

Preconditions and Methods for Measurement of Financed Emission (FE) by Sector in TCFD Recommendations for Disclosure (Progress Report 2023)

1. Overview of measurement

A) Applicable assets

Loans (corporate finance and project finance)

B) Applicable FY

- Base year: Fiscal year ended March 31, 2022
 - Loan balance: As of March 31, 2022
 - Customers’ financial data and greenhouse gas (GHG) emission data:
In principle, financial closing data for the period from April 2021 to March 2022

C) Target sectors

The following 17 sectors will be disclosed based on the TCFD Recommendations.

Oil & Gas	Coal	Electric Utilities	Aviation*	Maritime Transportation
Rail Transportation	Trucking Services	Automobiles & Components	Metals & Mining	Chemicals
Construction Materials	Capital Goods	Real Estate Management & Development	Beverages	Agriculture
Packaged Foods & Meats	Paper & Forest Products			

* The aviation sector includes both Air Freight and Passenger Air Transportation

D) Calculation method

Measurement based on the PCAF* Standard

* The Partnership for Carbon Accounting Financials (PCAF) is an international initiative that was launched in 2015 with the goal of standardizing the measurement and disclosure of financed GHG emission. It formulates the PCAF Standard, which is a framework for calculating GHG emission attributed to the lending and investment activities of financial institutions.

Based on the PCAF Standard, we score the quality of emission data by each customer/project according to the categories shown below, and aggregate the average score for the sector as a whole by weighted average of loan amount (Data Quality Score, or PACF Score; hereinafter, the “Score”).

	Quality	Category	Summary
High ↑ ↓ Low	Score 1	Disclosed information	● Verified emissions data of each customer/project
	Score 2		● Unverified emissions data of each customer/project
	Score 3	Estimated value (based on physical metrics)	● Estimation based on energy consumption data of each customer/project
	Score 4		● Estimation based on production data of each customer/project
	Score 5	Estimated value (based on financial metrics)	● Estimation based on the sales of each customer/project and the sectorial emission benchmarks per sales
	● Estimation based on loan balances of each customer/project and sectorial emission benchmarks per asset		
			● Estimation based on loan balances of the each customer/project, sectorial emission benchmarks per revenue, and asset turnover ratio per sector

Source: created by MUFG based on The Global GHG Accounting & Reporting Standard for the Financial Industry

Basic calculation formula

【Score 1 to 4】

$$\text{Financed Emission} = \sum_n \text{Attribution factor}_n \times \text{Company emission}_n$$

● Attribution factor

$$= \text{loan amount for each customer/project} \div \text{Debt} + \text{equity of each customer/project}$$

● Company Emission (GHG emission)

= We use the data disclosed by the customer. If we cannot obtain such data, we use estimated figures.

【Score 5】

$$\text{Financed Emission} = \sum_n \text{Loan amount}_n \times \text{GHG emission}_n / \text{Assets}_n^*$$

* Emission factor per asset value taken from the PCAF database

① Equations and measurement processes for each asset class

a) PCAF Standard equations and their application

«Corporate finance»

【Score 1 to 4】

■ Attribution factor

- Numerator: Loan amount to each customer

Note: Loan amount means the balance of loans provided by MUFG Bank, including undrawn committed amounts and excluding market risk exposures, etc.

- Denominator: Debt + equity of each customer

- For the numerator, we use our internal data for each customer.

- For the denominator, we use our internal data for each customer and data from information vendors (Bloomberg).

■ **Company emission (GHG emission)**

We prioritize data in the following order when calculating emission.

- We use data from information vendors (Bloomberg) and company disclosure data (equivalent to Score 1 when certified by a third party, Score 2 when not). However, when there is a significant difference in the amount disclosed by the company and its peers, we re-examine the value to adopt after verifying the accuracy.

- For companies in the oil and gas sector without disclosed emission but for which annual production data is available, we estimate the figure by using the emission factors per unit of production from the IEA World Energy Outlook (equivalent to Score 3).

- When the above data is not available, we multiply the emission factors per unit of revenue from the PCAF database (calculated by region and sector) by the company's sales to estimate GHG emission (equivalent to Score 4).

【Score 5】

- When a customer doesn't disclose either emission data or production/sales data, or when it is not possible to calculate the attribution factor due to a lack of data, etc., we estimate financed emission by multiplying the emission factors per unit of asset from the PCAF database (calculated by region and sector) by the loan amount for the customer (equivalent to Score 5).

«Project finance»

■ **Attribution factor**

- Numerator: Loan amount to each project

- Denominator: Debt + equity of each project

- For both the numerator and denominator, we use our internal data for each customer.

■ **Project emission (GHG emission)**

【Project finance for power generation projects】

We prioritize data in the following order when calculating emission.

- For projects for which the amount of GHG emission is available, we use the actual figures (equivalent to Score 2).

- For projects for which the amount of GHG emission is not available, we estimate project emission by multiplying the project's annual power generation by the emission factors per unit of power generation from the

IEA World Energy Outlook (calculated by region and power generation source) (equivalent to Score 3).

【Oil & gas upstream development projects】

• Emission are estimated by multiplying the project's annual production by the emission factor per unit of production from the IEA World Energy Outlook (equivalent to Score 3).

【Other project finance】

• Same as the above method for calculating corporate finance company emission (Score 5).

b) Measurement process

«Measurement targeting corporate finance and project finance (other than for power generation projects and oil & gas upstream development projects)»

- i. Reconciling sector classifications
 - Based on the GICS coding, we prepare industry data by classifying the sectors for disclosure based on the TCFD Recommendations (which have no set classification method), and the sectors in the PCAF database (which applies multiple classifications, including the Global Industry Classification Standard (GICS), North American Industry Classification (NAICS), and Statistical Classification of Economics Activities in the European Community (NACE)).
- ii. Identification of companies subject to measurement
 - We identify customers (on a company group basis) that fall under the sectors for disclosure based on the TCFD recommendations as those subject to measurement.
- iii. Reconciliation of external and internal data
 - As most GHG emission disclosures are on a consolidated basis, we prioritize using the consolidated figures for loan amount, interest-bearing debt, and net assets. If data on a consolidated basis is not available for a company, we use the non-consolidated figures for loan amount, interest-bearing debt, and net assets.
 - We put together customers by company group and reconcile customer data from information vendors with MUFG Bank's internal credit data.
- iv. Calculation of attribution factors and GHG emission
 - Same as described in "A".
- v. Calculation of financed emission and PCAF Scores
 - Scores 1 to 4: We multiply the attribution factor by the GHG emission

to calculate financed emission.

- Score 5: We multiply the loan balance by the emission factors per unit of asset from the PCAF database to calculate financed emission.
- We add up all finance emission for Score 1 to 5 to calculate the financed emission for each sector.
- After calculating the PCAF Score on an individual company/project finance basis, the PCAF Score is calculated for each sector by weighted average of the amount of loans.

«Measurement of emission from project finance (for power generation projects and oil & gas upstream development projects)»

- i. Identification of companies subject to measurement
 - We identify project finance deals that fall under the sectors for disclosure based on the TCFD Recommendations as those subject to measurement.
- ii. Preparation of data related to project finance for power generation and oil & gas upstream development projects
 - We collect data on GHG emission, annual power generation, and annual production for each project.
 - We also collect debt and equity data for each project.
- iii. Calculation of attribution factors and GHG emission
 - Same as described in "A".
- iv. Measurement of financed emission and calculation of PCAF Scores
 - Same as for corporate finance, we calculate the financed emission and PCAF Score of the projects subject to measurement.

2. Notes on measurement

- Data in customer reports and disclosures on Scope 1, 2, and 3 emission includes data for which the scope of calculations does not extend beyond some consolidated companies and certain GHG Protocol-based categories, and data which is still undergoing improvements in calculation methods. As such, the results of measurement of financed emission may change significantly in the future due to customer companies expanding their disclosure of GHG emission.
- As for Scope 3, in particular, we recognize challenges such as variations in disclosure categories depending on the company, emission from multiple companies within a single value chain being predisposed to double-counting, and the fact that the PCAF database used for estimations does not currently include data (emission factors) for estimating downstream Scope 3 emission.
- To estimate GHG emission, we utilize the emission factors from the IEA World

Energy Outlook and the emission factors per unit of revenue or asset from the PCAF database. However, these emission factors may be further refined or otherwise modified going forward, which may also significantly change the results of measurements.

- Moreover, there is also the possibility that methods for GHG emission measurement could change in the future due to revisions and improvements to the methodology of the PCAF Standard, clarification of practical standards for measurement and target-setting (definitions, scope of measurement, time frames, etc.), and other factors. In the event of any such changes, we will clearly state which points have changed when disclosing our measurement results.