HSBC Asset Management Net Zero Commitment

Methodology

March 2023

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Summary

HSBC Asset Management (HSBC AM) is a signatory of the Net Zero Asset Managers Initiative (NZAM)[1]. This means that as an asset manager, HSBC AM has committed to 'support the goal of net zero greenhouse gas ('GHG') emissions by 2050, in line with global efforts to limit warming to 1.5°C…it also commits to support investing aligned with net zero emissions by 2050 or sooner.'[2] As per the NZAM commitment, we published our initial interim GHG reduction target in November 2022.[3]

This technical supplement provides further detail on the methodology used to define HSBC AM's emissions baseline and decarbonisation target. Throughout this analysis, HSBC AM has aligned its approach to guidance and recommendations from the Task Force on Climate-related Financial Disclosures (TCFD)[4], Partnership for Carbon Accounting Financials (PCAF)[5] and the IIGCC's Net Zero Investment Framework (NZIF).[6]

We recognise that the methodology and data used to assess financed emissions and set targets is new and evolving and we expect industry guidance, market practices, and regulations to continue to change in the coming years. We plan to refine our analysis using credible data sources and methodologies available for the asset classes we invest in.

The TCFD provides a framework for constructing portfolio warming metrics, which involves three key steps:

1. Translating carbon budgets into decarbonisation benchmarks;
2. Assessing company-level alignment and
3. Assessing portfolio-level alignment.

Step 1 - Translating carbon budgets into decarbonisation benchmarks

The aim of this step is to select a decarbonisation benchmark which will support AM in framing its GHG reduction target.

Remaining carbon budgets refer to the maximum amount of global cumulative GHG emissions that can be emitted from a starting date, whilst limiting global warming to a certain temperature level, with a certain probability. A remaining carbon budget can be allocated over time globally, then to countries and sectors, defining global, regional and sectoral annual GHG scenario emissions pathways (i.e., annual emissions evolving over time) consistent with a global temperature target. These GHG emission trajectories, while constrained by the carbon budget chosen,[7] and are shaped by a series of assumptions in terms of technological progress, and socio-economic and policy factors.[8] We note that trajectories for a chosen temperature target are not unique, each of them being the result of different assumptions.[9]

These scenario emissions pathways can also be referred to 'decarbonisation benchmarks'[10], as they describe not only how emissions should evolve in order to comply with the global temperature goal, but also what should be done in terms of adopting technologies, required investments and changes to consumer behaviour. When choosing a decarbonisation benchmark, we also need to decide on the level of granularity (e.g. global or regional levels, sectors)

[1] The Net Zero Asset Managers initiative is an international group of asset managers committed to support the Net Zero goal, and which has more than 300 signatories (as at February 2023).
[2] From the Net Zero Asset Management Commitment in https://www.netzeroassetmanagers.org/commitment/
[3] HSBC AM net zero target announcement available at https://www.assetmanagement.hsbc.co.uk/en/institutional-investor/news-and-insights/on-interim-target-for-nzami
[4] The Task Force on Climate-related Financial Disclosures (TCFD) was created, "to improve and increase reporting of climate-related financial information". The TCFD develops "recommendations on the types of information that companies should disclose to support investors, lenders, and insurance underwriters in appropriately assessing and pricing a specific set of risks—risks related to climate change."
[5] Partnership for Carbon Accounting Financials. PCAF is a global partnership of financial institutions that work together to develop and implement a harmonized approach to assess and disclose the greenhouse gas (GHG) emissions associated with their loans and investments. PCAF enables transparency and accountability and has developed an open-source global GHG accounting standard for financial institutions, the "Global GHG Accounting and Reporting Standard for the Financial Industry."
[6] IIGCC Net Zero Implementation Framework available at https://www.iigcc.org/resource/net-zero-investment-framework-implementation-guide/
[7] In theory, for every year, the sum of individual pathways should not exceed the global pathway value for that year. In other words, the carbon budget needs to be carefully allocated over time and across sectors or country-sectors and companies.
[8] For instance, the International Energy Agency Net zero 2050 scenario pathway, which aims to limit global warming below 1.5 °C above pre-industrial levels, assumes a rapid growth of low-emissions energy supply in the current decade, with related investments reaching nearly 4% of GDP annually in 2030 (against 2% between 2017 and 2021), complemented by important measures to save energy, among other things.
[9] For instance, more than 90 trajectories with the 1.5°C goal have been proposed by the research community.
[10] To note that TCFD uses the term 'benchmark' instead of 'decarbonisation benchmark'. In this document, we use the term 'decarbonisation benchmark' for avoiding confusion with references to market benchmarks.

and on the use of absolute or carbon intensity metrics for reporting on goals. These decarbonisation benchmarks will define the theoretical emissions trajectory that any company should follow to comply with the temperature goals.

Step 2 – Assessing investee/borrower company-level alignment

This step involves comparing the investee/borrower company's GHG emission trajectory (for a given period of time) with a theoretical GHG emission trajectory consistent with a chosen temperature rise target, such as 1.5°C. The theoretical company trajectories are the decarbonisation benchmarks discussed in Step 1.

When looking at the emissions trajectory of a company, we need to make decisions on topics such as:

- Assets to be covered by the analysis, e.g., which assets are in scope?
- The scopes of emissions included, e.g., scope 1 and scope 2 only? Scope 3 inclusion? Partially or totally?
- Sources of current company carbon data and evaluation of the data quality
- Sources of forward-looking data, e.g., how are predictions calculated?
- How to measure alignment, e.g., should the analysis only consider forward-looking data within the alignment measure or also past data?
- How to quantify emissions baselines, e.g., carbon intensity, absolute emissions, financed emissions

Step 3 – Assessing portfolio level alignment

- In this step, we compare the carbon content of the HSBC AM portfolio with the value it would have if it were aligned to the temperature threshold objective (or 'decarbonisation benchmark'), in the chosen scenario at a specific time horizon.
- Here, we need to make decisions on how we aggregate different company metrics and what type of weightings we should use[11].

Considering these three steps, the choices we made are broadly as follows:

- Decarbonisation benchmark pathways are based on the International Energy Agency Net Zero Emissions by 2050 Scenario (IEA NZE), which achieves net zero emissions by 2050 and aims to limit global warming below 1.5°C above pre-industrial levels. HSBC AM's interim targets apply to the 2019-2030 period.
- The assets in scope cover listed equities and corporate bonds. Our choice of focusing on equities and corporate fixed income was driven by the fact there are well-defined approaches for assessing decarbonisation pathways in these asset classes.
- The metric targeted is annual emissions intensity for scope 1 and scope 2 of the HSBC AM portfolio as a whole. For listed companies, the emissions intensity of investee companies is measured by the ratio of emissions/enterprise value including cash (EVIC). For private companies, this is measured by the ratio of emissions / (equity + debt). Scope 3 is not included in the current analysis, however, in the future we intend to incorporate scope 3 targets for high emitting sectors.
- The emissions baseline date is 31 December 2019. 2020 was a year of exceptionally low emissions due to the pandemic and was therefore decided not to be a representative data set. The baseline is quantified with financed emissions (amount of emissions owned by HSBC AM) and carbon intensity.

The detailed rationales for our methodological choices are set out in the following pages of this document.

[11] There are various ways to aggregate company level alignment at the portfolio level. Such portfolio level aggregations tend to be based on either value-weighted or carbon-weighted or carbon-summed of the historical and/or expected pathways. It is worth noting that, independently of our methodological preference, when taking individual fund portfolios or mandates, we may expect that different mandates will require different metrics. We will explore these methodologies over time.

Exhibit 1 - Methodological approach (TCFD)

Methodological Step	Key Judgement	HSBC AM Methodological choices
Step 1: Translating carbon budgets into decarbonisation benchmarks	1. What type of benchmark did we choose?	Net Zero Emissions by 2050 Scenario (NZE) provided by the International Energy Agency (IEA), which aims to limit global warming below 1.5°C above pre-industrial levels
	2. Why was this benchmark scenario selected?	1.5°C scenario that complies with criteria set out by the NZBA Sector specific granularity Update scenarios when refreshed by scenario provider
	3. Absolute emissions vs emissions intensity	Target set using emissions intensity in tCO_2e/$M EVIC
Step 2: Assessing company-level alignment	4. What scope of emissions do we include?	Scope 1 and scope 2 for all sectors
	5. How is our emissions baseline quantified?	PCAF approach
	6. How are forward-looking emissions assessed?	Company targets, company historical trends, industry trends
	7. How is alignment measured?	Both point-in-time and cumulative emissions
Step 3: Assessing portfolio-level alignment	8. How is alignment expressed as a metric?	% emissions intensity reduction by 2030 from a 2019 baseline
	9. How are company-level emissions aggregated?	Weighted average of companies' emissions intensities, using holdings weights

Step 1. Translating scenario-based carbon budgets into decarbonisation benchmarks

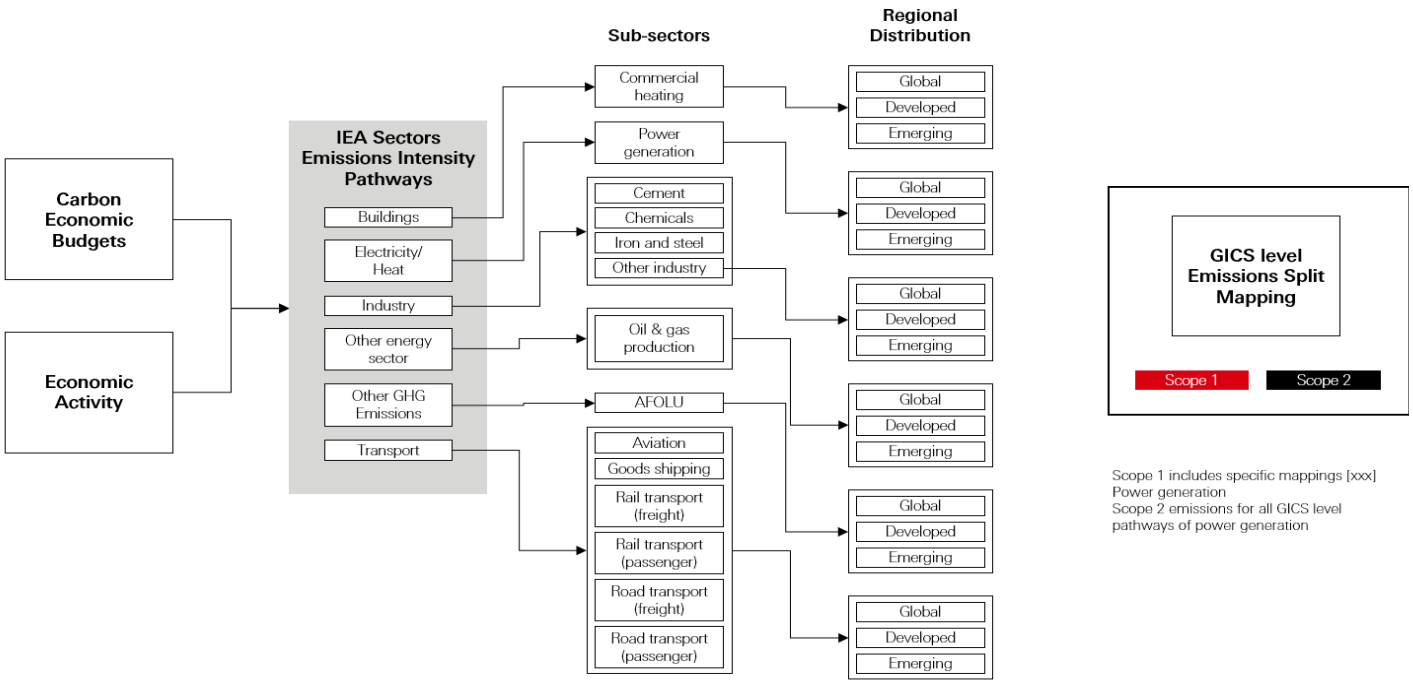
What type of decarbonisation benchmark did we choose?

We are using the Net Zero Emissions by 2050 Scenario (NZE) provided by the International Energy Agency (IEA)[12] as a single-scenario reference benchmark to assess our financed emissions.

The NZE scenario projects energy-related and industrial process carbon dioxide (CO_2) emissions to 2030, in line with a 1.5°C warming outcome with no or low temperature overshoot[13].

In the IEA's analysis, the economy is broken down into five sectors, which can be characterised by their carbon emission profile when producing and/or consuming energy. These are: Electricity/Heat Sectors; Other Energy Sectors; Industry; Transport; and Buildings. These sectors are then broken into sub-sectors,[14] as illustrated in Exhibit 2. The IEA has assessed the sub-sector emissions pathways that are consistent with the necessary reduction in global GHG emissions to reach net zero emissions by 2050. Taking these sub-sector pathways as a starting point, we worked with third-party consultants to construct more granular pathways by region (advanced versus emerging/developing economies). The granular pathways were constructed mainly using IEA assumptions, by sub-industry (following GICS, the Global Industry Classification Standard), and based on proprietary mapping assumptions of sub-sectors on sub-industries.

Exhibit 2 – Construction of decarbonisation benchmark pathways



Source : HSBC Asset Management 2022

[12] IEA (2021)
[13] IPCC (2018)
[14] The final breakdown is: Cement, Iron & Steel, Chemicals, Other Industry, Road Transport Passengers, Road Transport Freight, Rail Transport Passengers, Rail Transport Freight, Aviation, Goods Shipping, Commercial Heating, Power Generation, Oil & Gas Production, AFOLU.

At this stage, our pathways' numbers are limited to the starting point in 2019, and the horizon point of 2030. Setting intermediate targets for selected years between 2019 and 2030, which further defines the 'pathway', will be the object of future work. We also note that HSBC AM's targets might evolve in future given changes in the portfolio structure.

These emission pathways constitute decarbonisation benchmarks, which help us to set targets that align our investments and loans with the goals of the Paris Agreement at a portfolio level, globally.

We chose emissions as the primary marker of transition progress. This is because production-based benchmarks, such as energy usage, energy mix, vehicle sales by category, capex in low-carbon alternatives, etc., only exist for a small number of sectors. Instead, we believe the use of emissions data results in more transparent disclosures and enables year-on-year tracking.

Why was this benchmark scenario selected?

The IEA NZE scenario pathway, which we have selected for the decarbonisation benchmark, builds on previous IEA scenarios which have been used extensively for target setting and portfolio alignment. Choosing this scenario allows us to make comparisons of our portfolio targets with other asset managers who use the same scenario. This approach also aligns to HSBC Group targets, along with providing transparent data, global coverage across developed and emerging markets, and the latest climate science.

This scenario also meets the requirements of our NZAM commitment, which is to align our financing with outcomes consistent with a 1.5°C temperature rise.

In choosing the IEA NZE scenario, we are able to model both absolute emissions and emissions intensity in terms of economic activity. These can be used to construct pathways for most of the sectors which we are targeting.[15]

Key assumptions underpinning the IEA NZE scenario are publicly available.[16] Furthermore, we have focused on a scenario that is peer-reviewed and uses a global energy model to generate sector-by-sector projections.

IEA scenarios make distinctions between sectors, advanced and emerging/developing economies, and in some instances between countries and regions. In our roadmap, we have limited the distinctions within our scenarios to advanced and emerging/developing economies, following IEA assumptions in most instances and our own assumptions in limited cases, discussed with external consultants.

Emissions intensity versus absolute emissions

We report on both absolute financed emissions (following PCAF recommendations) and emissions intensity. Emissions intensity refers to emissions normalised by the company value, either the enterprise values including cash (EVIC) for listed companies, or the sum of the company's total equity plus debt for private companies.[17]

Our 2030 portfolio target is presented in terms of emissions intensity, though we also monitor financed absolute emissions. This is because the ultimate goal of net zero emissions by 2050 is related to absolute emissions.[18]

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[15] For the purpose of high-level aggregation, we only considered one set of scenarios. We acknowledge that there is more than one credible scenario to reach a 1.5°C outcome, so when it comes to implementation in our funds or mandates, we will consider alternative trajectories as long as they are part of credible 1.5°C scenario pathways, in order to provide the flexibility needed for a diverse client typology such as ours.

[16] International Energy Agency (2021), World Energy Model, IEA, Paris

[17] We discuss this concept in more detail in step 2.

[18] We could have a situation where a company's carbon intensity is falling while absolute emissions are not decreasing as required by the net zero goal. The reduction of carbon intensity is explained partly by a higher than expected inflation of the denominator. In this case, our carbon intensity targets will need to decline at a faster rate to ensure the reduction in absolute carbon emissions is consistent with the net zero goal. To translate portfolio emissions intensity reductions to absolute carbon reductions, we will adjust inflation to take out the influence of company value changes and capture the carbon pathway only. The EU climate benchmark regulation proposes an adjustment of the EVIC of every company, following a decrease or increase of the average EVIC of the constituent securities of the benchmark during the last calendar year. The EVIC of each constituent should be adjusted by dividing it by an enterprise value inflation adjustment factor. The latter is calculated by dividing the average EVIC of the benchmark constituents at the end of a calendar year by the average EVIC of the benchmark constituents at the end of the previous calendar year.

There is currently a debate between practitioners on what should be the normalising factor used for measuring emissions intensity: company value, revenues, or physical production. We believe that each of these measures have their advantages and disadvantages, but we chose to align to recommendations given by the Technical Expert Group on Sustainable Finance[19] (TEG) regarding the minimum standards for climate benchmarks[20]. The TEG recommends choosing company value as the normalising factor, and considers this measure to facilitate the comparison of emission intensity across sectors more effectively.

Overall, the measures of carbon intensity collectively have the common objective of adjusting a company's emissions based on its size. Naturally the largest companies will often have the largest footprints, but this does not necessarily imply that these companies are less effective in energy transitioning. As a result, carbon intensity can be seen as a better indicator for company level assessments in comparison to absolute emissions.

For computing future carbon intensities, we make use of the IEA NZE scenario on emissions and sector growth. This is complemented by growth assumptions for advanced and emerging /developing economies' sectors, mostly extracted from IEA data, and a mapping of this information on region sub-industries. We assume that company values grow in line with region sub-industries' growth.

[19] TEG stands for Technical Expert Group on Sustainable Finance, a group set up by the European Commission.

[20] The TEG "believes that using revenues as the denominator in the reporting of carbon intensity allows for the within sector point-in-time comparisons of the ability of corporations to decarbonize their business, generating less GHG emissions per unit of revenue. However, revenue multiples are not comparable across sectors. Market capitalization as a denominator for carbon intensity is only relevant in the case of equity indices. Therefore, administrators of EU Climate Transition and of EU Paris-aligned Benchmarks should use the enterprise value, which encompasses both equity capital and debt. Using Enterprise value as a denominator for the carbon intensity allows for the applicability of the methodology to both equity and/or fixed income investments and does not bias for or against any particular sector. Back tests conducted by TEG members furthermore indicated that enterprise value leads to less index turnover than alternative metrics." Meanwhile, it has been argued that carbon intensity based on revenue can be used for comparing the annual emissions of the company with a measure of annual activity, which may be more effective for tracking emissions against company operations. Carbon intensity based on units of production links emissions to physical production, and it is independent of fluctuations of prices, but these carbon intensities are not comparable across sectors.

Step 2. Assessing company-level alignment

Assessing company alignment means measuring the deviation between a company's GHG emissions (historic and expected) with the emissions benchmark pathways. In this section, after covering the alignment concept, we discuss the company data used, data quality and quantification of the baseline, e.g., the starting point of the analysis of the company.

How is company alignment measured?

Company alignment analysis is the comparison of a company's GHG emissions trajectory, for a chosen period of time, with a theoretical GHG company emission trajectory (or pathway) consistent with a chosen temperature rise target. In this case, the period of comparison is 2019-2030, and the temperature target is 1.5°C. The company's emissions trajectory is made up of both historic and forward-looking data, which is compared with the benchmark decarbonisation trajectory derived from the IEA NZE scenario.

A company's specific emissions trajectory can be aligning (i.e. demonstrating a small deviation) or aligned (demonstrating zero deviation) to the 1.5°C decarbonisation benchmark trajectory.[21] It is also worth noting that alignment is predominately a forward-looking measure, however, alignment to 1.5°C does not guarantee that we will actually observe GHG emission reductions in the future. That being said, it is a good starting point to assess a company regarding its transition to net zero.

As a result, to perform this alignment exercise, we need to assess the theoretical trajectories consistent with a 1.5°C temperature increase globally, and the actual company trajectories:

i. Theoretical trajectories in line with 1.5°C
   - As of today, the estimation of the theoretical pathways per our NZAM interim targets are limited to GHG emissions reductions per region and sub-industry between 2019 and 2030, in line with the IEA NZE scenario.
   - Our plan is to complete this 'long run' assessment with intermediate targets between 2019 and 2030.

ii. Company trajectories
   - We need to collect the information about historical GHG emissions and evaluate forward-looking company GHG emissions.
   - Forward-looking emissions are based on the company's GHG emissions reduction targets whenever available.
   - The availability of Science Based Targets[22] is highly appreciated as they have been subject to science/technology based analysis.
   - If said targets are not available, industry trends or historical past trends of the company are used for forecasting emissions.
   - We obtain company data from external vendors.

In practice, the relative deviation of the total company emissions (historic and projected) and the total theoretical emissions in line with 1.5°C for the chosen horizon is computed. This relative deviation can be translated into a score measuring the degree of misalignment.[23]

[21] This means that the closest theoretical trajectory to the company is the 1.5°C trajectory.

[22] The Science Based Targets initiative was established in 2015 to help companies to set emission reduction targets in line with climate science and Paris Agreement goals. Their seal has become a reference for validation of GHG emission targets set by companies.

[23] For example, the relative deviation between company and theoretical emissions can be converted into a temperature score, using the Transient Climate Response to Cumulative Carbon Emissions (TCRE), a coefficient which relates the change in near surface temperature to cumulative CO2 emissions.

What scope of emissions do we include?

Our current net zero commitment includes scope 1 and scope 2 carbon emissions. Scope 3 is not included at this stage but, in the future, we intend to start incorporating scope 3 into our commitment for high emitter sectors.

GHG coverage

Regarding the different types of GHG measured, we incorporate all greenhouse gases included in the data of our providers, including carbon dioxide (CO_2) and methane (CH_4). These GHG emissions are measured in tonnes of CO_2 equivalent (CO_2e) using the Global Warming Potential framework (see glossary).

Assets under analysis

HSBC AM's analysis is applied on listed equities and corporate bonds, including those from private companies. This choice is due to relatively better data quality for these assets in terms of emissions, and the availability of standardised methodologies for implementing decarbonisation trajectories for these assets.

Collective schemes (such as REITS, investment trusts, stapled securities, index certificates, private equity) and sovereign bonds are excluded. This is due to the lack of market approved methodologies or frameworks for targeting the decarbonisation of these assets. Concerning quasi-sovereign bonds, those with corporate activities (typically utilities and transport) have remained in scope.

Sectoral classification

HSBC AM has used the Global Industry Classification Standard (GICS). GICS was developed by S&P Dow Jones Indices (a leading provider of global equity indices) and MSCI (a premier independent provider of global indices and benchmark-related products and services). The GICS structure consists of 11 sectors, 24 industry groups, 69 industries and 158 sub-industries.

How is HSBC AM's emissions baseline quantified?

To determine our baseline emissions, we used data from 2019. We took into consideration potential distortions to 2020 data resulting from the Covid-19 pandemic.

Attribution factor and financed emissions of investees and borrowers

A financial institution finances emissions through their loans and investments. By measuring financed emissions, a financial institution can understand its impact on climate change.

We account for a portion of the annual emissions of the investee or borrowing company by determining the ratio between our outstanding amount of the company shares or corporate bonds (numerator), and the economic value of the financed company (denominator). The attribution factor relative to a company is given by:

$$Attribution\ factor_i = \frac{Outstanding\ amount_i}{Company\ \ value_i} \qquad i = \text{name of the borrower or investee company} \qquad (1)$$

where the outstanding amount refers to the market capitalisation of outstanding shares or outstanding corporate bonds, e.g. the shares or corporate bonds held by funds or mandates managed by HSBC AM.

Finally, the financed emission of a company *i* for the scope *s* (scope 1, scope 2 and the total) is given by

$$Financed\ emissions_{i,scope\ s} = Attribution\ factor_i \times Emisions_{i,scope\ s}$$

$$= \frac{Outstanding\ amount_i}{Company\ \ value_i} \times Emisions_{i,scope\ s} \quad (2)$$

We calculated the aggregate financed emissions of HSBC AM's listed equity and corporate fixed income portfolios in 2019 and 2030, as detailed in step 3.

Measuring company values

In order to calculate companies' financed emissions, we need to have an assessment of the economic value of the investee or borrowing company.

Company values have been calculated by HSBC AM, based on the financial statements of the companies. This data has been accessed through an external data provider. In line with PCAF recommendations:

- For publicly listed companies, the company value is measured using EVIC (enterprise value including cash). EVIC is defined as the sum of the market capitalisation of ordinary shares and preferred shares at fiscal year-end, the book values of the total debt and minorities' interests and the cash.
- The value for private companies is measured by the sum of total company equity and debt, which can be found on the client's balance sheet, as no market value for equity is available in the case of private companies.
- If total debt or total equity are not available, financial institutions can use the total balance sheet value (i.e. the sum of total equity and liabilities, which is equal to the client's total assets).
- PCAF also reminds the UN's (1992) precautionary principle: "If in doubt, err on the side of the planet not the side of the company"

The latter assertion implies that, in instances where there is doubt regarding the parameters which have been used for calculating financed emissions, the preference would be to overestimate financed emissions as opposed to underestimating them. In particular:

- In some instances, where total debt is readily available, it may be more suitable to use all liabilities for calculating company value (such as for banks or insurance companies). However, in order to be in line with the precautionary principle and PCAF recommendations, we will still use short-term and long-term debt only. This is because producing extremely large company values results in relatively lower carbon intensities and financed emissions.
- For private companies, PCAF specifies that, "In cases where the total company equity value according to the client's balance sheet is negative… the financial institution shall set total equity to 0; this means that all emissions are attributed to debt only, while no emissions are attributed to equity investments."[24]

Current/historic company-level emissions

Sources of emissions data and quality

We obtain data on emissions from external climate data providers. Our main data provider maintains a database of historic company emissions. Emissions data are based on company disclosures, or estimated by the provider in the absence of company reports.

The company-disclosed, non-modelled data used by the provider, "comes from a variety of publicly disclosed sources such as company financial reports (Annual Reports, Financial Statements, 10-K/20-F reports, SEC/regulatory filings)

[24] PCAF (2020).

and environmental data sources (CSR, Sustainability or Environmental Reports, the CDP, EPA filings) in addition to data published on company websites or other public sources."[25]

When data is not disclosed, the provider produces estimates based on their Environmentally Extended Input Output (EEIO) model:

- The model uses data on direct emissions from various distinct industry sectors, like emission intensity factors in units of emissions per dollar of industry output (or company revenue), sourced from national, international, industry and company databases. The provider uses country specific data when possible.
- Emissions from direct operations and the supply chain are based on emission intensity factors combined with the EEIO model parameters. The latter brings information on the ratios of expenditure from one sector within any other sector (one unit of revenue produced by one sector is decomposed in the amount of revenue needed in all other sectors). EEIO parameters are sourced mainly from tables published by the United States Department of Commerce, Bureau of Economic Analysis.

PCAF proposes a methodology for scoring the quality of company GHG emissions data used by financial institutions in their carbon footprint disclosures. Scores of this methodology go from 1 to 5, the lowest number indicating the best quality.

We have evaluated the PCAF quality score for the scope 1 and scope 2 emissions data used in HSBC AM's net zero commitment to be 2.63. This is based on PCAF's data quality which ranges from 1 (highest data quality) to 5 (lowest data quality).

The exhibit below presents a grid describing the PCAF quality scoring methodology.

[25] S&P Global (2019).

Exhibit 3 - PCAF data quality score table

Data Quality	Options to estimate the financed emissions		When to use each option
Score 1	Option 1: Reported emissions	1a	Outstanding amount in the company and EVIC (or equity + debt as relevant) are known. Verified emissions of the company are available
		1b	Outstanding amount in the company and EVIC (or equity + debt as relevant) are known. Unverified emissions calculated by the company are available.
Score 2	Option 2: Physical activity based emission	2a	Outstanding amount in the company and EVIC (or equity + debt as relevant) are known. Reported company emissions are not known. Emissions are calculated using primary physical activity data of the company's energy consumption and emission factors specific to that primary data. Relevant process emissions are added.
Score 3		2b	Outstanding amount in the company and EVIC (or equity + debt as relevant) are known. Reported company emissions are not known. Emissions are calculated using primary physical activity data of the company's production and emission factors specific to that primary data.
Score 4	Option 3: Economic activity	3a	Outstanding amount in the company, EVIC (or equity + debt as relevant), and the company's revenue are known. Emission factors for the sector per unit of revenue are known (e.g., tCO2 e per euro of revenue earned in a sector)
Score 5		3b	Outstanding amount in the company is known. Emission factors for the sector per unit of asset (e.g., tCO2 e per euro of asset in a sector) are known.
		3c	Outstanding amount in the company is known. Emission factors for the sector per unit of revenue (e.g., tCO2 e per euro of revenue earned in a sector) and asset turnover ratios for the sector are known

Source: The Global GHG Accounting & Reporting Standard for the financial industry, PCAF, 2020

Exhibit 4 shows the calculation of the PCAF data quality score for scope 1 and scope 2 financed emissions of HSBC AM's Assets Under Management (AUM) included in the scope of our net zero commitment. This is also taking into account the sources as described by our data provider, and a scoring of these sources using the PCAF scale, according to our interpretation on how to associate the PCAF scores to the different type of disclosures. This score reaches 2.63 based on financed emissions weights by type of disclosure.

Emissions data coming from our external provider account for more than 90% of the HSBC AM portfolio holdings in scope.

Exhibit 4: Breakdown of financed emissions per quality of source

Source of emissions data	PCAF Option	PCAF Score	Financed emissions share %	Holdings weights in %
Exact Value Annual Report/10K/Financial Accounts Disclosure/CDP/Environmental/CSR/Personal communication	1.b	2	40.4%	44.5%
Value summed up/split from Annual Reports/Financial Accounts Disclosure/CDP/Environmental/CSR	1.b	2	6.9%	4.5%
Value derived Annual Report/Financial Accounts Disclosure/CDP/Environmental/CSR/Personal communication	1.b	2	21.5%	25.6%
Value derived by charts/previous year figures	1.b	2	1.6%	2.0%
Value derived from fuel use provided in Annual Report/Financial Accounts Disclosure/CDP/Environmental/CSR	2.a	2	7.3%	1.8%
Estimate based on partial data disclosure in Annual Report/10-K/Financial Accounts/CDP/Environmental/CSR		3	0.2%	0.8%
Estimates not based on disclosures	3.a	4	3.0%	12.1%
HSBC estimate based on Sub-industries	3.a	4	0.6%	0.8%
HSBC estimate Based on sectors (Proxy use)	3.b	5	18.4%	7.9%

PCAF quality score:	
Based on financed emission weights	2.63
Based on holdings weights	2.50

Source: HSBC AM calculations (constructed using data from a third party provider)

Concerning HSBC AM estimates:

- There is a small proportion of holdings (total 0.8%, see row "HSBC AM estimate based on Sub-industries") for which company values and GICS sector classification were available, but data provider emissions data was not available. In this instance, we have estimated the emissions of company *I* by multiplying its company value by the average sub-industry emission intensity (in terms of EVIC), based on available data. Financed emissions are then calculated using equation (2) above.
- For 7.9% of HSBC AM holdings, company values could not be assessed. Note that equation (2) can also be written in the following way:

$$Financed\ emissions_{i,s} = Outstanding\ amount_i \times \frac{Emisions_{i,s}}{Company\ value_i} = Outstanding\ amount_i \times CI_{i,s} \quad (3)$$

where $CI_{i,s}$ = carbon intensity scope s (scope 1, scope 2, total) of investee or borrower, using company value as the denominator.

Using this feature, when data on company value is not available, we use equation (3) for calculating financed emissions, using the average company sector carbon intensity as a proxy of the company carbon intensity.

$$Financed\ emissions_i = Outstanding\ amount_i \times CI_{sector\ company\ i,s} \quad (4)$$

We assign a PCAF score of 5 (i.e. lowest data quality) to these estimates.

Step 3. Assessing portfolio-level alignment

Calculation of the HSBC AM portfolio emissions' baseline

For our 2019 portfolio, we measured the financed emissions and the carbon intensity of the aggregated holdings into four sub-groups:

i. Equities in developed markets,
ii. Equities emerging markets,
iii. Corporate bonds developed markets,
iv. Corporate bonds emerging markets.

We used the information we had in terms of HSBC AM's holdings of equities and corporate bonds as at 2019, and the data on GHG emissions (scope 1 and scope 2), and company values for the borrower/investee companies. The financed emissions of scope s for the group *J* in 2019 are calculated as follows:

$$Financed\ emissions_{J,\ scope\ s,2019} = \sum_{i \in J} Attribution\ factor_{i,2019} \times Emisions_{i,scope\ s,2019} \quad (5)$$

$$= \sum_{i \in J} \frac{Outstanding\ amount_{i,2019}}{Company\ value_{i,2019}} \times Emisions_{i,scope\ s,2019}$$

where:

i = borrower or investee company

s = scope 1, scope 2, scope 1+scope 2

J = equities developed markets, equities emerging markets, corporate bonds developed markets, corporate bonds emerging markets

The aggregated scope *s* carbon intensity for the group *J* in 2019 is given by:

$$Carbon\ intensity_{J,scope\ s,2019} = \frac{\sum_{i \in J} \frac{Outstanding\ amount_{i,2019}}{Company\ value_{i,2019}} \times Emisions_{i,scope\ s,2019}}{\sum_{i \in J} Outstanding\ amount_{i,2019}} \quad (6)$$

Calculation of the HSBC AM portfolio emissions' target

In order to quantify our commitment, based on the IEA NZE scenario, we calculated the financed emissions and carbon intensity of our portfolios in 2030. Financed emissions for the group *J* in 2030 are given by:

$$Financed\ emissions_{J,\ scope\ s,2030} = \sum_{i \in J} Attribution\ factor_{i,2030} \times Emisions_{i,scope\ s,2030} \quad (7)$$

$$= \sum_{i \in J} \frac{Outstanding\ amount_{i,2030}}{Company\ value_{i,2030}} \times Emisions_{i,scope\ s,2030}$$

The aggregated scope *s* carbon intensity for the group *J* in 2030 is given by:

$$Carbon\ intensity_{J,scope\ s,2030} = \frac{\sum_{i \in J} \frac{Outstanding\ amount_{i,2030}}{Company\ value_{i,2030}} \times Emisions_{i,scope\ s,2030}}{\sum_{i \in J} Outstanding\ amount_{i,2030}} \quad (8)$$

The following assumptions have been made:

1. Scope 1 and 2 emissions for every company grow from 2019 to 2030 in line with the decarbonisation benchmark (discussed in section 1): the net zero pathway of the sub-industry that the company belongs to.

2. The outstanding amount and value of any company will grow at the same rate, given by growth of the sub-industry that the company belongs to, in other words, the attribution factor for any company remains the same over time.

How is portfolio alignment measured?

Year-on-year portfolio alignment will be assessed in three ways to take into account both point in time and cumulative emissions, in order to get a more accurate picture of the portfolio emissions profile:

- Through the comparison of the GHG actual portfolio emissions intensity with the targeted portfolio emissions intensity.
- Through the comparison of the GHG actual portfolio financed emissions with the targeted portfolio financed emissions.
- Through the portfolio alignment score, based on the holdings weighted average of the companies' alignment scores, as discussed in the previous section. [26]

[26] For instance, by measuring the portfolio temperature, based on the weighted average of the company temperatures.

Glossary of terms[27]

Adaptation: The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects.

Afforestation: Planting of new forests on lands that historically have not contained forests.

Agriculture, Forestry and Other Land Use (AFOLU): Agriculture, Forestry and Other Land Use plays a central role for food security and sustainable development (SD). The main mitigation options within AFOLU involve one or more of three strategies: prevention of emissions to the atmosphere by conserving existing carbon pools in soils or vegetation or by reducing emissions of methane (CH_4) and nitrous oxide (N_2O); sequestration—increasing the size of existing carbon pools, and thereby extracting carbon dioxide (CO_2) from the atmosphere; and substitution—substituting biological products for fossil fuels or energy-intensive products, thereby reducing CO_2 emissions. Demand-side measures (e.g., by reducing losses and wastes of food, changes in human diet, or changes in wood consumption) may also play a role. FOLU (Forestry and Other Land Use)—also referred to as LULUCF (Land use, land-use change, and forestry)—is the subset of AFOLU emissions and removals of greenhouse gases (GHGs) resulting from direct human-induced land use, land-use change and forestry activities excluding agricultural emissions.

Anthropogenic emissions: Emissions of greenhouse gases (GHGs), aerosols, and precursors of a GHG or aerosol caused by human activities. These activities include the burning of fossil fuels, deforestation, land use changes (LUC), livestock production, fertilization, waste management, and industrial processes

Baseline emissions: reference point against which the GHG emissions of a company or a country, or any chosen aggregate will be compared going forward.

Buildings: The buildings sector includes energy used in residential, commercial and institutional buildings and non-specified other. Building energy use includes space heating and cooling, water heating, lighting, appliances and cooking equipment.

Carbon budget: Climate scientists have found an almost linear relationship between global temperature rise and CO_2 cumulative carbon dioxide emissions since the pre-industrial period. A carbon budget is the maximum amount of cumulative net global anthropogenic carbon dioxide (CO_2) emissions that would result in limiting global warming to a given level with a given probability, taking into account the effect of other anthropogenic climate forcers". When expressed relative to the pre-industrial period it is referred to as the Total Carbon Budget, and when expressed from a recent specified date it is referred to as the Remaining Carbon Budget. When looking at emission pathways scenarios, the area under the emissions trajectory reflects precisely the remaining carbon budget. Carbon budgets may be defined at the global level, national, or sub-national levels. The assessment of remaining carbon budgets differs depending not only on the methodological approach used, but also of the probability which is associated to the carbon budget in terms of temperature threshold associated. For instance, according to the IPCC Sixth Assessment Report, the remaining carbon budget from 2020 onwards is 500 Gt CO_2, for limiting temperature rise to 1.5°C with 50% of probability.

Carbon capture, utilisation and storage (CCUS): The process of capturing CO_2 emissions from fuel combustion, industrial processes or directly from the atmosphere. Captured CO_2 emissions can be stored in underground geological formations, onshore or offshore or used as an input or feedstock to create products.

Carbon footprint: Measure of the exclusive total amount of emissions of carbon dioxide (CO_2) that is directly and indirectly caused by an activity or is accumulated over the life stages of a product.

Carbon dioxide (CO_2): A naturally occurring gas, also a by-product of burning fossil fuels from fossil carbon deposits, such as oil, gas and coal, of burning biomass, of land use changes (LUC) and of industrial processes (e.g., cement

[27] Sources: All definitions referenced in this section have been sourced entirely from the International Energy Agency (IEA) or the Intergovernmental Panel on Climate Change (IPCC)

production). It is the principal anthropogenic greenhouse gas (GHG) that affects the earth's radiative balance. It is the reference gas against which other GHGs are measured and therefore has a Global Warming Potential (GWP) of 1.

Carbon dioxide removal (CDR): Carbon Dioxide Removal methods refer to a set of techniques that aim to remove carbon dioxide (CO2) directly from the atmosphere by either (1) increasing natural sinks for carbon or (2) using chemical engineering to remove the CO2, with the intent of reducing the atmospheric CO2 concentration. CDR methods involve the ocean, land, and technical systems, including such methods as iron fertilization, large-scale afforestation, and direct capture of CO2 from the atmosphere using engineered chemical means.

Carbon intensity: The amount of emissions of carbon dioxide (CO2) released per unit of another variable such as gross domestic product (GDP), output energy use, or transport.

Climate: Climate in a narrow sense is usually defined as the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period for averaging these variables is 30 years, as defined by the World Meteorological Organization. The relevant quantities are most often surface variables such as temperature, precipitation and wind. Climate in a wider sense is the state, including a statistical description, of the climate system.

Climate change: Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use. Note that the United Nations Framework Convention on Climate Change (UNFCCC), in its Article 1, defines climate change as: 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods'. The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition, and climate variability attributable to natural causes.

CO_2-equivalent emission: The amount of carbon dioxide (CO_2) emission that would cause the same integrated radiative forcing, over a given time horizon, as an emitted amount of a greenhouse gas (GHG) or a mixture of GHGs. The CO_2-equivalent emission is obtained by multiplying the emission of a GHG by its Global Warming Potential GWP) for the given time horizon. For a mix of GHGs it is obtained by summing the CO_2-equivalent emissions of each gas. CO_2-equivalent emission is a common scale for comparing emissions of different GHGs but does not imply equivalence of the corresponding climate change responses.

Deforestation: Conversion of forest to non-forest, one of the major sources of greenhouse gas (GHG) emissions.

Emission factor/Emissions intensity: The emissions released per unit of activity.

Emission scenario: A plausible representation of the future development of emissions of substances that are potentially radioactively active (e.g., greenhouse gases, aerosols) based on a coherent and internally consistent set of assumptions about driving forces (such as demographic and socioeconomic development, technological change, energy and land use) and their key relationships.

Energy: The power of 'doing work' possessed at any instant by a body or system of bodies. Energy is classified in a variety of types and becomes available to human ends when it flows from one place to another or is converted from one type into another:

Embodied energy: The energy used to produce a material substance or product (such as processed metals or building materials), taking into account energy used at the manufacturing facility, energy used in producing the materials that are used in the manufacturing facility, and so on.

Primary energy: Primary energy (also referred to as energy sources) is the energy stored in natural resources (e.g., coal, crude oil, natural gas, uranium, and renewable sources). It is defined in several alternative ways. The International Energy Agency (IEA) utilizes the physical energy content method, which defines primary energy as energy that has not undergone any anthropogenic conversion.

Secondary energy: Primary energy is transformed into secondary energy by cleaning (natural gas), refining (crude oil to oil products) or by conversion into electricity or heat.

Final energy: When the secondary energy is delivered at the end use facilities it is called final energy (e.g., electricity at the wall outlet), where it becomes usable energy in supplying energy services (e.g., light).

Renewable energy (RE): Any form of energy from solar, geophysical, or biological sources that is replenished by natural processes at a rate that equals or exceeds its rate of use.

Energy intensity: The ratio of energy uses to economic or physical output

Global warming: Global warming refers to the gradual increase, observed or projected, in global surface temperature, as one of the consequences of radiative forcing caused by anthropogenic emissions.

Global Warming Potential (GWP): An index, based on radiative properties of greenhouse gases (GHGs), measuring the radiative forcing following a pulse emission of a unit mass of a given GHG in the present-day atmosphere integrated over a chosen time horizon, relative to that of carbon dioxide (CO_2). The GWP represents the combined effect of the differing times these gases remain in the atmosphere and their relative effectiveness in causing radiative forcing. Estimates of GWP are periodically compiled, revised, and published in IPCC reports. The last revision dates from 2021, in the IPCC AR6 report.

Greenhouse gas (GHG): Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of terrestrial radiation emitted by the earth's surface, the atmosphere itself, and by clouds. This property causes the greenhouse effect. Water vapour (H2O), carbon dioxide (CO_2), nitrous oxide (N2O), methane (CH4) and ozone (O3) are the primary GHGs in the earth's atmosphere. Moreover, there are a number of entirely human-made GHGs in the atmosphere, such as the halocarbons and other chlorine- and bromine containing substances, dealt with under the Montreal Protocol. Beside CO_2, N2O and CH4, the Kyoto Protocol deals with the GHGs sulphur hexafluoride (SF6), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs).

Heat/electricity sector - Power generation, in the IEA framework: Refers to fuel use in electricity plants, heat plants and combined heat and power (CHP) plants. Both main activity producer plants and small plants that produce fuel for their own use (auto-producers) are included.

International Energy Agency (IEA): Refers to the organization created in 1974 to help coordinate a collective response to major oil supply disruptions. Its mission has evolved since its creation. Taking an all fuels, all technologies approach, the IEA advocates policies to improve the reliability, accessibility and sustainability of energy. The organization examines topics relating to renewable energy, supply and demand for oil, gas and coal, energy efficiency, clean energy technologies, power systems and markets, access to energy, demand management, etc.

IEA NZE scenario: "The Net Zero Emissions by 2050 Scenario (NZE) is a normative IEA scenario that shows a pathway for the global energy sector to achieve net zero CO_2 emissions by 2050, with advanced economies reaching net zero emissions in advance of others. This scenario also meets key energy-related United Nations Sustainable Development Goals (SDGs), in particular by achieving universal energy access by 2030 and major improvements in air quality. It is consistent with limiting the global temperature rise to 1.5 °C with no or limited temperature overshoot (with a 50% probability), in line with reductions assessed in the IPCC in its Sixth Assessment Report.

There are many possible paths to achieve net zero CO_2 emissions globally by 2050 and many uncertainties that could affect any of them; the NZE Scenario is therefore a path, not the path to net zero emissions. Much depends, for example, on the pace of innovation in new and emerging technologies, the extent to which citizens are able or willing to change behaviour, the availability of sustainable bioenergy and the extent and effectiveness of international collaboration. The Net Zero Emissions by 2050 Scenario is built on the following principles:

- The uptake of all the available technologies and emissions reduction options is dictated by costs, technology maturity, policy preferences, and market and country conditions.

- All countries co-operate towards achieving net zero emissions worldwide. This involves all countries participating in efforts to meet the net zero goal, working together in an effective and mutually beneficial way, and recognizing the different stages of economic development of countries and regions, and the importance of ensuring a just transition.
- An orderly transition across the energy sector. This includes ensuring the security of fuel and electricity supplies at all times, minimizing stranded assets where possible and aiming to avoid volatility in energy markets. »[28]

IIGCC: Institutional Investor Group on Climate Change. This organization, with more than 375 members – asset owners and asset managers - organizes different work programs related with climate issues, developed and delivered in collaboration with members. The organization produces, among other things, reports and guides for the sector, the "Net Zero investment framework 1.5°C" being one of the most popular.

Industry, in the IEA framework: This sector includes fuel used within the manufacturing and construction industries. Key industry branches include iron and steel, chemicals and petrochemicals, cement, and pulp and paper. Use by industries for the transformation of energy into another form or for the production of fuels is excluded and reported separately under other energy sector. Consumption of fuels for the transport of goods is reported as part of the transport sector, while consumption by off-road vehicles is reported under industry.

Mitigation (of climate change): A human intervention to reduce the sources or enhance the sinks of greenhouse gases (GHGs).

Other energy sector, in the IEA framework: Covers the use of energy by transformation industries and the energy losses in converting primary energy into a form that can be used in the final consuming sectors. It includes losses by gas works, petroleum refineries, blast furnaces, coke ovens, coal and gas transformation and liquefaction, biofuels production and the production of hydrogen and hydrogen-based fuels. It also includes energy own use in coal mines, in oil and gas extraction, in direct air capture, in biofuels production and in electricity and heat production. Transfers and statistical differences are also included in this category.

PCAF: Partnership for Carbon Accounting Financials. PCAF is a global partnership of financial institutions that work together to develop and implement a harmonized approach to assess and disclose the greenhouse gas (GHG) emissions associated with their loans and investments. PCAF enables transparency and accountability and has developed an open-source global GHG accounting standard for financial institutions, the "Global GHG Accounting and Reporting Standard for the Financial Industry".

Scenario: A plausible description of how the future may develop based on a coherent and internally consistent set of assumptions about key driving forces (e.g., rate of technological change (TC), prices) and relationships. Note that scenarios are neither predictions nor forecasts, but are useful to provide a view of the implications of developments and actions.

Scope 1: It designates the GHG emissions (in tons of CO_2 equivalent) from direct emitting sources owned or controlled by a Company: direct emissions resulting from the combustion of fossil fuels, such as gas, oil, coal, during their process of production.

Scope 2: Company's indirect GHG emissions (in tons of CO_2 equivalent) related to the consumption of electricity, heat or steam necessary to manufacture the product.

Scope 3: All other indirect GHG emissions (in equivalent CO_2 tons) that are not directly linked to the manufacture of the product, but to other stages of the product's life cycle (supply, transport, use, end of life).

Science Based Target (SBTi): The SBTi is an organization which "defines and promotes best practice in science-based target setting. Offering a range of target-setting resources and guidance, the SBTi independently assesses and approves companies' targets in line with its strict criteria" (from SBTi website)

[28] IEA website

TCFD: The Task Force on Climate-related Financial Disclosures (TCFD) was created in "to improve and increase reporting of climate-related financial information". This organization develops "recommendations on the types of information that companies should disclose to support investors, lenders, and insurance underwriters in appropriately assessing and pricing a specific set of risks—risks related to climate change."

TCRE: Transient Climate Response to Cumulative Carbon Emissions. It is the ratio of the globally averaged surface temperature change per unit of CO_2 emitted.

Transport, in the IEA framework: Fuels and electricity used in the transport of goods or people within the national territory irrespective of the economic sector within which the activity occurs. This includes fuel and electricity delivered to vehicles using public roads or for use in rail vehicles; fuel delivered to vessels for domestic navigation; fuel delivered to aircraft for domestic aviation; and energy consumed in the delivery of fuels through pipelines. Fuel delivered to international marine and aviation bunkers is presented only at the world level and is excluded from the transport sector at a domestic level.

X degrees' pathways: Usually refers to CO_2 (equivalent) emissions' trajectories consistent with x degrees of global warming above pre-industrial levels. For example, trajectories consistent with 1.5 ° C warming above pre-industrial levels can be identified under a range of assumptions about economic growth, technological developments and lifestyles. These trajectories are often prepared by the IPCC or the IEA

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