CIMB

GHG Calculation Methodology

Public Methodology Document

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THANK YOU FROM TOMORROW

Contents

Introduction

At CIMB, we are committed to playing a proactive role in addressing climate change by transparently managing and reducing our greenhouse gas (GHG) emissions. This document outlines CIMB's GHG Calculation Methodology, designed to ensure that our emissions reporting is accurate, comprehensive, and aligned with internationally recognized standards.

This methodology document is aligned with the *IFRS S2 Climate-related Disclosures Standard*, which emphasizes transparency and consistency in climate-related financial disclosures. It also follows the principles of the *Greenhouse Gas (GHG) Protocol*, the most widely used framework for GHG accounting, and the *Global Reporting Initiative (GRI)* standards, which promote transparent sustainability reporting practices.

Our GHG calculations encompass Scope 1 (direct emissions), Scope 2 (indirect emissions from purchased energy), and relevant Scope 3 (other indirect emissions) categories. By adhering to these standards and protocols, we aim to provide our stakeholders with clear insights into our carbon footprint and demonstrate our ongoing commitment to sustainable business practices.

This document provides a detailed explanation of the processes, data sources, and assumptions used in CIMB's GHG inventory calculations. It also describes the controls and verification mechanisms employed to ensure the integrity of our reporting.

CIMB remains dedicated to continuous improvement in our GHG accounting and disclosure practices as part of our broader sustainability goals. Through transparent reporting and data-driven decision-making, we seek to contribute meaningfully to global efforts in mitigating climate change.

GHG Accounting and Reporting Principle

At CIMB, our approach to GHG accounting and reporting is guided by a set of fundamental principles designed to ensure the integrity, transparency, and accuracy of our greenhouse gas (GHG) emissions inventory. We adhere to the principles outlined in the GHG Protocol, with an additional principle that focuses on conservatism in addressing our data uncertainty. These principles help us provide a true and fair representation of our emissions, supporting our commitment to environmental sustainability and regulatory compliance.

Relevance

We ensure that our GHG inventory reflects the emissions of CIMB and meets the decision-making needs of both internal and external stakeholders. Our data collection efforts focus on capturing information that is pertinent to our business operations, enabling us to identify key areas for emissions management and reduction.

Completeness

We account for and report all GHG emissions sources and activities within our defined organisational and operational boundaries. By collecting comprehensive data, we ensure that no significant emission sources are overlooked, providing a full picture of our total emissions footprint.

Consistency

We apply consistent methodologies across all reporting periods to allow for meaningful comparisons of emissions over time. Consistency in our accounting and reporting practices ensures that changes in our GHG inventory accurately reflect real changes in our emissions rather than methodological variations.

Transparency

We disclose all relevant information and assumptions used in our GHG inventory process. By documenting our methodologies, data sources, and any deviations from standard practices, we provide a clear and understandable GHG inventory that can be easily reviewed and validated by our stakeholders.

Accuracy

We strive to reduce uncertainties and ensure that our GHG emissions data is precise, reliable, and free from material errors. Our commitment to accuracy involves using robust measurement tools, thorough verification processes, and stringent quality control procedures.

Conservativeness

This is an additional added principle to address uncertainty in our data. In situations where uncertainty is unavoidable, we use conservative assumptions and methodologies to prevent underestimating our GHG emissions. This principle ensures that uncertainties or data limitations do not lead to underrepresenting our emissions.

Approach to Defining Organisational Boundary

CIMB adopts the operational control approach to define our organisational boundary. Under this approach, we include all operations and entities over which we have operational control, meaning we have the authority to introduce and implement operating policies.

The operational control approach is selected for its ability to provide a clear and practical framework for GHG data collection and management. This approach ensures that we focus on the areas where we have the greatest ability to influence emissions reductions, aligning with our sustainability objectives and regulatory requirements.

Scope of Organisational Boundary

Included Entities:

1. All subsidiaries and joint ventures where CIMB has operational control.
2. Business units, branches, and offices under the operational control of CIMB.
3. Any other entities or operations where CIMB has the authority to direct operational activities.

Excluded Entities:

1. Entities where CIMB does not have operational control, such as equity investments or joint ventures where we do not have the authority to implement operational policies.
2. Entities and operations outside the scope of our direct operational influence.

Note that for included entities, a majority of the Category 1 Entities within the CIMB Group's Entity Governance Policy have been included in the organisational boundary, where accurate data is available. For excluded entities, only the final GHG reported will be included in our consolidated GHG reporting, at best effort basis to align with the reporting framework such as the International Financial Reporting Standards (IFRS) or as part of Scope 3 reporting.

It is to note that, to comply with the IFRS S2 Climate-related Disclosures Standard, CIMB also applies the financial control approach where necessary in GHG consolidated reporting. Under this approach, entities and operations where CIMB has the power to control financial and operating policies for financial reporting purposes are included in the organisational boundary. This ensures that our disclosures are aligned with the requirements for financial materiality and consistency under IFRS S2.

Changes to Organisational Boundary

We recognise that our organisational structure may change over time due to acquisitions, divestitures, or changes in operational control. As such, we commit to:

Regular Reviews

Conducting regular reviews of our organisational boundary to ensure it accurately reflects our current operations and control.

Documenting Changes

Documenting any changes to the organisational boundary, including the reasons for the changes and their impact on our GHG inventory.

Transparency in Reporting

Transparently reporting any changes to the organisational boundary and their implications for our GHG emissions data.

Operational Boundary

The operational boundary defines the scope of greenhouse gas (GHG) emissions sources that are included in CIMB Group's GHG inventory. This boundary specifies which emission sources are accounted for and reported, based on the activities that occur within our defined organisational boundary.

Classification of Emissions

CIMB adopts Greenhouse Gas Protocol Group GHG emissions classification as follows:

Scope 1: Direct Emissions

- Direct GHG emissions from sources that are owned or controlled by CIMB.
- Examples include emissions from fuel combustion in company-owned vehicles, emissions from on-site combustion of fossil fuels, and fugitive emissions from equipment and facilities.

Scope 2: Indirect Emissions from Energy Consumption

- Indirect GHG emissions from the consumption of purchased electricity, heat, steam, or cooling.
- These emissions are associated with the production of energy that is consumed by CIMB but occurs at sources owned or controlled by another entity.

Scope 3: Other Indirect Emissions

- All other indirect emissions that occur as a result of CIMB's activities but are not owned or directly controlled by CIMB.
- Examples include emissions from business travel, employee commuting, waste disposal, and supply chain activities.

CIMB's GHG inventory considers the seven greenhouse gases covered under the Kyoto Protocol. However, only the first four are included as they are relevant and material to our operations.

1. **Carbon Dioxide (CO_2)**
2. **Methane (CH_4)**
3. **Nitrous Oxide (N_2O)**
4. **Hydrofluorocarbons (HFCs)**
5. Perfluorocarbons (PFCs)
6. Sulphur Hexafluoride (SF_6)
7. Nitrogen Trifluoride (NF_3)

Inclusion Criteria for GHG Emissions

To ensure a comprehensive and accurate GHG inventory, CIMB Group includes emissions based on the following criteria:

1. **Relevance:** GHG emissions sources that are significant to our operations and contribute substantially to our overall GHG footprint.
2. **Data Availability:** GHG emissions sources for which reliable and accurate data can be collected and reported.
3. **Regulatory Requirements:** GHG emissions sources that are mandated for reporting by applicable regulations and standards.
4. **Stakeholder Interest:** GHG emissions sources that are of interest to our stakeholders, including investors, customers, and regulatory bodies.

Exclusion Criteria for GHG Emissions

While we strive for comprehensive coverage, certain emissions sources may be excluded from our operational boundary due to:

1. **Data Limitations:** Lack of reliable data or the inability to collect accurate data for specific GHG emissions sources.
2. **Materiality Thresholds (or also known as De Minimis Thresholds):** GHG emissions sources that are considered insignificant in terms of their contribution to the total GHG emissions.

Materiality is the magnitude of an omission or misstatement of GHG information that makes it likely that the judgment of a reasonable person relying on the information would have been influenced by the omission or misstatement. Hence, materiality threshold is defined as a level or percentage of the total emissions used by the verifier to determine whether an error or omission is a significant misstatement.

The materiality threshold for a material misstatement of the CIMB's Scope 1 and Scope 2 GHG Inventory is 5% of the combined Scope 1 and Scope 2 emissions totals, respectively for each country. The materiality threshold for a material misstatement of the CIMB's Scope 3 GHG Inventory is 5% of the total CIMB's Scope 3 emissions.

Any exclusions are documented and justified to ensure transparency and provide a clear understanding of the scope of our GHG inventory.

Base Year and Emissions Tracking

Tracking GHG emissions over time is essential for CIMB to monitor progress towards our environmental goals, identify trends, and ensure continuous improvement in our sustainability practices.

A base year serves as a reference point against which future emissions performance is measured. CIMB has established 2019 as the base year for tracking GHG emissions. The base year is 2019, chosen to represent typical business operations with reliable and comprehensive emissions data. All relevant GHG emissions data for 2019 is accurately documented and stored. This includes emissions data across all scopes and sources covered within our operational boundary.

Reporting Period

CIMB's reporting period is from January 1 to December 31 of each year. Annual emissions data will be collected, calculated, and reported based on this timeframe.

Consistent Methodologies

To ensure meaningful comparisons of GHG emissions over time, CIMB:

Maintains Consistent Methodologies

Applies consistent data collection, calculation, and reporting methodologies across all reporting periods to accurately track changes in emissions.

Documents Methodological Changes

Documents any necessary changes to methodologies (e.g., due to improved data accuracy or operational changes) and their impact on emissions data to ensure transparency and enable accurate comparisons.

Data Collection and Management

To effectively track emissions over time, CIMB:

Implements Robust Data Collection Systems

Establishes and maintains robust data collection systems to ensure accurate and timely capture of GHG emissions data across all relevant sources.

Conducts Regular Data Audits

Performs regular audits of emissions data to verify accuracy and completeness, promptly identifying and correcting any discrepancies.

Reporting and Analysis

Reports Annual Emissions

Reports GHG emissions on an annual basis, comparing current emissions data against the 2019 base year and previous reporting periods (with at least four years of historical data).

Performs Trend Analysis

Analyses trends to identify significant changes in emissions, understand underlying causes, and assess progress towards emissions reduction targets.

Drives Continuous Improvement

Uses emissions data to identify opportunities for emissions reduction and operational improvements, supporting continuous improvement in sustainability practices.

Specific Emission Sources and Calculations

Scope 1: Direct Emissions

Scope 1 emissions refer to direct greenhouse gas (GHG) emissions from sources that are owned or controlled by CIMB. This section details the calculation methods and formulas for Scope 1 emissions,

specifically focusing on stationary combustion, mobile combustion, and fugitive emissions from refrigerants.

To accurately assess the climate impact of Scope 1 emissions, CIMB Group calculates CO_2-equivalent (CO_2e) emissions. This involves converting various GHGs into a common unit—CO_2-equivalent—using their Global Warming Potential (GWP).

Combustion of Fuel in Generators (Stationary Combustion)

Stationary combustion refers to the burning of fuel in stationary sources such as generators. These sources are typically used to provide backup power or support operational needs.

Calculation Formula:

$$Emissions = \sum Fuel\ Consumption \times Emission\ Factor \times GWP$$

- **Fuel Consumption**: Measure the amount of fuel consumed by the generator over the reporting period (e.g., litres of diesel, cubic meters of natural gas). In the absence of measurable fuel consumption, a fuel top-up record could be used as a proxy to determine the fuel consumption.
- **Emission Factor**: Use the appropriate emission factor for the type of fuel used. This factor represents the amount of CO_2, CH_4, and N_2O emitted per unit of fuel consumed (e.g., kg CO_2 per litre of diesel).
- **GWP (Global Warming Potential)**: Use the GWP value for the specific GHG, which represents its relative impact compared to CO_2.

Example Calculation:

If a generator consumes 10,000 litres of diesel and the emission factor for diesel is 2.68 kg CO_2 per litre, the emissions are calculated as follows:

$$Emissions = 10{,}000 liters \times 2.68 kg\ CO_2/litre \times 1 = 26{,}800 kg\ CO_2e$$

Note that the GWP of 1kg CO_2 is equivalent to 1kg CO_2e.

Combustion of Fuel in Mobile Vehicles (Mobile Combustion)

Mobile combustion refers to the burning of fuel in vehicles such as cars, trucks, and buses used for transportation purposes.

Calculation Formula:

$$Emissions = \sum Fuel\ Consumption \times Emission\ Factor \times GWP$$

- **Fuel Consumption**: Record the total amount of fuel consumed by the fleet of vehicles during the reporting period (e.g., litres of gasoline and diesel).
- **Emission Factor**: Apply the emission factor specific to the type of fuel used by the vehicles (e.g., kg CO_2 per litre of gasoline).

- **GWP (Global Warming Potential)**: Use the GWP value for the specific GHG, which represents its relative impact compared to CO_2.

Example Calculation:

If the fleet consumes 50,000 litres of gasoline, and the emission factor for gasoline is 2.31 kg CO_2 per litre, the emissions are calculated as follows:

$$Emissions = 50{,}000 liters \times 2.31 kg\ CO_2/litre \times 1 = 115{,}500 kg\ CO_2e$$

Note that the GWP of 1kg CO_2 is equivalent to 1kg CO_2e.

Emissions from Refrigerant Leaks (Fugitive Emissions)

Fugitive emissions occur from the leakage of refrigerants used in cooling systems, such as air conditioning units and refrigerators. These emissions are potent GHGs and are reported under Scope 1.

Calculation Formula:

$$Emissions = Amount\ of\ Refrigerant\ Leaked \times Global\ Warming\ Potential\ (GWP)$$

- **Amount of Refrigerant Leaked**: Measure or estimate the quantity of refrigerant leaked from the system (e.g., kilograms).
- **Global Warming Potential (GWP)**: Use the GWP value for the specific refrigerant, which represents its relative impact compared to CO_2 (e.g., GWP of 1,430 for R-134a).

Example Calculation:

If 100 kg of R-134a (GWP of 1,430) leaks from a cooling system, the emissions are calculated as follows:

$$Emissions = 100kg \times 1{,}430 = 143{,}000 kg\ CO_2e$$

Note that the GWP of 1kg R-134a is equivalent to 1,430kg CO_2e.

Estimation of Refrigerant Leaks

Accurately measuring refrigerant leaks directly can be challenging, particularly in large-scale systems where individual monitoring is impractical. Therefore, CIMB adopts estimation methods to approximate refrigerant leaks. These methods involve using refrigerant top-up data and standard leak rates.

1. **Refrigerant Top-Up Method**

Due to the difficulty of monitoring exact refrigerant leakages, the top-up method is used. This approach estimates the amount of refrigerant leaked by tracking the amount added to the system over a given period.

Calculation Formula:

$$Estimated\ Leak = Refrigerant\ Top\text{-}Up$$

- **Refrigerant Top-Up**: Record the total amount of refrigerant added to the system during the reporting period. This amount is used as an approximation of the refrigerant leak.

Example Calculation:

If 200 kg of refrigerant is added to a system over the reporting period:

$$Estimated\ Leak = 200kg$$

Note that this method is equivalent to the Simplified Material Balance Method as per *USEPA, Greenhouse Gas Inventory Guidance, Direct Fugitive Emissions from Refrigeration, Air Conditioning, Fire Suppression, and Industrial Gases*.

2. **Standard Leak Rate Method**

In cases where monitoring individual refrigerant top-ups is not feasible, especially in large coverage locations with numerous units, a standard leak rate method is adopted. This method uses average leak rates based on typical system performance and maintenance data.

Refrigerant leaks are estimated using the total refrigerant charge of the unit, which can be approximated based on the unit's horsepower. The estimated charge is then multiplied by a standard leak rate percentage to determine the approximate amount of refrigerant leaked.

Calculation Formula:

$$Estimated\ Leak = (Approximate\ Refrigerant\ Charge) \times (Standard\ Leak\ Rate\ Percentage)$$

- **Approximate Refrigerant Charge**: This can be estimated based on the unit's horsepower. For example, a standard assumption might be 0.5 kg of refrigerant per horsepower.
- **Standard Leak Rate Percentage**: A typical percentage used for office split units, which reflects average leakage rates observed in similar systems.

For standard leak rates in refrigeration systems, including office split units, the following source provides industry-standard estimates:

- **IPCC Good Practice Guidelines and Uncertainty Management in National Greenhouse Gas Inventories (2000)**
  Chapter 3, Table 3.22: Provides standardized leak rates for various refrigeration and air conditioning systems. This document is a widely accepted resource for estimating GHG emissions and includes comprehensive guidelines for managing uncertainties in inventories.
- **UK Environmental Reporting Guidelines: Including Streamlined Energy and Carbon Reporting Guidance**

Annex C: Offers guidance on estimating emissions from refrigerants, including typical leak rates for different types of equipment. These guidelines are aligned with best practices in environmental reporting and provide practical examples for calculating emissions.

For typical office split units, CIMB adopts a standard **leak rate of 5% annually**, based on industry benchmarks and historical data from the above sources.

Example Calculation:

If an office split unit has a horsepower of 10 and the approximate refrigerant charge is calculated as follows:

$$\textit{Approximate Refrigerant Charge} = 10\ HP \times 0.5\ kg/HP = 5\ kg$$

Assuming a standard leak rate of 5%:

$$\text{Estimated Leak} = 5\ kg \times 0.05 = 0.25\ kg$$

Note that this method is equivalent to the Screening Method as per *USEPA, Greenhouse Gas Inventory Guidance, Direct Fugitive Emissions from Refrigeration, Air Conditioning, Fire Suppression, and Industrial Gases*.

Scope 2: Indirect Emissions from Energy Consumption

Scope 2 emissions account for indirect GHG emissions from the consumption of purchased electricity, steam, heating, and cooling. Currently, CIMB does not purchase steam, heating, and cooling; hence, these are not included in the Scope 2 calculations. The methodology will be updated if such purchases occur in the future. The Greenhouse Gas Protocol provides two approaches for calculating Scope 2 emissions from purchased electricity: the Location-Based method and the Market-Based method.

Location-Based Method

The Location-Based method calculates emissions based on the average energy generation emission factors for the grids on which energy consumption occurs. This method reflects the emissions intensity of the local grid where the electricity is consumed.

Calculation Formula:

$$\textit{Scope 2 Emissions (Location-Based)} = \sum(\textit{Electricity Consumption} \times \textit{Grid Emission Factor})$$

- **Electricity Consumption**: The total amount of electricity consumed (in kWh or MWh) by the organisation.
- **Grid Emission Factor**: The emission factor (in kg CO_2e/kWh or t CO_2e/MWh) associated with the local electricity grid.

Example Calculation:

- Electricity Consumption: 100,000 kWh
- Grid Emission Factor: 0.5 kg CO_2e/kWh

Scope 2 Emissions (Location-Based) = 100,000 kWh × 0.5 kg CO_2e/kWh = 50,000 kg CO_2e

Market-Based Method

The Market-Based method calculates emissions based on emissions factors that CIMB has specifically chosen (e.g., through purchasing renewable energy certificates, contracts, or supplier-specific emissions rates). This method reflects the emissions associated with the energy CIMB has chosen to procure.

Calculation Formula:

Scope 2 Emissions (Market-Based) = ∑(Electricity Consumption × Supplier-Specific Emission Factor) + ∑(Electricity Consumption × Residual Mix Emission Factor)

- **Electricity Consumption**: The total amount of electricity consumed (in kWh or MWh) by the organisation.
- **Supplier-Specific Emission Factor**: The emission factor (in kg CO_2e/kWh or t CO_2e/MWh) associated with the specific electricity supplier or contract.
- **Residual Mix Emission Factor**: The emission factor (in kg CO_2e/kWh or t CO_2e/MWh) representing the average emissions of the remaining grid electricity that is not covered by specific contracts or renewable energy certificates.

Example Calculation:

- Electricity Consumption from Supplier A: 60,000 kWh
- Supplier A Emission Factor: 0.3 kg CO_2e/kWh
- Electricity Consumption from Supplier B: 40,000 kWh
- Supplier B Emission Factor: 0.6 kg CO_2e/kWh

Scope 2 Emissions (Market-Based) = (60,000kWh × 0.3kg CO_2e/kWh) + (40,000kWh × 0.6kg CO_2e/kWh) = 18,000 kg CO_2e + 24,000 kg CO_2e = 42,000 kg CO_2e

Monitoring Onsite Renewable Energy Generation

To ensure accurate accounting of onsite renewable energy generation, it is essential to monitor and record the energy produced by onsite systems such as Solar PV. This helps in reducing Scope 2 emissions and promotes transparency in reporting renewable energy contributions.

Requirements for Monitoring**:**

1. **Installation of Meters**: Install dedicated meters to measure the electricity generated by onsite renewable energy systems.

2. **Data Recording**: Record the energy generation data periodically (e.g., monthly) to maintain accurate and up-to-date records.
3. **Documentation**: Document the specifications of the renewable energy systems, including capacity, location, and commissioning date.
4. **Reporting**: Include the onsite renewable energy generation data in GHG emissions reports to highlight the contribution to reducing Scope 2 emissions.

Additional Considerations

Data Collection: Ensure accurate data collection for electricity consumption from all relevant facilities and sources. This may include utility bills, meters, and supplier statements.

Emission Factors: Obtain the latest emission factors from credible sources such as:

- Local grid operators or national databases for Location-Based factors.
- Renewable energy certificates (RECs), guarantees of origin (GOs), or contracts for Market-Based factors.

Dual Reporting: According to the GHG Protocol, organisations are required to report both Location-Based and Market-Based Scope 2 emissions to provide a comprehensive view of their electricity-related emissions.

Scope 3: Other Indirect Emissions

Understanding and managing Scope 3 emissions is crucial for CIMB as it provides a comprehensive view of the organisation's carbon footprint, often representing the largest portion of its emissions. This thorough assessment ensures regulatory compliance, meets stakeholder expectations, and supports effective risk management. It enables CIMB to set impactful sustainability goals, drive positive change across its value chain, and enhance its Environmental, Social, and Governance (ESG) performance. By addressing Scope 3 emissions, CIMB demonstrates its commitment to sustainability, operational efficiency, and long-term value creation for stakeholders.

However, not all the categories within Scope 3 are relevant to CIMB. We have provided a table below to indicate the inclusion or exclusion for each category in our Scope 3 calculations. Those that are excluded are accompanied by justification. Note that this table will be revised from time to time as the organisation structure evolves in the future.

Scope 3 Categories Inclusion and Exclusion for CIMB Group

Scope 3 Category	**Included/ Excluded**	**Reason for Exclusion (if applicable)**
Category 1: Purchased Goods and Services	Included	Not Applicable

Scope 3 Category	**Included/ Excluded**	**Reason for Exclusion (if applicable)**
Category 2: Capital Goods	Excluded	This is often included in purchased goods and services. CIMB does not typically engage in the construction of buildings or major renovations that would result in significant capital goods emissions. For example, emissions from office furniture and IT equipment are minimal compared to other sources and are included in Category 1.
Category 3: Fuel- and Energy-Related Activities (not included in Scope 1 or 2)	Included	Not Applicable
Category 4: Upstream Transportation and Distribution	Excluded	Emissions from the transportation and distribution of goods are typically included by our suppliers. Obtaining data specific to the delivery of goods from our tier 1 suppliers is challenging. For instance, emissions from the transportation of office supplies are not significant and are difficult to trace.
Category 5: Waste Generated in Operations	Included	Not Applicable
Category 6: Business Travel	Included	Not Applicable
Category 7: Employee Commuting	Included	Not Applicable
Category 8: Upstream Leased Assets	Included	Not Applicable
Category 9: Downstream Transportation and Distribution	Included	Not Applicable
Category 10: Processing of Sold Products	Excluded	As a bank, CIMB does not produce products that require further processing for use. For example, there are no manufacturing processes that would need to be accounted for in this category.
Category 11: Use of Sold Products	Excluded	CIMB does not produce physical products. Emissions associated with our digital transaction services are covered by Scope 2 if the data centers belong to us, or by Scope 3, Category 1 if we subscribe to services from third-party data centers. For example, online banking services are supported by data centers whose emissions are already accounted for.

Scope 3 Category	Included/ Excluded	Reason for Exclusion (if applicable)
Category 12: End-of-Life Treatment of Sold Products	Excluded	CIMB does not sell products that require end-of-life treatment or disposal. There are no physical goods sold by the bank that would result in disposal emissions.
Category 13: Downstream Leased Assets	Included	Not Applicable
Category 14: Franchises	Excluded	As a bank, CIMB does not operate as a franchise and does not have franchise operations. Therefore, there are no emissions to account for from franchised activities.

Note that Scope 3 – Category 15: Investment is not included in this methodology and is covered by Financed Emission's Supplementary Report issued separately. The approach of each of the Scope 3 categories is provided below.

Category 1: Purchased Goods and Services

Description:

This category includes all upstream (cradle-to-gate) emissions from the production of products and services purchased or acquired by the reporting company in the reporting year. This includes emissions from the extraction of raw materials, the processing of raw materials, and the manufacturing of products up to the point of sale to the reporting company.

Calculation Boundary:

The calculation boundary for this category includes all goods and services purchased by CIMB Group that are relevant to our operations. This encompasses office supplies, IT equipment, outsourced services, and any other goods or services procured to support our business activities.

Exclusions:

Exclusions from this category are minimal but may include insignificant purchases that do not contribute materially to our overall emissions profile, or where data is not available or reliable.

Calculation Methodology:

The calculation methodology involves two primary approaches, i.e. the quantity-based method and the spend-based method.

- The quantity-based method involves collecting data on the quantities of purchased goods and services and applying relevant emission factors to estimate the associated GHG emissions. The emission factors can be obtained from life cycle assessment (LCA) databases or supplier-specific data where available. The general formula used is:

$$Emissions = Quantity\ of\ Goods/Services\ Purchased \times Emission\ Factor$$

- The spend-based method involves using financial expenditure on purchased goods and services and applying relevant emission factors to estimate the associated GHG emissions. The formula for the spend-based method is:

  $$Emissions = Amount\ Spent \times Emission\ Factor\ per\ Unit\ of\ Spend$$

  Emission factors for the spend-based method can be obtained from economic input-output LCA models or industry-average data.

Data Sources:

Data sources for this category include purchase records, invoices, procurement databases, and supplier data. Where specific supplier data is unavailable, industry-average emission factors from LCA databases such as DEFRA may be used. For the spend-based method, financial accounting records are also utilised.

References:

1. GHG Protocol Corporate Value Chain (Scope 3) Standard
2. DEFRA emission factors

Category 2: Capital Goods

Description:

This category includes upstream emissions from the production of capital goods purchased or acquired by the reporting company in the reporting year. Capital goods are final goods that have an extended useful life and are used by the company to produce goods or provide services. Examples include buildings, machinery, vehicles, and equipment.

Calculation Boundary:

The calculation boundary includes all capital goods acquired by CIMB Group, such as IT infrastructure, office furniture, and construction materials for new buildings or major renovations.

Exclusions:

Exclusions may include minor capital goods that do not significantly impact the overall emissions profile, or where obtaining data is impractical.

Calculation Methodology:

The methodology involves identifying all capital goods purchased and applying appropriate emission factors based on their production processes. Emission factors can be sourced from LCA databases or specific studies on capital goods. The formula used is:

$$Emissions = Quantity\ of\ Capital\ Goods\ Purchased \times Emission\ Factor$$

Data Sources:

Data sources include asset registers, procurement records, and supplier information. In the absence of supplier-specific data, industry-average emission factors from LCA databases may be used.

References:

1. GHG Protocol Corporate Value Chain (Scope 3) Standard
2. DEFRA emission factors

Category 3: Fuel- and Energy-Related Activities (Not Included in Scope 1 or Scope 2)

Description:

This category encompasses emissions related to the production of fuels and energy purchased and consumed by the reporting company, not already accounted for in Scope 1 or Scope 2. This includes emissions from the extraction, production, and transportation of fuels consumed, as well as emissions from the generation of electricity, steam, heating, and cooling that are consumed by the reporting company.

Calculation Boundary:

The boundary includes all fuel and energy purchases for CIMB Group's operations, such as electricity, natural gas, and other fuels used for heating and cooling.

Exclusions:

Exclusions are limited and generally pertain to insignificant fuel and energy sources that do not materially affect the total emissions, or where data collection is challenging.

Calculation Methodology:

The calculation involves determining the amount of each fuel and energy source consumed and applying upstream emission factors related to their production and transport. The formula is:

$$\textit{Emissions} = \textit{Amount of Energy/Fuel Consumed} \times \textit{Upstream Emission Factor}$$

Data Sources:

Data sources include utility bills, fuel purchase records, and energy consumption reports. Emission factors are sourced from LCA databases or industry reports.

References:

1. GHG Protocol Corporate Value Chain (Scope 3) Standard
2. DEFRA emission factors

Category 4: Upstream Transportation and Distribution

Description:

This category includes emissions from the transportation and distribution of products purchased by the reporting company in the reporting year, between a company's tier 1 suppliers and its own operations (in vehicles and facilities not owned or controlled by the reporting company). This also includes emissions from third-party transportation and distribution services purchased by the reporting company.

Calculation Boundary:

The boundary covers all logistics activities related to the transportation and distribution of goods purchased by CIMB Group, including domestic and international freight.

Exclusions:

Exclusions may include minor transportation activities that do not significantly contribute to the overall emissions profile or where data is not readily available.

Calculation Methodology:

The methodology requires collecting data on the distances travelled and the modes of transportation used for purchased goods. Emission factors for different transportation modes (road, rail, air, sea) are then applied. The formula used is:

$$Emissions = Distance\ Travelled \times Weight\ of\ Goods \times Emission\ Factor\ per\ Mode$$

Alternatively, an emissions report provided by the logistic company used by our tier 1 suppliers could be adopted.

Data Sources:

Data sources include shipping records, logistics provider data, and invoices. Emission factors are obtained from transportation studies and LCA databases.

References:

1. GHG Protocol Corporate Value Chain (Scope 3) Standard
2. DEFRA emission factors
3. Transportation studies

Category 5: Waste Generated in Operations

Description:

This category includes emissions from third-party disposal and treatment of waste generated in the reporting company's operations in the reporting year. This includes emissions from disposal in landfills, waste-to-energy facilities, and recycling facilities, as well as emissions from waste treatment.

Calculation Boundary:

The boundary includes all waste generated by CIMB Group's operations, including office waste, electronic waste, and other types of waste.

Exclusions:

Exclusions may include minor waste streams that do not significantly impact the total emissions or where data collection is impractical.

Calculation Methodology:

The methodology involves quantifying the amount of waste generated and applying emission factors based on the disposal method. The formula is:

$$Emissions = Amount\ of\ Waste \times Emission\ Factor\ per\ Disposal\ Method$$

We adopted a waste sampling approach, where waste was sampled for at least a month for a particular location and extrapolated to the representative CIMB Group waste based on FTE.

Data Sources:

Data sources include waste management records, contractor reports, and internal waste tracking systems. Emission factors are sourced from waste management studies and LCA databases.

References:

1. GHG Protocol Corporate Value Chain (Scope 3) Standard
2. DEFRA emission factors
3. Waste management studies

Category 6: Business Travel

Description:

According to the GHG Protocol, this category includes emissions from the transportation of employees for business-related activities during the reporting year in vehicles not owned or operated by the reporting company. This includes air travel, rail travel, bus travel, and car travel.

Calculation Boundary:

The calculation boundary for this category includes all business travel undertaken by CIMB Group employees, encompassing air travel, train travel, bus travel, and car rentals. It also includes travel arrangements made through travel agencies or third-party travel services.

Exclusions:

Exclusions may include minor business travel activities that do not significantly contribute to the overall emissions profile or where data collection is impractical.

Calculation Methodology:

The methodology involves collecting data on the distances travelled and the modes of transportation used for business travel. Emission factors for different transportation modes are then applied. The formulas used are:

For air travel:

$$Emissions = Distance\ Travelled \times Emission\ Factor\ per\ Air\ Travel\ Class$$

For other modes of travel (train, bus, car):

$$Emissions = Distance\ Travelled \times Emission\ Factor\ per\ Mode$$

The emission factors can vary based on the travel class for air travel (long, medium, short haul) and the type of vehicle for car travel (e.g., standard car, hybrid, electric).

Data Sources:

Data sources include travel booking records, invoices, travel agency reports, and internal travel management systems. Emission factors are obtained from transportation studies, LCA databases, and industry reports.

References:

1. GHG Protocol Corporate Value Chain (Scope 3) Standard
2. DEFRA emission factors
3. Transportation studies

Category 7: Employee Commuting

Description:

This category includes emissions from the transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting company).

Calculation Boundary:

The calculation boundary for this category encompasses all commuting activities by CIMB employees, including travel by car, public transit (bus, train), bicycle, and walking.

Exclusions:

Exclusions may include minor commuting activities that are difficult to measure accurately or do not significantly contribute to the overall emissions profile.

Calculation Methodology:

The methodology involves using employee commuting surveys to estimate the total distance travelled by employees commuting to and from work. The surveys collect information on the mode of transportation, distance travelled, frequency of commute, and vehicle type. The collected data is then used to apply relevant emission factors for each mode of transportation. The formulas used are:

For car commuting:

$$Emissions = \sum(Number\ of\ Employees \times Commute\ Distance \times Commute\ Frequency \times Emission\ Factor\ per\ Car\ Type)$$

For public transit:

$$Emissions = \sum(Number\ of\ Employees \times Commute\ Distance \times Commute\ Frequency \times Emission\ Factor\ per\ Mode\ of\ Transit)$$

Data Sources:

Data sources include employee commuting surveys, transportation studies, and internal records on employee commuting patterns. Emission factors are sourced from government reports, LCA databases, and transportation studies.

References:

1. GHG Protocol Corporate Value Chain (Scope 3) Standard
2. DEFRA emission factors
3. Transportation studies
4. Government transportation reports

<u>Category 8: Upstream Leased Assets</u>

Description:

This category includes emissions from the operation of assets that are leased by the reporting company (lessee) and not already included in the company's Scope 1 or Scope 2 inventories. This category is relevant for companies that lease assets, such as office buildings, vehicles, or equipment, from other companies.

Calculation Boundary:

The calculation boundary for this category includes all upstream leased assets that CIMB Group leases but does not own or have operational control over. This includes office spaces, equipment, and vehicles leased from third parties.

Exclusions:

Exclusions may include minor leased assets that do not significantly contribute to the overall emissions profile or where data collection is impractical.

Calculation Methodology:

The methodology involves collecting data on the energy consumption and other relevant emissions sources from the upstream leased assets. The collected data is then used to apply relevant emission factors. The formulas used are:

For energy consumption:

$$Emissions = Energy\ Consumption \times Emission\ Factor\ per\ Energy\ Type$$

For other emissions sources (e.g., refrigerants):

$$Emissions = Quantity\ of\ Emissions\ Source \times Emission\ Factor\ per\ Source$$

If detailed data on energy consumption is not available, estimations can be made using proxy data such as equipment energy rating, operating hours, floor space and/or average energy intensity of similar assets.

Data Sources:

Data sources include lease agreements, energy bills, equipment usage records, and communications with landlords or asset owners. Emission factors are sourced from government reports, LCA databases, and industry reports.

References:

1. GHG Protocol Corporate Value Chain (Scope 3) Standard
2. DEFRA emission factors
3. Energy consumption reports
4. Industry standards

Category 9: Downstream Transportation and Distribution

Description:

This category includes emissions from the transportation and distribution of sold products in vehicles and facilities not owned or controlled by the reporting company. This category covers the transportation and distribution of products from the reporting company to the end consumer.

Calculation Boundary:

The calculation boundary for this category includes all downstream transportation and distribution activities for CIMB Group's products and services. This encompasses third-party logistics providers, shipping companies, and distribution centers that handle the delivery of CIMB's products and services to customers.

Exclusions:

Exclusions may include minor transportation activities that do not significantly contribute to the overall emissions profile or where data collection is impractical.

Calculation Methodology:

The methodology involves collecting data on the distance travelled, mode of transportation, and the weight or volume of products transported. The collected data is then used to apply relevant emission factors for each mode of transportation. The formulas used are:

For transportation emissions:

$$Emissions = \sum(Distance\ Travelled \times Weight\ or\ Volume\ of\ Goods \times Emission\ Factor\ per\ Mode\ of\ Transportation)$$

For distribution center emissions:

$$Emissions = Energy\ Consumption\ of\ Distribution\ Centers \times Emission\ Factor\ per\ Energy\ Type$$

If detailed data on transportation and distribution is not available, estimations can be made using proxy data such as average distances, typical transportation modes, and average energy intensity of similar distribution activities.

Alternatively, an emissions report provided by our third-party logistics vendor could be adopted.

Data Sources:

Data sources include transportation contracts, shipping invoices, distribution center energy bills, and communications with logistics providers. Emission factors are sourced from government reports, LCA databases, and industry reports.

References:

1. GHG Protocol Corporate Value Chain (Scope 3) Standard
2. DEFRA emission factors
3. Transportation and logistics industry reports
4. Energy consumption reports

Category 10: Processing of Sold Products

Description:

This category includes emissions from the processing of intermediate products sold by the reporting company by third parties (e.g., manufacturers). This category covers emissions from the further processing or transformation of sold products by downstream entities.

Calculation Boundary:

The calculation boundary for this category includes all downstream processing activities of intermediate products sold by CIMB Group. This encompasses emissions from the energy used and other relevant processes required for further transformation by third-party processors or manufacturers.

Exclusions:

Exclusions may include minor processing activities that do not significantly contribute to the overall emissions profile or where data collection is impractical.

Calculation Methodology:

The methodology involves estimating emissions based on the amount of intermediate products sold and the typical processing activities required for these products. Emission factors for specific processing activities are applied to the estimated amount of processed products. The formulas used are:

For processing emissions:

$$Emissions = \sum(Quantity\ of\ Intermediate\ Products \times Emission\ Factor\ per\ Processing\ Activity)$$

If detailed data on processing activities is not available, estimations can be made using industry averages and typical processing energy intensity.

Data Sources:

Data sources include sales records of intermediate products, industry reports on typical processing activities, and communications with downstream processors. Emission factors are sourced from government reports, LCA databases, and industry standards.

References:

1. GHG Protocol Corporate Value Chain (Scope 3) Standard
2. DEFRA emission factors
3. Manufacturing and processing industry reports
4. Energy consumption reports

Category 11: Use of Sold Products

Description:

This category includes emissions from the use of goods and services sold by the reporting company. This category captures the emissions resulting from the operation of sold products over their expected lifetime, typically including energy use and other activities directly related to product usage.

Calculation Boundary:

The calculation boundary for this category includes all products sold by CIMB Group that have emissions associated with their use. This encompasses financial products and services, electronic devices, and any other products where the use phase generates GHG emissions.

Exclusions:

Exclusions may include minor products or services that do not significantly contribute to the overall emissions profile or where data collection is impractical.

Calculation Methodology:

The methodology involves estimating the emissions based on the expected usage patterns and lifetimes of the sold products. Emission factors for energy use or other relevant activities are applied to the estimated usage. The formulas used are:

For use phase emissions:

$$Emissions = \sum(Quantity\ of\ Products\ Sold \times Average\ Usage\ per\ Product \times Emission\ Factor\ per\ Usage)$$

For financial products and services, emissions can be estimated based on the average energy consumption of digital transactions and related activities.

Data Sources:

Data sources include sales records, product specifications, industry reports on typical product usage, and customer usage data. Emission factors are sourced from government reports, LCA databases, and industry standards.

References:

1. GHG Protocol Corporate Value Chain (Scope 3) Standard
2. DEFRA emission factors
3. Product usage and energy consumption reports
4. Industry standards

Category 12: End-of-Life Treatment of Sold Products

Description:

This category includes emissions from the waste disposal and treatment of products sold by the reporting company at the end of their life. This category captures emissions from activities such as recycling, landfilling, incineration, and composting of sold products.

Calculation Boundary:

The calculation boundary for this category includes all products sold by CIMB Group that result in emissions during their end-of-life treatment. This encompasses products that are disposed of or treated by third parties at the end of their useful life.

Exclusions:

Exclusions may include minor products that do not significantly contribute to the overall emissions profile or where data collection is impractical.

Calculation Methodology:

The methodology involves estimating the emissions based on the quantity of products sold and the typical end-of-life treatment methods. Emission factors for different waste treatment methods are applied to the estimated quantities. The formulas used are:

For end-of-life treatment emissions:

$$Emissions = \sum(Quantity\ of\ Products\ Sold \times Emission\ Factor\ per\ Treatment\ Method)$$

If detailed data on end-of-life treatment is not available, estimations can be made using industry averages and typical disposal methods.

Data Sources:

Data sources include sales records, industry reports on typical end-of-life treatment methods, and communications with waste management providers. Emission factors are sourced from government reports, LCA databases, and industry standards.

References:

1. GHG Protocol Corporate Value Chain (Scope 3) Standard
2. DEFRA emission factors
3. Waste management and recycling industry reports
4. Environmental protection agency reports

Category 13: Downstream Leased Assets

Description:

This category includes emissions from the operation of assets that are owned by the reporting company (acting as lessor) and leased to other entities (lessees) where the emissions are not included in Scope 1 or Scope 2. This category captures emissions from the use of leased buildings, vehicles, machinery, and equipment.

Calculation Boundary:

The calculation boundary for this category includes all leased assets owned by CIMB Group that are operated by other entities. This encompasses emissions from energy consumption and other operational activities associated with these leased assets.

Exclusions:

Exclusions may include minor leased assets that do not significantly contribute to the overall emissions profile or where data collection is impractical.

Calculation Methodology:

The methodology involves estimating the emissions based on the type and use of leased assets. Emission factors for energy use and other relevant activities are applied to the estimated usage of these assets. The formulas used are:

For leased asset emissions:

$$Emissions = \sum(Quantity\ of\ Leased\ Assets \times Average\ Usage\ per\ Asset \times Emission\ Factor\ per\ Usage)$$

For buildings, this could involve estimating energy use based on floor space and typical energy consumption patterns. For vehicles, it could involve estimating fuel consumption based on mileage. For equipment, it could be approximated using data such as equipment energy rating, operating hours, and type of equipment.

Data Sources:

Data sources include lease agreements, records of leased assets, industry reports on typical usage patterns, and energy consumption data. Emission factors are sourced from government reports, LCA databases, and industry standards.

References:

1. GHG Protocol Corporate Value Chain (Scope 3) Standard
2. DEFRA emission factors
3. Building energy consumption reports
4. Vehicle fuel consumption standards
5. Equipment energy consumption reports

Category 14: Franchises

Description:

This category includes emissions from the operation of franchises not included in Scope 1 or Scope 2. This category captures emissions from energy consumption, waste generation, and other operational activities of franchised operations.

Calculation Boundary:

The calculation boundary for this category includes all franchised operations of CIMB Group. This encompasses emissions from energy use, waste management, and other activities that occur within the operational control of the franchisees.

Exclusions:

Exclusions may include minor franchises that do not significantly contribute to the overall emissions profile or where data collection is impractical.

Calculation Methodology:

The methodology involves estimating the emissions based on the type and scale of franchised operations. Emission factors for energy use, waste management, and other relevant activities are applied to the estimated usage within the franchises. The formulas used are:

For franchise emissions:

$$Emissions = \sum(Number\ of\ Franchises \times Average\ Emissions\ per\ Franchise)$$

Alternatively, more detailed data can be used if available:

$$Emissions = \sum(Franchise\ Activity\ Data \times Emission\ Factor)$$

For example, energy use in franchise buildings can be estimated based on floor space and typical energy consumption patterns, while waste generation can be estimated based on operational data from the franchises.

Data Sources:

Data sources include franchise agreements, operational records from franchisees, industry reports on typical usage patterns, and energy consumption data. Emission factors are sourced from government reports, LCA databases, and industry standards.

References:

1. GHG Protocol Corporate Value Chain (Scope 3) Standard
2. DEFRA emission factors
3. Industry reports on franchise operations
4. Environmental protection agency guidelines

Prioritisation of Input Quality for Scope 3 Calculation

The accuracy and reliability of Scope 3 emissions data are crucial for meaningful and actionable GHG reporting. As Scope 3 emissions encompass a wide range of indirect emissions throughout our value chain, the prioritisation of input quality is essential. CIMB adopts a structured approach to prioritise and enhance the quality of input data for Scope 3 calculations, ensuring the integrity and robustness of our GHG inventory.

1. Data Source Hierarchy

CIMB follows a hierarchy of data sources to ensure the highest quality of input data for Scope 3 calculations:

- **Primary Data:** Wherever possible, we prioritise the collection of primary data directly from suppliers, service providers, and internal operations. Primary data provides the most accurate representation of our emissions and includes specific activity data, such as fuel consumption records, business travel distances, and employee commuting surveys.
- **Secondary Data:** When primary data is not available, we utilize secondary data, such as industry averages, emission factors, and proxy data. Secondary data is obtained from reliable sources, including government databases, industry reports, and research studies. While less specific than primary data, secondary data provides a reasonable estimate of emissions based on broader trends and averages.
- **Estimations and Assumptions:** In cases where neither primary nor secondary data is available, we apply estimations and assumptions based on expert judgment and best practices. This approach is used sparingly and is clearly documented to ensure transparency.

2. Supplier Engagement and Collaboration

Collaborating with suppliers and other stakeholders is critical for obtaining high-quality input data. CIMB actively engages with key suppliers to encourage the provision of detailed and accurate emissions data. This includes:

- **Supplier Surveys:** Distributing surveys to collect specific activity data related to the products and services we procure.
- **Training and Awareness:** Providing training and resources to suppliers to enhance their understanding of GHG emissions reporting and the importance of accurate data.
- **Contractual Requirements:** Incorporating data reporting requirements into supplier contracts to ensure compliance and data availability.

3. Continuous Improvement

CIMB is committed to the continuous improvement of our data collection and reporting processes. This includes:

- **Feedback Mechanisms:** Implementing feedback loops to gather insights from internal and external stakeholders on data quality and reporting practices.
- **Data Management Systems:** Utilising advanced data management systems and tools to streamline data collection, storage, and analysis.
- **Periodic Reviews:** Regularly reviewing and updating our data collection methodologies and emission factors to reflect the latest scientific developments and best practices.

4. Transparency and Documentation

Maintaining transparency in our data collection and reporting processes is essential for building trust and credibility. CIMB ensures that all methodologies, data sources, assumptions, and calculations are thoroughly documented and available for review. This includes:

- **Detailed Methodologies:** Providing comprehensive documentation of the methodologies used for calculating emissions for each Scope 3 category.
- **Assumptions and Limitations:** Clearly stating any assumptions made and limitations encountered during the data collection and calculation process.
- **Audit Trails:** Maintaining audit trails for all data inputs and calculations to facilitate external assurance and verification.

Common Emission Factors and References

This section provides general information on the factors that are used in GHG-related calculations.

Hierarchy of Emission Factors

CIMB follows the guidelines provided by the Intergovernmental Panel on Climate Change (IPCC) for selecting and applying emission factors in GHG accounting. The IPCC's guidelines categorize emission factors into three tiers, representing varying levels of complexity and accuracy.

Tier 1: Default Emission Factors

- **Definition**: Tier 1 emission factors are generic, default values provided by the IPCC or other internationally recognised sources. They are the most basic and widely applicable, requiring minimal data.
- **Application**: These factors are used when detailed data specific to the activity or region is not available. They offer a broad estimation based on global averages.
- **Example**: Using a global average emission factor for gasoline combustion in vehicles.

Tier 2: Country-Specific Emission Factors

- **Definition**: Tier 2 emission factors are more specific than Tier 1 and are developed based on country or regional data. They reflect local practices, technologies, and conditions.
- **Application**: These factors are preferred over Tier 1 when national data is available. They provide a more accurate estimation of emissions by incorporating local variations.
- **Example**: Using a country-specific emission factor for electricity generation based on the national energy mix.

Tier 3: Facility-Specific Emission Factors

- **Definition**: Tier 3 emission factors are the most detailed and accurate. They are based on facility-specific data, including direct measurements, detailed process information, and comprehensive analysis.
- **Application**: These factors are used when precise and accurate data is available. They require extensive data collection and analysis but offer the highest accuracy.
- **Example**: Using a measured emission factor from a specific site's fuel combustion process.

Preference and Selection Criteria

1. **Accuracy and Specificity**: CIMB prioritises emission factors in the following order of preference to ensure accuracy and reliability in GHG accounting:
    a. **Tier 3 (Facility-Specific)**: Where practical, feasible, and data is available, CIMB will use facility-specific emission factors to capture the precise emissions profile of our operations.
    b. **Tier 2 (Country-Specific)**: In the absence of facility-specific data, we will use country-specific emission factors that reflect local conditions and practices.
    c. **Tier 1 (Default)**: When neither facility-specific nor country-specific data is available, CIMB will use default emission factors from internationally recognised sources.
2. **Data Availability and Quality**: The choice of emission factors depends on the availability and quality of data. Higher-tier factors are used when detailed and high-quality data is practically and easily accessible.
3. **Regulatory and Reporting Requirements**: CIMB aligns its choice of emission factors with regulatory requirements and best practices in GHG reporting to ensure compliance and credibility.

Global Warming Potential (GWP)

The Global Warming Potential (GWP) is a metric used to compare the ability of different greenhouse gases to trap heat in the atmosphere, contributing to global warming. GWP is expressed as a factor of carbon dioxide (CO_2), which has a GWP of 1. Below are the GWP values for common greenhouse gases as per the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5):

Global Warming Potential (GWP) Values

Greenhouse Gas	GWP (100-year horizon, AR5)
Carbon dioxide (CO_2)	1
Methane (CH_4)	28
Nitrous oxide (N_2O)	265
Hydrofluorocarbons (HFCs)	
$CHCLF_2$ (R22)	1,760
R410A*	1,9235
CH_2F_2 (R32)	677

* R-410A is a member of the hydrofluorocarbon (HFC) class of refrigerants and is composed of equal parts R-32 and R-125.

While the AR6 provides the latest GWP values, the AR5 values are still widely used in the industry and by regulatory bodies, ensuring consistency and comparability with existing GHG inventories and reports. The AR5 values are also well-established, with extensive supporting data and analysis. For consistency in reporting, especially when comparing historical data or adhering to existing regulatory requirements, AR5 values are often preferred. Hence, we maintain the adoption of AR5 GWP for all our calculations.

Reference:

1. https://ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf (Last access on: 19 March 2025)
2. https://www.ipcc.ch/report/ar5/wg1/ (Last access on: 19 March 2025)

Net Calorific Value

Net Calorific Value (NCV), also known as Lower Heating Value (LHV), represents the amount of heat released by the complete combustion of a fuel, excluding the latent heat of vaporization of the water produced during combustion. Essentially, NCV measures the usable energy content of the fuel, making it an important factor in calculating greenhouse gas (GHG) emissions. It is particularly relevant in sectors where fuel combustion is a significant source of emissions, such as in mobile (e.g., vehicle engines) and stationary (e.g., generators) combustion. The default NCV adopted for common fuel types are provided in table below.

Net Calorific Value for Combustion of Fuel

Fuel Type	NCV (TJ/Gg)
Petrol	44.3
Diesel	43.0

These values are taken from the **IPCC Guidelines for National Greenhouse Gas Inventories (2006)** and represent standard values used in the calculation of GHG emissions from fuel combustion.

Reference:

1. https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf (Last access on: 19 March 2025)

Default Emission Factor for Fuel

The Default Emission Factor is a standardised metric used to estimate the amount of greenhouse gases (GHGs) emitted per unit of fuel consumed. It typically covers carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), the three primary GHGs associated with fuel combustion. Emission factors vary based on the type of fuel and the combustion process (mobile vs. stationary), and they are essential for calculating the total GHG emissions from a specific activity.

According to the **IPCC Guidelines for National Greenhouse Gas Inventories (2006)**, the default emission factors for petrol (motor gasoline) and diesel (gas/diesel oil) are as provided in table below.

Default Emission Factors for Combustion of Fuel

Process	Fuel Type	EF (kg CO_2/TJ)	EF (kg CH_4/TJ)	EF (kg N_2O/TJ)
Stationary Combustion	Petrol	69,300	3.0	0.6
	Diesel	74,100	3.0	0.6
Mobile Combustion	Petrol	69,300	3.8	5.7
	Diesel	74,100	3.9	3.9

These emission factors represent average values and are widely used in the estimation of GHG emissions across various sectors. The factors for CO_2 are usually more consistent, reflecting the direct oxidation of carbon in the fuel. However, the emission factors for CH_4 and N_2O can vary significantly depending on combustion conditions. In mobile combustion, for instance, incomplete combustion and the presence of catalytic converters can influence the emissions of CH4 and N2O, leading to higher emission factors compared to stationary combustion.

Reference:

1. https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_3_Ch3_Mobile_Combustion.pdf (Last access on: 19 March 2025)
2. https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf (Last access on: 19 March 2025)

Consideration of Country-Specific Factors

Some countries, such as Indonesia, publish their own fuel emission factors, which may differ from the IPCC defaults. These country-specific EFs take into account local variations in fuel quality, technology, and usage patterns. For instance, Indonesia's Ministry of Environment and Forestry may provide emission factors that are tailored to the country's fuel characteristics and combustion technologies.

When country-specific emission factors are available, they should be used in place of or alongside IPCC default factors to provide more accurate and localized GHG emissions estimates. This practice ensures compliance with local regulations and reflects the actual environmental impact more accurately. The net calorific value and default emission factor for CO_2 for Indonesia is given as below:

Indonesia's Factors for Combustion of Fuel

Fuel Type	NCV (TJ/litre)	EF (kg CO_2/TJ)
Petrol	33×10^{-6}	Bensin RON 92: 72,600 Bensin RON 92: 72,967 Average Petrol: 72,783.50
Diesel	36×10^{-6}	74,433

Reference:

1. https://www.esdm.go.id/assets/media/content/content-kajian-emisi-gas-rumah-kaca-2017.pdf (Last access on: 19 March 2025)
2. https://kemenperin.go.id/download/22128 (Last access on: 19 March 2025)

Derived CO_2-equivalent Emission Factors

Based on the NCV and Emission Factors, the derived CO_2-equivalent emissions factors can be computed for ease of use and integration into GHG emissions calculation. The following table indicates the derived emissions factors based on fuel types.

Derived Fuel Emission Factors

Country	Process	Fuel Type	Fuel Emission Factor (tCO_2e/litre)
Malaysia, Singapore, Thailand, Cambodia	Stationary Combustion	Petrol	0.0023629390
		Diesel	0.0026472278
	Mobile Combustion	Petrol	0.0024096215
		Diesel	0.0026792646
Indonesia	Stationary Combustion	Petrol	0.0024098745
		Diesel	0.0026883360
	Mobile Combustion	Petrol	0.0024552132
		Diesel	0.0027207252

Grid Emission Factors

Grid emission factors (GEFs) are critical for calculating Scope 2 emissions associated with electricity consumption, as they represent the average CO_2 emissions produced per unit of electricity generated and delivered to the grid. These factors vary significantly across countries depending on the energy mix of the grid, such as the proportion of fossil fuels, renewables, and other energy sources.

The latest GEFs are provided in the table below.

Grid Emission Factors

Country	Grid	GEF (tCO_2/MWh)
Malaysia	Peninsular Malaysia	0.774
	Sarawak	0.199
	Sabah	0.525
Indonesia	DKI Jakarta	0.870
	Banten	0.870
	Jawa Barat	0.870
	Jawa Tengah	0.870
	Yogyakarta	0.870
	Sumatera Utara	0.940
	Kepulauan Riau	0.840
	Riau	0.940
	Sumatera Barat	0.940
	Jambi	0.940
	Lampung	0.940
	Bangka Belitung	0.890
	Sumatera Selatan	0.940
	Aceh	0.940
	Jawa Timur	0.870
	Bali	0.870
	Nusa Tenggara Timur	1.030
	Nusa Tenggara Barat	1.610
	Kalimantan Timur	1.140
	Kalimantan Utara	0.480
	Kalimantan Selatan	1.310
	Kalimantan Tengah	1.310
	Kalimantan Barat	1.630
	Sulawesi Selatan	0.950
	Sulawesi Tenggara	1.020
	Sulawesi Utara	0.780
	Maluku	0.660
	Papua	0.590
	Papua Tengah	0.590
Singapore	Singapore	0.412
Thailand	Thailand	0.4999
Cambodia	Cambodia	0.3839

These grid emission factors play a crucial role in calculating the indirect GHG emissions associated with electricity use for CIMB's operations in these countries. They must be reviewed regularly to ensure that the most accurate and up-to-date values are applied in emissions calculations. As countries continue to shift towards more sustainable energy sources, these factors are expected to evolve, potentially reducing the overall carbon footprint of electricity consumption.

Reference:

1. https://meih.st.gov.my/documents/10620/cdddb88f-aaa5-4e1a-9557-e5f4d779906b (Last access on: 19 March 2025)
2. https://gatrik.esdm.go.id/assets/uploads/download_index/files/96d7c-nilai-fe-grk-sistem-ketenagalistrikan-tahun-2019.pdf (Last access on: 19 March 2025)
3. https://www.ema.gov.sg/resources/singapore-energy-statistics/chapter2 (Last access on: 19 March 2025)
4. https://thaicarbonlabel.tgo.or.th/admin/uploadfiles/emission/ts_578cd2cb78.pdf (Last access on: 19 March 2025)
5. https://www.iges.or.jp/en/pub/list-grid-emission-factor/en (Last access on: 11 August 2024)

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