reduction\ (EER)}$$

A financial institution calculates the AER across the portfolio using the following formula:

$$Portfolio\text{-}wide\ AER = \sum_{asset} Attribution\ factor_{\ asset} * AER_{asset}$$

The attribution factor depends on the relevant asset class as delineated in Part A of the Standard.

The formula for calculating % achieved EER across the portfolio is:

$$Portfolio\text{-}wide\ \%\ AER = \frac{Portfolio\text{-}wide\ AER}{Portfolio\text{-}wide\ EER\ *}$$

(Where portfolio-wide EER is adjusted for changes in the attribution factor)*

AERs **shall** be calculated per scope, and in their reporting, financial institutions **shall** make clear as to what scope the AER pertains.

In the above example, Company A has 85,000 tCO_2e Scope 1 emissions in 2027. The AER is (100,000 - 85,000) = 15,000. Assuming that *Financial Institution* A still only reports EER for Company A and the attribution factor remained constant, *Financial Institution* A reports a portfolio-wide Scope 1 AER of 10% * 15,000 = 1,500 in 2027. The % achieved EER for Company A in 2027 is (15,000/50,000) = 30%.

Under the previous assumption that the financial institution A only reports EER for Company A and the attribution factor remained constant, the portfolio wide %AER would also be 30%.

Company A	2025	2027
Scope 1 (tCO_2e)	100,000	85,000
EVIC (MEUR)	100	100,000,000
EER Scope 1 (tCO_2e) by 2030	50,000	
AER Scope 1 (tCO_2e)		15,000
% achieved Scope 1 EER		30%

Financial Institution	2027
Loan (MEUR)	10
Attribution factor	0.1
Attributed EER Scope 1 (tCO_2e) by 2030	5,000
Attributed AER Scope 1 (tCO_2e)	1,500
% achieved Scope 1 EER	30%

In their report an FI would include:	
Attributed Scope 1 EER	5,000 by 2030 (2025 base year)
Attributed Scope 1 AER (2027)	1,500
% Achieved Scope 1 AER (2027)	30%

A financial institution **may** choose to calculate an 'interpolated EER'. An interpolated EER refers to the portion of estimated emissions reductions that has been realized at a given point in time, compared to

what was projected for that same year in a forward-looking emissions reduction pathway. Calculating interpolated EER may be useful for a financial institution when it wants to assess if a counterparty/portfolio is on track to meet its reduction target on a year-on-year basis. An interpolated EER assumes a linear reduction of emissions between the base year and the expected year and does not represent company stated interim expected emission changes (unless otherwise reported by the company).

This metric can be calculated using the following formula:

$$Interpolated\ EER = \frac{EER}{Expected\ year - base\ year} * (Reporting\ year - base\ year)$$

A financial institution **may** replace the above formula with direct data on the interpolated EER. This may be available if, for example, a company has set intermediate milestones on its expected emissions reductions.

A financial institution calculates the interpolated EER across the portfolio using the following formula:

$$Portfolio\text{-}wide\ interpolated\ EER = \sum_{asset} Attribution\ factor_{\ asset} * Interpolated\ EER_{asset}$$

The formula for calculating % interpolated EER is:

$$\%Interpolated\ EER = \frac{Portfolio\text{-}wide\ AER}{Portfolio\text{-}wide\ interpolated\ EER\ *}$$

(Where portfolio-wide EER is adjusted for changes in the attribution factor)*

*In the above example, the interpolated EER for Company A in 2027 is (100,000 – 50,000) / (2030 – 2025) * (2027-2025) = 20,000. Under the previous assumption that the* financial institution *A only reports EER for Company A and the attribution factor remained constant, the portfolio wide interpolated EER would be 10% * 20,000 = 2,000. In turn, the % interpolated EER for Scope 1 would be 1,500 / 2,000 = 75%.* Financial institution *A reports this number in 2027. See fully worked example in the Technical Appendix for additional details.*

Company A	2025	2027
Scope 1 (tCO_2e)	100,000	85,000
EVIC (MEUR)	100	100,000,000
EER Scope 1 (tCO_2e)	50,000	
AER Scope 1 (tCO_2e)		15,000
Interpolated EER (tCO_2e)		20,000
% Interpolated EER		75%

Financial Institution	2027
Loan (MEUR)	10
Attribution factor	0.1
Attributed EER Scope 1 (tCO_2e)	5,000
Attributed AER Scope 1 (tCO_2e)	1,500
Attributed interpolated EER (tCO2ee)	2,000
% Interpolated EER	75%

In their report an FI should include:	
Attributed Scope 1 EER (by 2030)	5,000 by 2030 (2025 base year)
Attributed Scope 1 AER (2027)	1,500
% Achieved AER (2027)	30%
Attributed interpolated EER (2027)	2,000
% Interpolated EER (2027)	75%

The key difference between %AER and % Interpolated EER is that %AER represents achieved emissions reductions against the base case EER, while the % interpolated EER represents the achieved reductions against what the expected reductions for a point in time would be (assuming a linear reduction in emissions).

In the example above, the entity has achieved 30% of its overall Scope 1 expected emissions reductions (%AER) in 2027. On the other hand, assuming a linear reduction in emissions, in 2027 the company would be expected to achieve 2,000 tCO_2e reductions. Having achieved 1,500 tCO_2e reductions, the % interpolated EER is 75% (1,500/2,000).

EXPECTED AVOIDED EMISSIONS (EAE)

The expected avoided emissions (EAE) metric seeks to capture the financial institution's attribution of a loan or investment's avoided GHG emissions over a specified time horizon based on the financial institution's level of financing and the project's expected emission avoidance.

In this option, the formula for calculating EAE for a specific asset is:

$$EAE = Absolute\ emissions_{Counterfactual\ scenario} - Absolute\ emissions_{Projected}$$

The fundamental difference with Expected Emission Reductions is that the projected emissions are compared to a counterfactual scenario.[17]

- **The EAE shall be calculated on an annualized basis.** This involves calculating the total projected absolute emissions over the period covered and subtracting the total absolute emissions in the counterfactual scenario in that same period. This total number is then annualized over the period covered. Depending on the type of investment, the period covered can be the useful life of the solution or the project lifetime. The annualized EAE shall only be reported on an annual basis until the financial institution has no more exposure to the counterparty.

A financial institution calculates the EAE across the portfolio using the following formula:

$$Portfolio\text{-}wide\ EAR = \sum_{asset} Attribution\ factor_{\ asset} * EAE_{asset}$$

[17] The term "counterfactual scenario" may be used interchangeably with "reference scenario" or "baseline scenario" in other guidance documents.

The attribution factor depends on the relevant asset class.

Example using the enterprise value or EVIC as a denominator for the attribution factor formula: Company A reported 100,000 tCO_2e Scope 1 emissions in 2025. In 2026, it will deploy cutting-edge green technology with a five-year useful life. This technology is expected to reduce Scope 1 emissions to 80,000 tCO_2e per year, starting in 2026 and continuing through its useful life. The counterfactual scenario (without the technology) has the following emissions pathway:

Year	2025	2026	2027	2028	2029	2030
Counterfactual scenario (tCO_2e)	100,000	98,000	96,000	94,000	92,000	90,000
Projected emissions (tCO_2e)	*80,000*	*80,000*	*80,000*	*80,000*	*80,000*	*80,000*

Financial institutions A provides a 10 MEUR loan in 2025 to finance the purchase of the green technology. Company A has 100MEUR EVIC. The attribution factor is therefore 10/100.

For the sake of this example, financial institution A only calculates the EAE for Company A and not for the rest of the portfolio. This means financial institution A compares the emissions projected over the period 2026-2030 of 400,000 tCO_2e (80,000 tCO_2e per year), versus the counterfactual scenario pathway total emissions, 470,000 tCO_2e. In 2025 (the year of contracting), financial institution A calculates a cumulative and annualized EAE number.

Cumulative EAE= (470,000 - 400,000) * (10/100) = 7,000 tCO_2e

Annualized EAE = 7,000 / 5 = 1,400 tCO_2e

Similar to the EER, adjustments to reflect changes in the calculation parameters, such as the attribution factor, may be necessary when reporting updates to the EAE.

AGGREGATING EXPECTED AVOIDED EMISSIONS

- Options to disaggregate expected avoided emissions are the same as the ones highlighted in the avoided emissions section under the section “Aggregating expected avoided emissions”.

Box 2. The difference between Avoided Emissions and Expected Avoided Emissions
Avoided emissions from sold products focus on the emissions that have been avoided from sales that have already taken place in a given year. EAE entails the calculation of avoided emissions from products that will be sold in the future.

COMPARING EXPECTED (AVOIDED) EMISSION REDUCTION OPTIONS

The following differences can be distinguished between EER and EAE, which emphasize certain advantages and limitations of each metric:

- EAE captures more clearly how the projected performance compares to different alternatives and can account for expected growth. For example, if a cement company expects to increase production significantly while still moderately reducing Scope 1 emissions, this would lead to a smaller emissions intensity per ton of cement than if Scope 1 emissions were reduced the same amount without increasing production. The counterfactual scenario in EAE can capture this dynamic, while EER cannot as it focuses solely on absolute emissions reductions.
- EER can be used as a performance metric that can be continuously tracked, while EAE cannot. This is because EAE is only calculated once at contracting but cannot be easily monitored afterwards, since a counterfactual scenario is used. In addition, the counterfactual scenario established in the year of contracting might not be applicable anymore in later years - for example, for the refurbishment of an industrial plant it might be that the counterfactual scenario in 2025 included certain technologies that in 2028 would no longer be considered a credible counterfactual.
- EER does not capture 'ongoing' savings. For example, if equipment is being replaced the emissions reduction is only reflected in the year the new equipment is installed, but afterwards the absolute emissions remain stable. In EAE, emissions reductions can continue to be calculated if the counterfactual scenario is applicable.
- EAE allows emissions reductions outside the asset's value chain to be considered, while EER focuses on emissions reductions in the asset's own inventory.
- The definition of an appropriate counterfactual scenario for EAE is complex and time-consuming. This means that data quality assurance by the financial institution can be more laborious as it is difficult to establish whether a counterfactual scenario is credible and conservative. In contrast, EER is straightforward to implement and monitoring only requires absolute emissions data, which the financial institution would probably require in any case for financed absolute emissions reporting.
- EER has a built-in safeguard for overestimating as financial institutions need to report the achieved EER in subsequent years against actual emissions. Therefore, overestimating EER in the year of contracting comes at the expense of underperforming on achieved EER in subsequent years. EAE does not have such a built-in safeguard and is more easily overestimated as counterfactual scenarios are difficult to validate.

REPORTING SCOPE

Financial institutions **should** report their absolute financed emissions separately for the portfolio for which EER or EAR are reported from the financed emissions of the rest of this portfolio. This is especially helpful to provide an understanding of how transition finance will help to reduce the absolute financed emissions for that part of the portfolio.

DATA QUALITY ASSURANCE

While this guidance does not require, in principle, financial institutions to assess the quality of data reported by counterparties for EER calculations, it is recommended that financial institutions establish an

internal assurance process to evaluate the quality of data used in their calculations and disclosures. Data quality assurance is of particular importance when disclosing metrics that are separate from absolute emissions given the lack of standardization of how these are reported. As a result, reported numbers will vary in quality, including the risk that impact might be overstated. Therefore, more scrutiny should be applied, and hence more time spent on collecting evidence support disclosure. Financial institutions are encouraged to engage with their data vendors, counterparties, and internal teams to establish best practices.

Guardrails to consider include:

- Financial institutions should establish and may disclose a data quality assurance policy
- Financial institutions should require data reported by portfolio companies to:
  - Be verified by a third-party auditor.
  - Transparently disclose calculation assumptions. For EAE this includes a credible and conservative counterfactual scenario (including emissions reductions that will naturally occur without the avoided emissions activity in place).
  - Be accompanied by a transition plan that includes capital expenditures required to meet emissions reductions.

Technical Appendix

PCAF
Partnership for
Carbon Accounting
Financials

Avoided Emissions

The illustrative examples below are provided to highlight how a financial institution may attribute financed avoided emissions.

EXAMPLE AVOIDED EMISSIONS REPORTED BY A RAIL COMPANY

An electric passenger rail company discloses that 500,000 tCO_2e emissions were avoided in 2023 due to the creation of a new metro line that has displaced passenger vehicle trips that would have taken place in the absence of the expanded rail network. The avoided emissions reported by the company represent the savings that occurred in 2023 only. This figure was audited under limited assurance by an auditor and uses the WBCSD method for avoided emissions. For this example, a financial institution provided both equity and debt to the company, resulting in an attribution factor of 20%. The financial institution examined the avoided emissions figure provided and considered enough guardrails to be in place for the number to be credible.

The FI calculates financed avoided emissions of 500,000 x 20% = 100,000 tCO_2e

AVOIDED EMISSIONS EXAMPLE – RENEWABLE POWER PROJECT FINANCE

Annual avoided emissions for renewable power projects can be calculated by assuming that the annual power production of these projects avoids the counterfactual scenario in which certain fossil fuel power plants would need to run. The counterfactual scenario can be captured using emissions factors based on various approaches and assumptions, as illustrated in Table A.1.

Table A.1. Emissions factors per type of power mix

Preferred Options	Type of mix	Description of emissions factors
A	**Operating margin**	The operating margin represents the marginal generating capacity in the existing dispatch hierarchy in a country/region that will most likely be displaced (i.e., the generation from the power plants with the highest variable operating costs in the economic merit order dispatch of the electricity system).
B	**Fossil fuel mix traded**	Emissions factors based on the emissions of all fossil fuel power (including or excluding nuclear power) traded (i.e., produced and imported minus exported) in a country or region.
C	**Fossil fuel mix produced**	Emissions factors based on the emissions of all fossil fuel power (including or excluding nuclear) produced in a country or region.
D	**Average electricity mix**	Emissions factors based on the emissions of all power (fossil and non-fossil) produced in a country or region[18].

Various publicly available data sources on national and international levels are available and provide the data to calculate these emissions factors (e.g., International Energy Agency (IEA), US Environmental

[18] See UNFCCC harmonized GHG accounting standards/approaches and guidelines and resources for more details: https://unfccc.int/topics/mitigation/resources/ifis-harmonization-of-standards-for-ghg-accounting

Protection Agency (EPA), European Environment Agency (EEA)). If possible, emissions factors with greater granularity across time (e.g. hourly or monthly) and space (e.g. sub-regional, local or nodal level) should be used.

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

Besides open-source data, there are third party data providers (similar to those cited Part A, page 61), and initiatives (e.g., AEP Emissions Platform) that provide avoided emissions data

Example – pure-play renewable energy company finance

A pure-play independent power producer (IPP) company develops and operates a geothermal power plant project, with an installed capacity of 2x50 MW (100 MW). For 2024, the company reported an annual renewable power production of 700,000 MWh. For this example, a financial institution provided both equity and debt to the company, resulting in an attribution factor of 10%. The financial institution may report the avoided emissions for 2024 in line with the above guidance as follows:

(Operating margin – geothermal absolute emissions intensity) * annual power production * attribution factor = (0.8 tCO_2e/MWh – 0.1 tCO_2e/MWh) * 700,000 MWh * 10% = 49,000 tCO_2e

Example – avoided emissions for a corporate green bond

Financial institutions shall follow the draft 'Use of proceeds structures' guidance when attributing avoided emissions that result from instruments with specified use of proceeds. The following table illustrates the example of a 12 MEUR green bond issued by a steel corporate. The bond has been partially allocated to two electric steel facilities the corporate owns and controls. All numbers are for the reporting year 2024 and are illustrative for the purpose of this example.

	Total debt + equity (MEUR)	Outstanding amount (MEUR)	Data quality score	Avoided emissions (tCO_2e)
Electric steel facility A (operational)	20	2	2	20,000
Electric steel facility B (construction)	50	8	1	20,000

Note that for this example, the outstanding amounts in the underlying projects do not equal the total green bond value. This occurs when the green bond proceeds have not been fully allocated yet.

The energy corporation, i.e. the issuer, would report the following impact for this green bond:

	Data quality score	Avoided emissions (tCO_2e)
Total avoided emissions green bond	(2 * 2 + 8 * 1) / 10 = 1.2	(2 / 20 * 20,000) + (8/50 * 20,000) = 5,200

For this example, an investor is investing 6 MEUR in the green bond, which means the attribution factor in the green bond will be 6 MEUR/12 MEUR = 50%. Therefore, this investor would calculate the following avoided emissions for this investment:

	Data quality score	Avoided emissions (tCO_2e)
Avoided emissions green bond for investor	1.2	50% x 5,200 = 2,600

Examples of forward-looking emissions metrics

EXPECTED EMISSIONS REDUCTION (EER)

For the sake of this example, the portfolio of financial institution A only comprises two loans, one loan to company A and one to company B. The loan to company A was a sustainability-linked loan. As part of this, company A has committed to reduce their Scope 1 emissions from 200,000 tCO_2e in 2023 to 150,000 tCO_2e in 2030. They have also committed to annual intermediate expected emission changes, which financial institution A used for the interpolated EER. Company B has set a science-based target for 2028. As a result, the Scope 1 emissions are expected to reduce from 80,000 in 2023 to 55,000 in 2028. The financial institution also chooses to calculate and disclose % interpolated EER.

The table below shows how the emissions and attribution factors for companies A and B progressed from 2023 to 2030, and what financial institution A would report accordingly for each year.

								Realized	Target
Company A	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2030**
Actual emissions (tCO_2e)	200,000	198,000	193,000	190,000	185,000	178,000	170,000	163,000	150,000
EER (tCO_2e)	50,000								
AER (tCO_2e)	0	2,000	7,000	10,000	15,000	22,000	30,000	37,000	
Attribution Factor FI A	10%	9%	8%	7%	6%	5%	4%	3%	
Attributed EER (tCO_2e)	5,000	4,500	4,000	3,500	3,000	2,500	2,000	1,500	
AER (tCO_2e)	0	2,000	7,000	10,000	15,000	22,000	30,000	37,000	
% AER	0	4%	14%	20%	30%	44%	60%	74%	
Interpolated EER (tCO_2e)	0	5,000	10,000	15,000	20,000	30,000	40,000	50,000	

						Realized	Target		
Company B	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2028**	**2029**	**2030**
Actual emissions (tCO_2e)	80,000	75,000	70,000	60,000	60,000	50,000	55,000		
EER (tCO_2e)	25,000								
AER (tCO_2e)	0	5,000	10,000	20,000	20,000	30,000			
Attribution Factor FI A	25%	20%	15%	10%	5%	0%			
Attributed EER (tCO_2e)	6,250	5,000	3,750	2,500	1,250	0			
AER (tCO_2e)	0	5,000	10,000	20,000	20,000	30,000			
% AER	0	20%	40%	80%	80%	120%			
Interpolated EER (tCO_2e)	0	5,000	10,000	15,000	20,000	25,000			

FI reporting	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Portfolio-wide Scope 1 EER (tCO_2e)*	11,250	9,500	7,750	6,000	4,250	2,500	2,000	1,500
Portfolio-wide Scope 1 AER (tCO_2e) **	0	1,180	2,060	2,700	1,900	1,100	1,200	1,110
Portfolio-wide Scope 1 % AER	0	12%	27%	45%	45%	44%	60%	74%
Portfolio-wide Scope 1 Interpolated EER (tCO_2e)	0	1,450	2,300	2,550	2,200	1,500	1,600	1,500
Portfolio-wide Scope 1 % Interpolated EER	0	81%	90%	106%	86%	73%	75%	74%

Notes

**Because the attribution factor changes over time, portfolio-wide EER is recalculated each reporting year. Please note however, that what changes is the attribution factor, not the absolute EER, which is calculated once at year of contracting*

*** If AER is adjusted for attribution factor, then EER should also be adjusted for attribution factor as well*

EXPECTED AVOIDED EMISSIONS (EAE)

This example examines two scenarios involving the calculation of EAE. In the first, the financial institution provides $20 MEUR in financing in 2026 to a shipping company for the acquisition of two vessels. A portion of the capital is allocated to retrofitting the ships to improve their fuel efficiency.

To assess its contribution to estimated avoided emissions[1], the financial institution evaluates the counterfactual scenario. In doing so, it identifies relevant regulatory requirements under the IMO's MARPOL Convention. Under IMO's MARPOL Annex VI and the Carbon Intensity Indicator (CII) framework, a vessel that receives a D rating for three consecutive years or an E rating in a single year must submit a Corrective Action Plan to achieve at least a C rating.

Financial institution A assesses that one of the ships achieved a rating of E while the other one achieved a rating of D for three consecutive years and therefore the ships need to achieve a rating of C. Part of the financing from the financial institution A will finance the retrofitting of the newly acquired ships to improve their fuel efficiency C rating (the regulatory minimum to remain in operation without a corrective plan).

Parameters (For both ships)	Pre-Retrofit (current)	Post-Retrofit (C-rating)
Annual fuel consumption (tons)	25,000	22,500
Annual emissions (tCO_2e)	77,850	70,065
Annual avoided emissions compared to Pre-Retrofit stage (tCO_2e)	0	7,785

Financial institution A realizes that the company's plan to achieve a rating of C would not be additional to what is required under the Marpol regulation and therefore the counterfactual scenario. Therefore, the financial institution evaluates that it cannot claim any EAE.

$$EAE = Absolute\ emissions_{Counterfactual\ scenario} - Absolute\ emissions_{Expected}$$

EAE = (70,065-70,065) = 0 tCO_2ee

In another scenario, financial institution A decides to provide a sustainability linked loan to the company so that it retrofits its ships to achieve a rating of B.

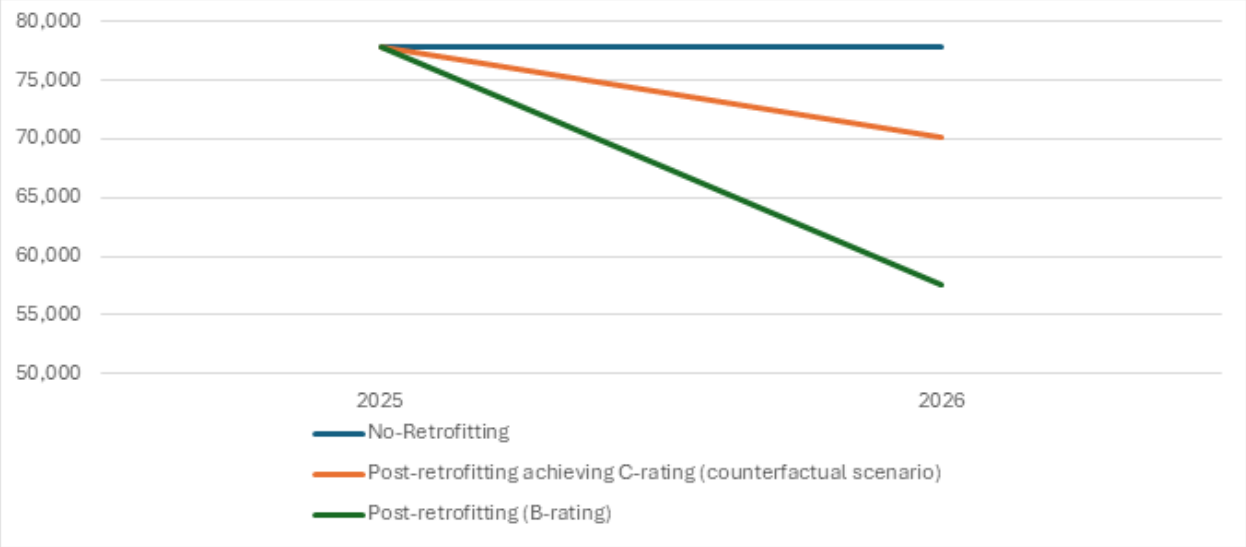
The table below outlines the estimated emissions reductions across the different retrofit scenarios.

Parameters (For both ships)	Pre-Retrofit (current)	Post-Retrofit (C-rating)	Post-Retrofit (A-rating)
Annual fuel consumption (tons)	25,000	22,500	18,500
Annual emissions (tCO_2)	77,850	70,065	57,609
Annual avoided emissions compared to Pre-Retrofit stage (tCO_2e)	0	7,785	12,456

Assuming an attribution factor of 50%, the financial institution reports the following annual EAE:

$$Attributed\ EAE = Attribution\ Factor * (Absolute\ emissions_{Counterfactual\ scenario} - Absolute\ emissions_{Expected})$$

EAE = 0.5 * (70,065-57,609) = 6,228 tCO_2e/year



In another scenario, the financial institution seeks to assess its climate contribution by estimating avoided emissions over a 10-year period. As outlined previously, the company has retrofitted its vessels to achieve a high efficiency rating under the IMO CII framework. In establishing a robust counterfactual scenario, it is assumed that—had the vessels only achieved a C rating—they would have required additional retrofitting five years later to remain compliant with progressively tightening MARPOL regulations. This assumption allows the financial institution to isolate and quantify the additional emissions avoided by supporting a higher standard (B rating) from the outset, rather than deferring improvements. The table below estimates the emissions avoided over the next 10 years taking into consideration the counterfactual scenario.

Year	Pre-Retrofit (current) Emissions (tCO_2e)	Post-Retrofit (C-rating) Emissions (tCO_2e)	Annual Emissions Avoided (tCO_2e)
2025	-	-	
2026	70,065	57,609	12,456
2027	70,065	57,609	12,456
2028	70,065	57,609	12,456
2029	70,065	57,609	12,456
2030	65,000	57,609	7,391
2031	65,000	57,609	7,391
2032	65,000	57,609	7,391
2033	65,000	57,609	7,391
2034	65,000	57,609	7,391
2035	65,000	57,609	7,391
Total	**675,260**	**576,090**	**99,170**

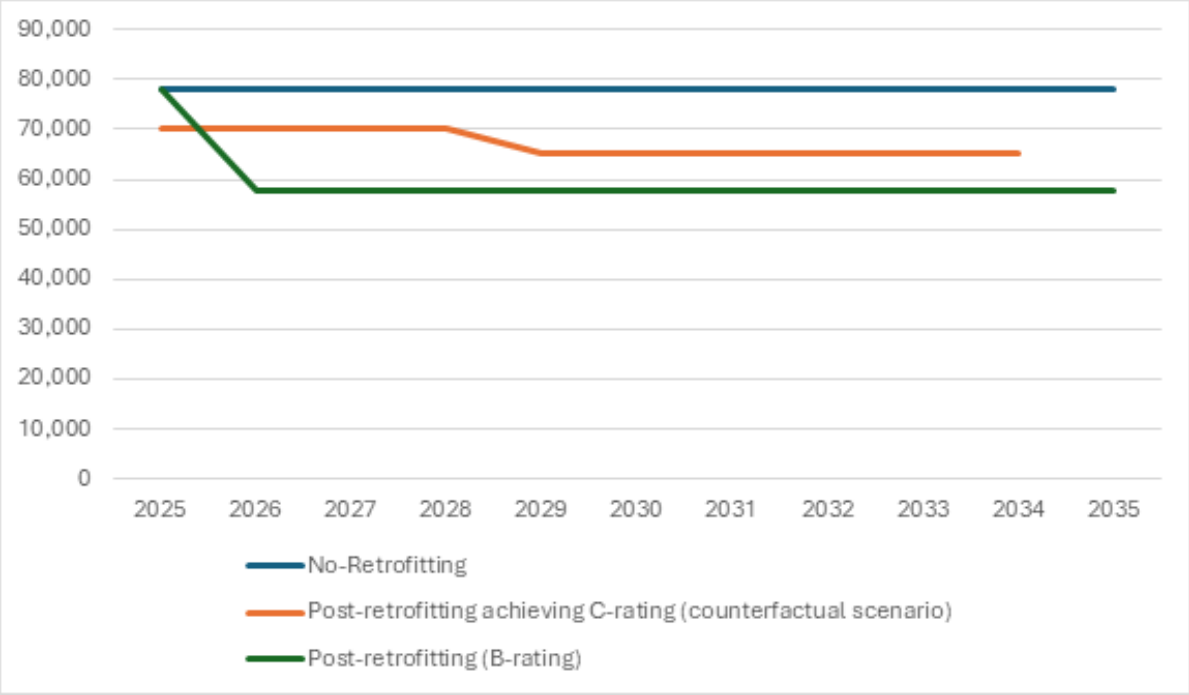
Assuming an attribution factor remains at 50% over the same period, the financial institution calculates the following cumulative EAE:

$$Attributed\ EAE = Attribution\ Factor * (Absolute\ emissions_{Counterfactual\ scenario} - Absolute\ emissions_{Expected})$$

EAE = 0.5 * (675,260-576,090) = 49,585 tCO_2e

The financial institution can also report an annualized figure of:

EAE = 0.5 * (675,260-576,090) / 10 years = 4,958.5 tCO_2e



The GLOBAL GHG ACCOUNTING & REPORTING Standard

PART A

Website:
carbonaccountingfinancials.com
E-mail:
info@carbonaccountingfinancials.com

PCAF®
Partnership for
Carbon Accounting
Financials