HSBC Holdings plc

Financed Emissions Methodology Update

20.02.2023

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Introduction

The transition to net zero is one of the biggest challenges for our generation. We recognise that our planet urgently needs drastic and lasting action to protect our communities, businesses and the natural environment from the damaging effects of climate change.

Our ability to meet our net zero ambition – to align the financed emissions of our portfolio to net zero by 2050, and to become net zero in our operations and supply chain by 2030 – relies on the pace of change taking place in the real economy and action among a broad set of stakeholders, including policymakers. This will include responsible actions from both HSBC and our clients to address climate change.

This technical supplement provides details of our financed emissions baselining and target setting. In 2021, we started measuring our financed emissions for two emissions-intensive sectors: oil and gas, and power and utilities. On the following pages, we present our updated approach for these sectors and for four additional sectors: cement; iron, steel and aluminium; aviation; and automotive. The analysis to measure financed emissions and portfolio alignment sits alongside other purpose-built models and frameworks for stress testing and risk management, and helps us to measure and evaluate the progress we are making towards our interim sector targets.

Financed emissions link the financing we provide to our customers and their activities in the real economy, helping to provide an indication of the greenhouse gas ('GHG') emissions associated with those activities. They form part of our Scope 3 GHG accounting emissions, which includes emissions associated with the use of a company's products and services.

Our framework for analysing our Scope 3 financedemissions reflects industry recommendations, including guidance from the Glasgow Financial Alliance for Net Zero ('GFANZ'), the Net Zero Banking Alliance ('NZBA'), the Task Force on Climate-related Disclosures ('TCFD'), and the Partnership for Carbon Accounting Financials ('PCAF').

The methodology and data used to assess financed emissions and set targets is new and evolving, and we expect industry guidance, market practice, and regulations to continue to change

We will periodically update our methodology, baselines and targets where needed to reflect real world decarbonisation and the latest development of scenarios which drive our target setting.

Our design choices

Our analysis of financed emissions considers on-balance sheet financing, including project finance and direct lending. We define 'counterparty' as being an individual counterparty to a loan or transaction and "counterparty group" as being a group of connected counterparties.

Scope of analysis

When assessing financed emissions, we focus our analysis on those parts of the sector that we believe are most material in terms of GHG emissions, and where we believe engagement and climate action have the greatest potential to effect change

Sectors and GHG scopes

In 2021, we started measuring our financed emissions for two emissions-intensive sectors: oil and gas, and power and utilities. In 2022, we began measuring the financed emissions for four additional sectors: cement; iron, steel and aluminium; and the transport sectors of automotive and aviation. Due to the low materiality of the aluminium sector's financed emissions within our portfolio, we have combined them with our iron and steel financed emissions. We plan to measure and report progress on an annual basis, and plan to extend our analysis to include shipping, agriculture, commercial real estate and residential real estate in our Annual Report and Accounts 2023 and related disclosures.

Our coverage rationale

Climate impact	Pragmatic	Transparent	Implementable	Communication
We analyse the sectors and parts of the value chain where we believe the majority of emissions are accounted.	We focus on the parts of the value chain where we believe there is a viable roadmap to achieve the financed emissions reductions set in our targets.	Our approach aligns with publicly available net zero pathways and we believe links financing directly to the source of emissions.	Our analysis seeks to use data which is accurate, and that we can use to efficiently track our progress towards net zero.	We seek to align with industry recommendations and guidance to deliver the metrics needed for the banks wider climate agenda.

Figure 1 shows the parts of the value chain and the GHG accounting scopes that are included in our analysis.

Figure 1 - Value chain in scope

Sector	Scope of emissions	Value chain in scope				Coverage of greenhouse gases
Oil and gas	1, 2 and 3	Upstream (e.g. extraction)	Midstream (e.g. transport)	Downstream (e.g. fuel use)	Integrated/diversified	CO_2/methane
Power and utilities	1, 2	Upstream (e.g. generation)	Midstream (e.g. transmission and distribution)		Downstream (e.g. retail)	CO_2
Cement	1 and 2	Upstream (e.g. raw materials, extraction)	Midstream (e.g. clinker and cement manufacturing)		Downstream (e.g. construction)	CO_2
Iron, steel and aluminium	1 and 2	Upstream (e.g. raw materials, extraction)	Midstream (e.g. ore to steel		Downstream (e.g. construction)	CO_2
Aviation	1 for airlines, 3 for aircraft lessors	Upstream (e.g. parts manufacturers)	Midstream (e.g. aircraft manufacturing)		Downstream (e.g. airlines and air lessors)	CO_2
Automotive	1, 2 and 3	Upstream (e.g. suppliers)	Midstream (e.g. motor vehicle manufacture)		Downstream (e.g. retail)	CO_2

Asset classes and products

Our analysis covers financing from the global businesses of Global Banking and Markets ('GBM'), and Commercial Banking ('CMB'), as the sectors and parts of the value chain that we currently include have limited retail exposure.

We calculate on-balance sheet financed emissions using the apportioned value of on-balance sheet financing related to wholesale credit and lending, which includes business loans, trade and receivables finance, and project finance. Internal analysis of on-balance sheet lending products was used to determine which should be qualified for inclusion and which should be excluded.

We only include products for which the typical original term is 12 months or longer, having considered industry guidance[1,2] and consulted with subject matter experts from the business. We exclude products where there is a weak link to production activities. Product types that were excluded include limited recourse receivables finance and trade finance products (import, export, bills). Corporate activities which are not lending products, such as savings and checking accounts, are also excluded. We continue to engage with industry bodies to help formulate our methodology for assessing and measuring financed emissions, and will consider expanding coverage of our analysis as methodologies for new asset classes are published.

We have chosen to defer setting targets for facilitated emissions until the PCAF standard for capital markets is published, which is expected in 2023. We had intended to disclose facilitated emissions data for 2019 and 2020 for the oil and gas, and power and utilities sectors for transparency, as we did last year. However, following internal and external assurance reviews performed during the year, we identified certain data and process limitations and have deferred the publication of our facilitated emissions for 2019 and 2020 for these two sectors while additional verification procedures are performed. We aim to provide these disclosures as soon as practicable in 2023. We continue to monitor the developments in industry standards for the publication of such emissions and associated targets, and, as mentioned above, we will seek to align to the PCAF standard when published. However, we will aim to

[1] Science-Based Targets (2020), Financial Sector Science-Based Targets Guidance Pilot Version.
[2] PCAF (2020). The Global GHG Accounting and Reporting Standard for the Financial Industry. First edition.

provide transparency on our 2019 and 2020 facilitated emissions for the oil and gas, and power and utilities sectors as they become available, which may be in advance of the PCAF standard being available.

GHG coverage

Regarding the different types of GHG measured, we include carbon dioxide (CO_2) and methane (CH_4), measured in CO_2e, for the oil and gas sectors, and CO_2 only for the remaining sectors due to data availability and emissions materiality.

CO_2 exists for a long time in the atmosphere and accounts for more than two-thirds of warming. Most of the other GHGs have shorter lives and cannot be treated with a carbon budget approach in the same way. CH_4 is a significant share of Scope 1 and 2 emissions in oil and gas, mainly due to gas flaring, and so it is within scope. Conversely, power and utilities sector emissions are recorded mostly as CO2, through the combustion of fossil fuels.

CH_4 and CO_2 emissions are aggregated to tonnes of CO_2 equivalent (CO_2e) using the Global Warming Potential ('GWP'[3]) framework detailed by the GHG Protocol .We may analyse CH_4 separately in the future as data and methodologies are made available. .

We do not include avoided emissions in our calculations. These are emission reductions that a financed project produces versus what would have been emitted in the absence of the project (the baseline emissions).

Setting targets

We set interim 2030 targets for sectors based on decarbonisation pathways that are consistent with limiting global warming to 1.5°C with limited overshoot, such as those produced by the International Energy Agency ('IEA') and Intergovernmental Panel on Climate Change ('IPCC'). They provide us with industry specific emissions projections from which we construct benchmark pathways to 2030. The benchmarks allow us to set targets that aim to align the provision and facilitation of finance with the goals and timelines of the Paris Agreement at a portfolio level globally.

For our current targets we have chosen the Net Zero Emissions by 2050 ('NZE') scenario from the IEA (2021 version). It is 1.5°C aligned with limited overshoot and is also a recommended scenario from the NZBA. For certain sectors, further adjustments were made for which we will incorporate additional references and provide more detail in our sector deep dives[4]. We plan to review these target scenarios as they are updated and new Paris-aligned ones are produced.

Alternative, production-based benchmarks only exist for a small number of sectors. Using the scenario emissions projections, we model both absolute and emissions intensity activity figures. These are used to construct intensity pathways with differing rates of decarbonisation for the sectors which we are targeting.

Our approach for HSBC's emissions accounting does not rely on purchasing offsets to achieve any financed emissions targets we set.

Benchmark reference pathways

We have chosen scenarios which meet the criteria shown in Table 2. For each of the sectors, our sector deep dives provide more detail on any adjustments we make to build our sector reference benchmark.

The reference scenarios selected as our benchmarks form part of the analysis developed by the IEA in the World Energy Outlook (WEO). Choosing the IEA NZE by 2050 scenario also allows us to make comparisons of our sector targets with other banks that use the same data to build a reference pathway.

[3] https://ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf
[4] For example, the IEA NZE scenario does not currently provide detail on decarbonisation pathways for agriculture and aluminium

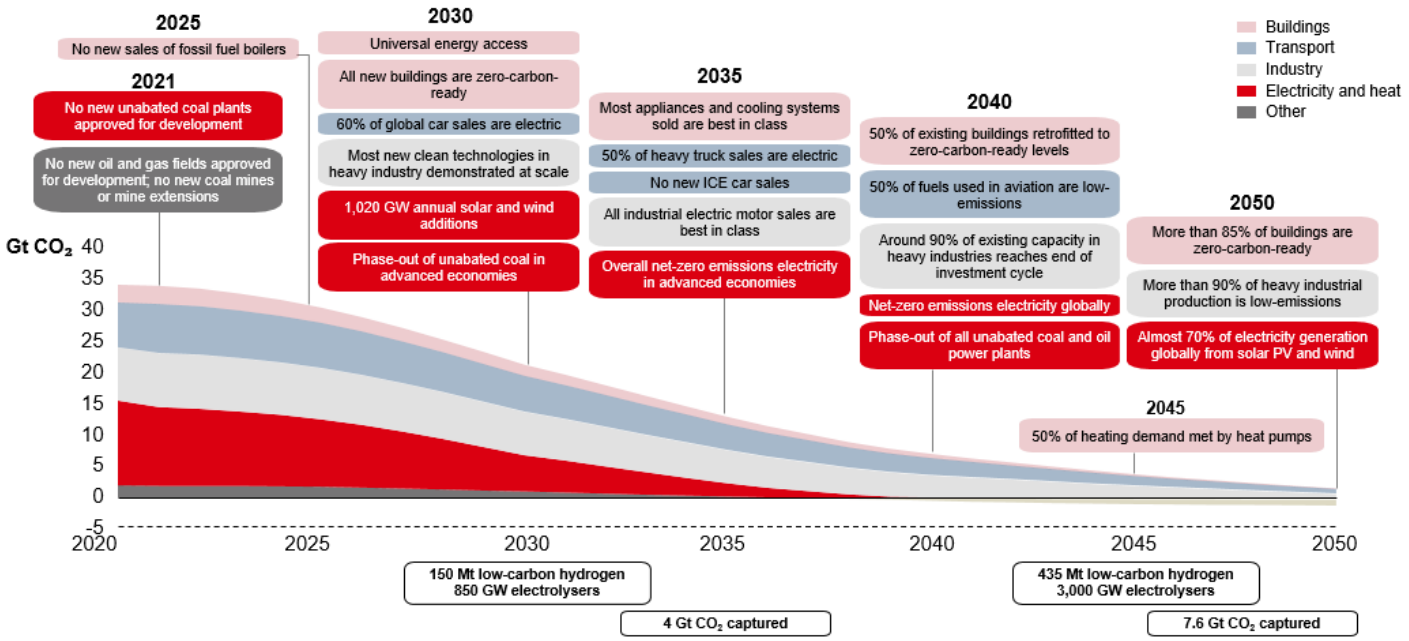
Our choice of reference scenarios	The scenario meets the requirements of our NZBA commitment to align our financing with outcomes consistent with a 1.5°C temperature rise with limited overshoot. The IEA NZE scenario projects energy-related and industrial process carbon dioxide (CO2) emissions to 2030 in line with a 1.5° C warming outcome with no or low temperature overshoot. The scenario has low reliance on negative emissions technologies and we believe has reasonable assumptions on carbon sequestration achieved through nature-based solutions and land use change. Key assumptions underpinning the IEA scenarios are publically available. The scenario is peer-reviewed and uses a global energy model to generate sector-by-sector projections. The IEA's analysis and projections meet these criteria and have been used extensively for target setting and portfolio alignment.

The IEA NZE scenario details more than 400 sectoral and technology milestones to help guide the global journey to net zero by 2050 (see Figure 2 for a selection of the milestones). We remain mindful that this scenario is one of many credible pathways to achieve net zero emissions globally by 2050 and there are many uncertainties that could affect any of these different pathways.

The IEA NZE scenario does not yet include regional disaggregation, requiring us to make assumptions at a regional level within our portfolio. We plan to consult with external scientific and international bodies to inform these assumptions and will continue to monitor the available climate science and industry practice for portfolio alignment as it evolves.

Further details on the NZE scenario are available at www.iea.org/reports/world-energy-model/net-zero-emissions-by-2050-scenario-nze.

Figure 2 – IEA roadmap to net zero by 2050 for the global energy sector



Source: International Energy Agency (2021), World Energy Outlook 2021, IEA

Target metrics

Both absolute financed emissions and financed emissions intensities are assessed in our analysis. We report both metrics for all in-scope sectors but set targets on the most appropriate metric for each sector.

Absolute financed emissions reductions targets are set for fossil fuel extraction. This absolute emissions metric helps preserve a direct link to reducing GHG emissions in the real economy, and allows us to assess our alignment with the NZE scenario.

All other sectors have physical intensity based targets. Physical emission intensity metrics describe the attributed quantity of emissions released per unit of production and vary based on the sector and specific activity data. We use this target metric to help enable climate-positive investment in the real economy by directing capital towards green technologies and transition solutions. This is in line with peers and industry guidance.

Baseline year

We used 2019 data for our financed emissions baseline, having taken into consideration potential distortions caused by the Covid-19 pandemic in 2020.

Sector targets

We have set targets using the following forward-looking metrics (Table 1):

- For oil and gas –on-balance sheet absolute financed emissions percentage reduction target, by 2030 from a 2019 baseline. This is equal to the percentage reduction that the IEA indicates in its scenario for global sector emissions to 2030 from a 2019 baseline.
- For all other sectors –on-balance sheet financed emissions intensity targets, at 2030. Our emissions intensity targets are equal to the global sector average emissions intensity for 2030 set out by the IEA with adjustments made to reflect our portfolio.

Table 1 - Our sector targets

Sector	2030 target	Unit	2030 target	Target scenario
Oil and gas	-34%	Mt CO2e	Absolute	IEA NZE
Power and utilities	138	tCO2/GWh	Intensity	IEA NZE
Cement	0.46	tCO2/t cement	Intensity	IEA NZE
Iron, steel and aluminium	1.05 (1.43)*	tCO2/t metal	Intensity	IEA NZE (MPP)*
Aviation	63	tCO2/million rpk	Intensity	IEA NZE
Automotive	66	tCO2/million vkm	Intensity	IEA NZE

Note: *MPP is shown as an alternative scenario for the steel sector

An evolving process

The methodology and data used to assess financed emissions and set targets is new and evolving. We expect data, industry guidance and market practice to evolve, alongside the climate scenarios deployed to reflect real-world progress in decarbonisation. We plan to refine our analysis using new data sources, methodologies, and 1.5°C degree aligned scenarios available for the sectors we analyse, as well as increase our sector coverage.

Our methodology is based upon the PCAF Standard for estimating financed emissions. However, for particular counterparties it has been necessary to deviate from the Standard. This has generally been due to data availability - in particular for the economic value used in our estimates, production data for particular sectors, and details needed to calculate project specific emissions for our project finance portfolio. As we refine our methodology and approach, we hope to improve data linkages, work with data providers and industry bodies to improve the availability of certain data points, and to collect additional data from companies directly as part of our ongoing engagement process.

As we track financed emissions each year, estimates may be subject to changes to data, movement in our client sector portfolio and financing, changes to company valuations and other market factors. We remain conscious that the attribution factor (see *How we measure financed emissions* for further details) used in the financed emissions calculation is sensitive to changes in drawn amounts or market fluctuations, and that financed emissions figures may not be reconcilable or comparable year-on-year. Our initial set of baselines and targets may require updating as data inputs, assumptions and methodologies evolve over time including updates of scenarios based on real world developments. We plan to report financed emissions and progress against our targets annually and seek to be transparent in our disclosures about the methodologies applied.

We expect our data quality scores to improve over time as clients continue to expand their disclosures to meet growing regulatory and stakeholder expectations. We believe methodologies should be transparent and comparable and provide science-based insights that focus customer engagement efforts, inform capital allocation and help us develop solutions that are both timely and impactful. We are taking steps to establish an ESG data utility to help streamline and support data needs across the organisation. Until our systems, processes, controls and governance are fully developed, certain aspects of our reporting will rely on manual sourcing and categorisation of data – this categorisation of data is not always aligned with the data used in our businesses currently.

Our approach focuses on what we believe to be the most material parts of the sector value chains, and we seek to minimise double counting between the transactions within our portfolio. Double counting occurs when GHG emissions are counted more than once in financed emissions analysis, and cannot be avoided. We remain committed to transparency around our methodology and scope of analysis.

Our targets have been set considering the available carbon budget to limit the long-term increase in average global temperatures to 1.5°C with limited overshoot and the roadmap presented by the IEA NZE by 2050 scenario. Meeting these targets will require a significant ramp-up in renewable power generation as well as a step-change in electric vehicles uptake, energy efficiency

and faster scaling of low-carbon solutions for heavy industry, aviation, shipping and buildings. We recognise that the only way to get on track for net-zero and permanently reduce emissions while maintaining economic growth and rising prosperity is for supply and demand in the energy market to move concurrently in their decarbonisation. That means driving the adoption of low-carbon technology in transport, industry, and buildings that shifts demand away from fossil fuels, at the same time as we rapidly increase the supply of renewables and clean energy. This rapid reorganization of the world's energy and industrial systems will require strong and consistent policy support, and public and private capital to be deployed at scale.

Scenarios used in our analysis are modelled upon assumptions of the available carbon budget and actions that need to be taken to limit the long-term increase in average global temperatures to 1.5°C with limited overshoot. We expect that scenarios will continue to evolve based on assumptions including technology development and/or adoption, shifts in the energy mix, the retirement of assets, behavioural changes and implementation of policy levers, among others. Scenario updates will reflect changes to real economy decarbonisation and scenario developers will continuously improve the usability, accuracy and granularity of their pathways (including the IEA's NZE scenario).

We continue to engage with regulators, standard setters (e.g. PCAF, Science Based Targets initiative ('SBTi'), and, IFRS- Foundation -International Sustainability Standards Board ('ISSB') and industry bodies such as NZBA to help shape our approach to measuring financed emissions and managing portfolio alignment to net zero. We also work with data providers, scientific organizations (e.g. IPCC, IEA) and our clients to gather robust and consistent data from the real economy to improve our analysis.

We have been working to embed financed emissions, considerations into our business decision-making. Our global businesses continue to collaborate with our Sustainability Center of Excellence, Global Risk and Compliance, and Global Finance functions to develop and operationalise our financed emissions approach. Improvements to climate data and analytics solutions are underway. Data and analytics drive the implementation of our net zero strategy and we focus on data-led engagement with clients on developing credible transition plans to net zero.

We recognise that to achieve our climate ambition we need to be transparent on the opportunities, challenges, related risks and progress we make. We will continue to review our approach to our disclosures, with our reporting needing to evolve to keep pace with market developments. The role of standard setters and regulators will be important in achieving standardisation.

Oil and gas

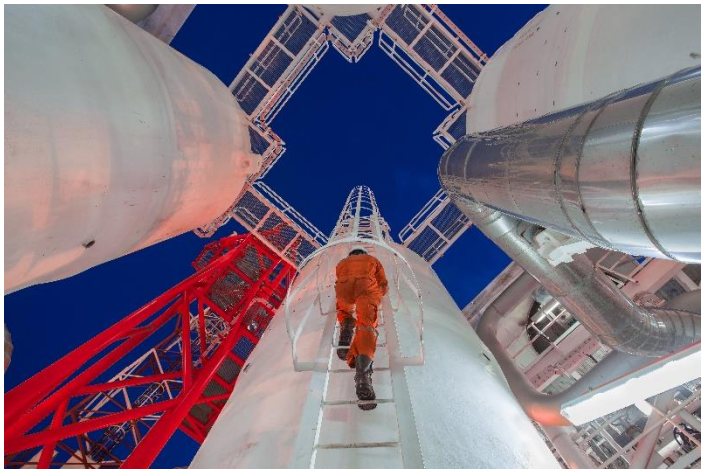


Table 2 - Oil and gas summary

Metric	MtCO2e
Scope	Scope 1, 2 and 3
Value chain focus	Upstream e.g. extraction and Integrated/ Diversified
Target	Absolute, -34% by 2030 from 2019
Scenario	IEA NZE (2021)

Our absolute target set for the oil and gas sector reflects the need to reduce greenhouse gas emissions for this fossil fuel sector in the wider economy. Tracking the physical financed emissions intensity for oil and gas also allows us measure the transition of counterparties relative to the benchmark scenario and each other, irrespective of size or absolute emissions footprint.

Decarbonising the oil and gas sector is an imperative for the economy to transition to net zero by 2050. Emissions from the sector, including Scope 1, 2, and 3, represent between 33-40% of global GHG emissions each year, including approximately 20% of methane emissions. Net zero scenarios from a range of organisations e.g. IEA, Inevitable Policy Response ('IPR'), Network for Greening the Financial System ('NGFS'), and University of Technology Sydney ('UTS'), converge on the need to reduce emissions from the oil and gas sector by 25-35% by 2030 for the economy to be within a 1.5°C aligned pathway.

Value chain and scope

For the oil and gas sector, we cover all scopes for upstream as well as integrated companies to ensure we include the vast majority of CO_2 and CH_4 emissions created by crude oil and natural gas extraction and consumption.

Our analysis covers Scope 1, 2 and 3 emissions[5] for the oil and gas sector. This includes emissions associated with the use of oil and gas products as a fuel source. By focusing on upstream and diversified energy producers, and including Scope 3 GHG emissions we believe we are accounting for the majority of emissions across the sector[6, 7, 8, 9].

We have excluded midstream (e.g. processing, storing and transportation of crude product) and downstream (e.g. distribution) companies within the oil and gas sectors in order to limit double counting within the

[5] World Resources Institute (2015), The GHG Protocol - A Corporate Accounting and Reporting Standard, USA
[6] International Energy Agency (2018), CO2 Emissions from Fuel Combustion 2018, IEA, Paris.
[7] International Energy Agency (2018), World Energy Outlook 2018, IEA, Paris
[8] McKinsey & company (2020), https://www.mckinsey.com/industries/oil-and-gas/our-insights/the-future-is-now-how-oil-and-gas-companies-can-decarbonize
[9] PACTA (2020), PACTA for Banks Methodology Document, Version 1.1.0

sector level analysis and to concentrate engagement with customers whose products contribute most to GHG emissions in the global economy.

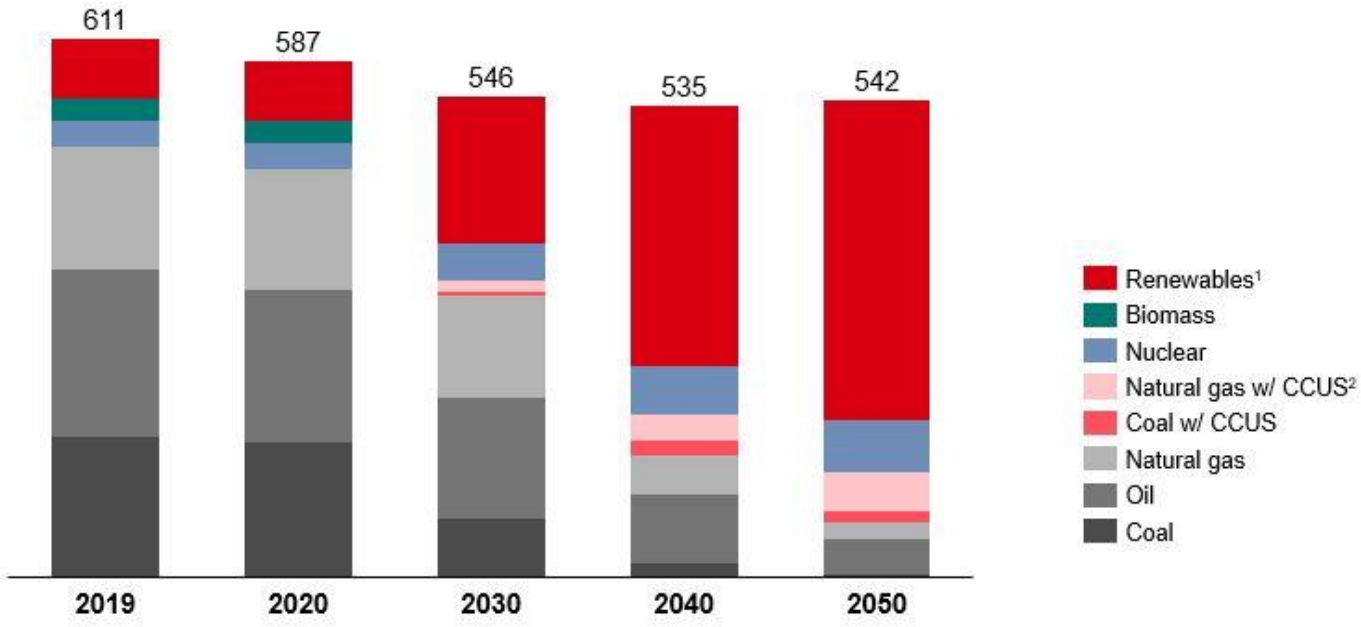
Reference scenario

In line with the IEA NZE by 2050 scenario we target an absolute reduction of 34% in on-balance sheet financed emissions ('Mt CO2e') by 2030, using 2019 as our baseline. We believe decarbonising the energy system, and therefore our ability to meet our targets, requires electrification of the economy, combined with a shift from consuming fossil fuels towards the use of more renewable electricity and alternative fuels.

This needs to occur alongside decarbonising oil and gas supply as much as possible, given that oil and gas still has a role to play in 1.5°C pathways in the decades to, and beyond, 2050. Oil and gas production with carbon abatement is expected to support non-energy use of oil (e.g. plastics, other chemicals), and will continue to be used in sectors where technology options are scarce. Mitigating methane emissions, clean energy powered operations, and the use of carbon abatement technologies will be critical here. Figure 3 shows the development of energy sources according to the IEA NZE scenario. We recognize that the supply and demand side of the energy market need to move concurrently. That means driving the adoption of zero-carbon technology in transport, industry, and buildings that shifts demand away from fossil fuels, at the same time as we rapidly increase the supply of renewables and clean energy.

Our current reference scenario is updated on a regular basis and is one of many possible pathways.

Figure 3 - Total primary energy demand, IEA NZE (EJ)



Source: International Energy Agency (2021), World Energy Outlook 2021, IEA

[1] Renewables include solar, wind, hydro, biofuels, and other renewables

[2] Carbon Capture Utilisation and Storage

Power and Utilities

Table 3 - Power and utilities summary

Metric	tCO2 per GWh[10]
Scope	Scope 1 and 2
Value chain focus	Upstream e.g. generation
Target	Intensity, 138 tCO2/GWh by 2030 from 2019
Scenario	IEA NZE (2021)

For the power and utilities sector we set an emissions intensity metric. This helps to reflect the reality that over the next decade electrification of transport, heating and other activities is central to the decarbonisation of these systems, and will drive a corresponding increase in electricity demand. Over time, as clean energy sources make up more of the energy mix of the grid around the world, global GHG emissions will decouple from electricity demand. This will require rapid scaling up of investment and financing for renewable and other low emission sources of electricity to meet demand from increased electrification. Monitoring our progress using an emissions intensity metric for the power and utilities sector allows us to account for the anticipated increase in demand for electricity as electrification occurs, and the need to rapidly grow the proportion of renewable energy in electricity generation.

Value chain and scope

For the power and utilities sector, our analysis focused on upstream (e.g. power generation) companies. Midstream (e.g. transmission and distribution) and downstream (e.g. retail) companies are excluded from our scope. We believe power generation is where the majority of sector emissions occur through their use of fossil fuels (oil, gas and coal) as a source of energy.

For power generation companies, we focus on Scope 1 and 2 GHG emissions. In analysing the power and utilities sector, we did not take account of upstream Scope 3 GHG emissions because we believe them to be less material. We believe upstream power producers have the most potential to reduce GHG emissions by shifting to renewables and other sources of low-emissions power generation.

We have included coal-fired power within our power and utilities portfolio but will report progress against our thermal coal-fired power policy baseline and targets separately. We recognise that there is some double counting of financed emissions using this approach but

[10] TWh = terawatt hour = 1000000000kWh

coal focused targets should help to accelerate the reduction of coal related emissions.

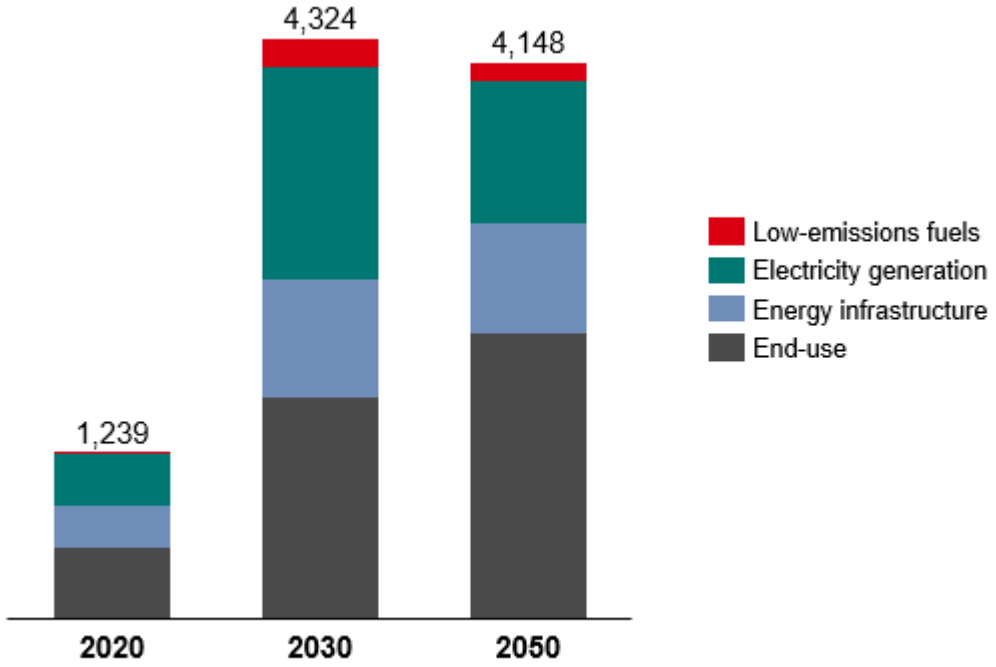
Reference scenario

For this sector, we also follow the IEA NZE by 2050 scenario and target an on-balance sheet financed emissions intensity of 138 tonnes of carbon dioxide equivalent per gigawatt hour ('tCO2/GWh') by 2030, using 2019 as our baseline.

The power and utilities sector is expected to expand significantly as the electrification of transport, heating and other activities will drive an increase in electricity demand. To help enable this growth and ensure that this is done with low emission sources of electricity, we have chosen an intensity target. Financing for renewable energy will need to scale up at an unprecedented rate to decarbonise the power and utilities sector (see Figure 4).

Our current reference scenario is updated on a regular basis and is one of many possible pathways.

Figure 4 - Total Clean Energy Investment, IEA NZE (billion USD)



Source: International Energy Agency (2021), World Energy Outlook 2021, IEA

Cement

Table 4 - Cement summary

Metric	tCO2 per tonne of cement
Scope	Scope 1 and 2
Value chain focus	Midstream e.g. clinker and dement manufacturing and Downstream e.g. construction
Target type	Intensity, 0.46 tCO2/t cement by 2030 from 2019
Scenario	IEA NZE (2021)

For the cement sector we set an emissions intensity metric. For the decarbonisation of cement production large-scale investments in new technologies such as clinker substitution, alternative fuel use, and carbon capture, usage and storage ('CCUS') technologies are required to reduce fuel and process emissions. An emissions intensity metric for the cement sector allows us to work with clients and account for the anticipated increase in capital investments required for rapid decarbonisation.

Value chain and scope

For the cement sector, we included scopes 1 and 2 of the midstream (e.g. clinker and cement manufacture) companies in the value chain. We believe the majority of emissions come from cement-manufacturing, particularly the emissions associated with the sintering process. There are investable opportunities in decarbonising cement manufacturing, including supporting electrification and carbon capture, usage and storage ('CCUS') technologies on manufacturing and we believe focusing on the financed emissions of these companies links our financing most directly to the source of emissions. The upstream emissions of this sector will be covered when we expand our coverage to include the mining sector in the coming years.

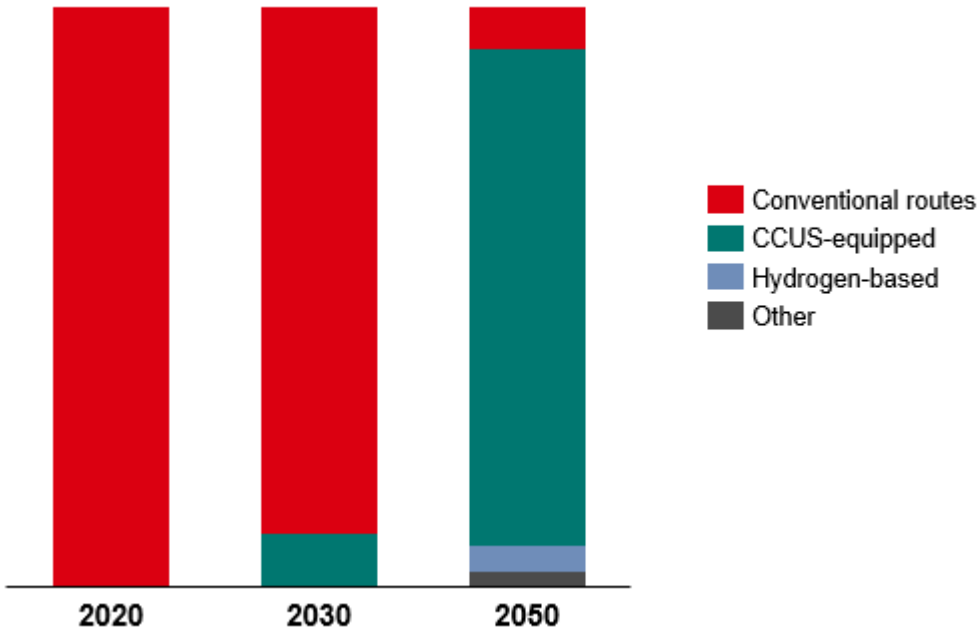
Reference scenario

In line with the IEA NZE by 2050 scenario, we target an on-balance sheet financed emissions intensity of 0.46 tonnes of carbon dioxide per tonne of cement ('tCO2/t cement'), using 2019 as our baseline.

Some emission reductions can be achieved through energy efficiency. However, to significantly reduce fuel and process emissions from cement manufacturing, large-scale investments are required in new technologies, such as clinker substitution, alternative fuel use, and carbon capture use and storage (see Figure 5).

Our current reference scenario is updated on a regular basis and is one of many possible pathways.

Figure 5 - Global industrial production of cement by production route, IEA NZE (%)



Source: International Energy Agency (2021), World Energy Outlook 2021, IEA

Iron, steel and aluminium

Table 5 - Iron, steel and aluminium summary

Metric	tCO2 per tonne of metal
Scope	Scope 1 and 2
Value chain focus	Midstream e.g. ore to steel
Target type	Intensity, 1.05 tCO2/t metal by 2030 from 2019 (1.43tCO2/t metal for MPP)
Scenario	IEA NZE (2021) and MPP as alternative)

We have combined our analysis of iron, steel and aluminium owing to the relatively small size of our aluminium portfolio.

For the iron, steel and aluminium sector we set an emissions intensity metric. For the decarbonisation of iron, steel and aluminium production large-scale investments in increased efficiency, use of scrap as well as new technologies are required to reduce fuel and process emissions. An emissions intensity metric for the iron, steel and aluminium sector allows us to work with clients and account for the anticipated increase in capital investments required for rapid decarbonisation.

The combination of sectors was done as an attributed production-weighted average of emissions intensity by tonne of metal (steel or aluminium). As this sector becomes a more material part of our portfolio we will look to refine this methodology.

Value chain and scope

For the iron, steel and aluminium sector, we focused on scope 1 and 2 emissions from the midstream (e.g. steel manufacturing, and the energy and raw materials used in aluminium smelting). Investable opportunities in aluminium largely relate to the use of energy, so we believe improving energy efficiency and transitioning from fossil fuels to renewables is the primary way to decarbonise. In steel, we believe there are also investable opportunities in steel manufacturing, including supporting electrification and CCUS.

Reference scenario

For the iron, steel and aluminium sector, we target an on-balance sheet financed emissions intensity of 1.06 tonnes of carbon dioxide per tonne of metal ('tCO2/t metal'), using 2019 as our baseline. We use the IEA NZE by 2050 scenario as our core target scenario, and have included the net zero-aligned Mission Possible Partnership ('MPP') Technology Moratorium as an alternative scenario.

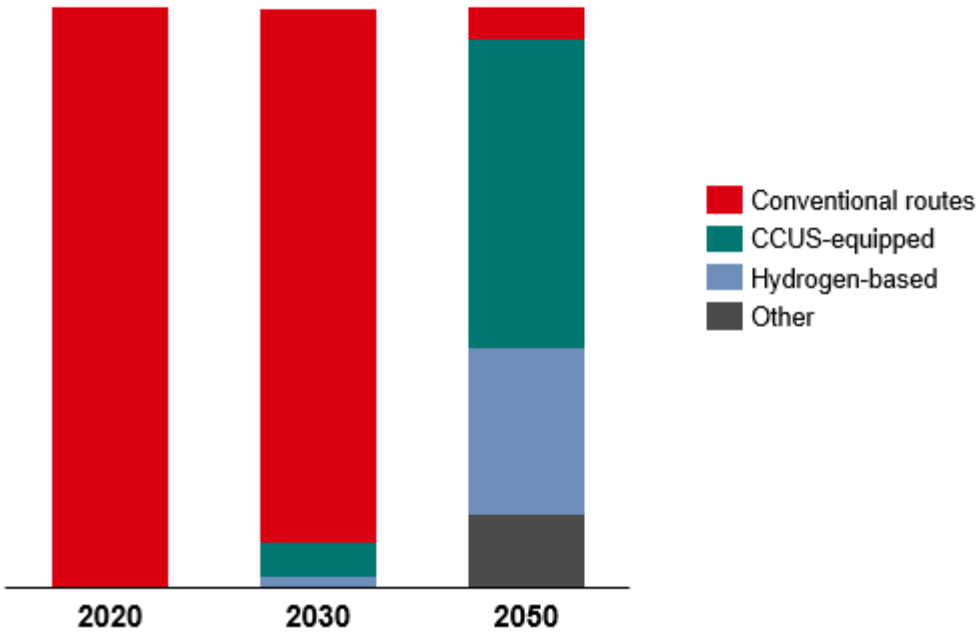
We recognise that for these so-called 'hard-to-abate' sectors, a 1.5C pathway is dependent on strong policy

support to unlock widespread investment and the scaling up of crucial nascent technologies. Given the uncertainty around future policy and regulatory support, we will continue to monitor the progress in real economy uptake of low-carbon technologies this decade, and assess real economy progress against the IEA versus MPP scenarios.

Figure 6 shows the expected share of production routes for steel under the NZE scenario and includes the adoption of low carbon technologies such as hydrogen-based reduction and carbon capture, usage and storage ('CCUS').

Our current reference scenario is updated on a regular basis and is one of many possible pathways.

Figure 6 - Global industrial production of steel by production route, IEA NZE (%)



Source: International Energy Agency (2021), World Energy Outlook 2021, IEA

Aviation

Table 6 - Aviation summary

Metric	tCO2 per million revenue passenger kilometre
Scope	Scope 1 for airlines, 3 for aircraft lessors
Value chain focus	Midstream e.g. aircraft manufacturing and Downstream e.g. airlines and air lessors
Target type	Intensity, 63 tCO2/million rpk by 2030 from 2019
Scenario	IEA NZE (2021)

For the aviation sector we set an emissions intensity metric. For the decarbonisation of the aviation sector significant investments in alternative fuels and new aircraft will be required to reduce emissions. An emissions intensity metric for this sector allows us to work with clients and account for the anticipated increase in investments required for rapid decarbonisation.

Value chain and scope

For the aviation sector, our analysis includes scope 1 for airlines and scope 3 aircraft lessors emissions, and focuses on the midstream (e.g. aircraft manufacturing) and downstream (e.g. airlines and aircraft lessors) companies in the value chain. We have prioritised scope 1 emissions from airlines and scope 3 from aircraft lessors to focus action on the use of lower emissions aviation fuels and different propulsion systems for new aircraft[11]. We believe the bulk of the aviation sector emissions come from flying planes and jet fuel combustion.

[11] This is a deviation from the PCAF guidance to report GHG scopes 1 and 2 across sectors.

Reference scenario

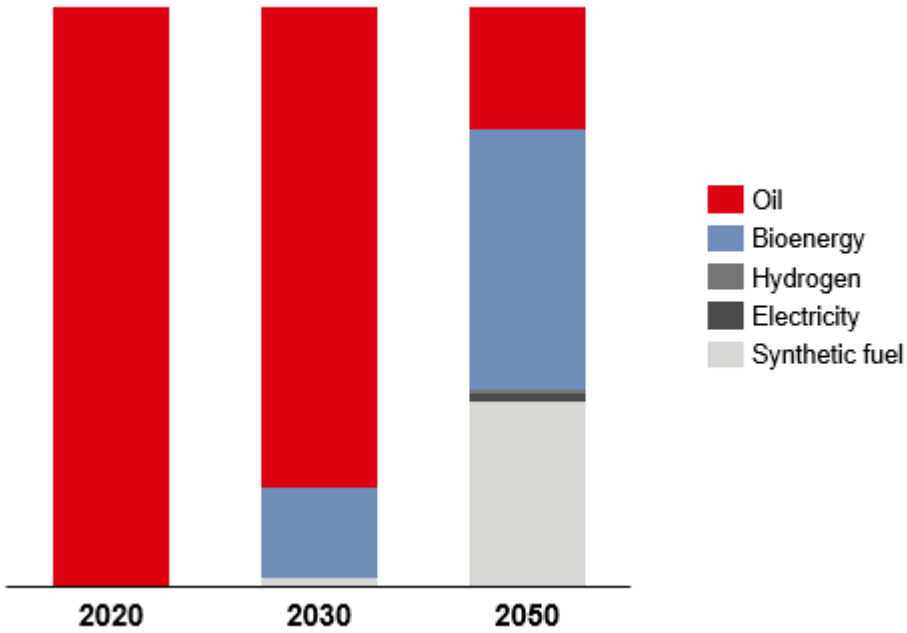
As per the IEA NZE by 2050 scenario, we target an on-balance sheet financed emissions intensity of 63 tonnes of carbon dioxide per million revenue passenger kilometre ('tCO2/rpk'), using 2019 as our baseline. We modified the IEA NZE by 2050 scenario to produce a global emissions intensity reference pathway for the scope of our analysis. It was adapted to exclude military and dedicated cargos from the pathway.

Decarbonisation options are currently limited to the use of alternative fuels in this sector. These can be produced from biomass sources or synthetically to produce Sustainable Aviation Fuel or SAF, but are costly and in limited supply and will therefore take time to increase in market share (see Figure 7). Without any near-term cost effective decarbonisation options, the NZE scenario assumes an increase in absolute emissions in the short-term whilst new technologies mature.

To reach our target intensity levels, and help meet our targets, we believe the sector needs significant policy support investments into alternative fuels, such as sustainable aviation fuel, and new aircraft to reduce emissions. Since these options are not commercially available yet the industry's decarbonisation efforts are highly dependent on partnerships between energy companies, airlines and aircraft manufacturers.

Our current reference scenario is updated on a regular basis and is one of many possible pathways.

Figure 7 - Global energy consumption by fuel in aviation, IEA NZE (%)



Source: International Energy Agency (2021), World Energy Outlook 2021, IEA

Automotive

Table 7 - Automotive summary

Metric	tCO2 per million vehicle-kilometer
Scope	Scope 1, 2 and 3
Value chain focus	Midstream e.g. Motor vehicle manufacture
Target type	Intensity, 66 tCO2/million vkm by 2030 from 2019
Scenario	IEA NZE (2021)

For the automotive sector we set an emissions intensity metric. For the decarbonisation of the auto sector large-scale investments in new vehicle and battery manufacturing plants are required to reduce emissions. An emissions intensity metric for the automotive sector allows us to work with clients and account for the anticipated increase in capital investments required for rapid decarbonisation.

Value chain and scope

For the automotive sector, we look at scope 1, 2 and 3 emissions from the manufacturing of vehicles, and tank-to-wheel exhaust pipe emissions for light-duty vehicles. We excluded heavy-duty vehicles from our analysis following industry practice and peers. We will consider including them at a later stage of our analysis as data and methodologies develop.

We believe vehicle manufacture drives downstream emissions through the types of vehicles produced and sold, and that they have most control over CO2 emissions and the technology mx (i.e. internal combustion engines, electric vehicles or hybrid vehicles.) Supporting investment in electric vehicle manufacturing is a clear lever that HSBC can deploy to help enable sectoral decarbonisation.

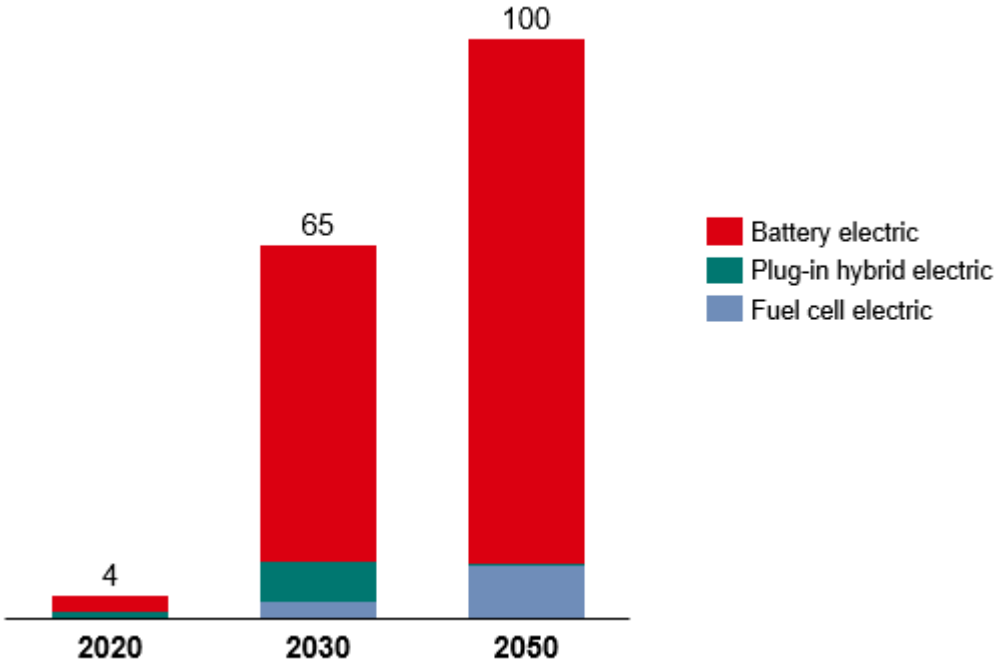
Reference scenario

We target an on-balance sheet financed emissions intensity of 66 tonnes of carbon dioxide per million vehicle kilometre ('tCO2/million vkm'), using 2019 as our baseline. This is in line with the IEA NZE by 2050 scenario. We modified the IEA NZE scenario to isolate light-duty vehicles and produce a global emissions intensity reference pathway based on the share of sales by technology.

We believe decarbonisation of the automotive sector, and therefore our ability to meet our targets, needs large-scale investments in new electric vehicle and battery manufacturing plants, widespread charging infrastructure, and government policies to support electric vehicles and end sales of new internal combustion engine cars. See Figure 8 for the expectations of zero emissions vehicles as part of the overall fleet of light-duty vehicles under the NZE scenario. In addition, the electrification of the fleet and greening of electricity supply needs to happen simultaneously to reduce emissions in line with net zero.

Our current reference scenario is updated on a regular basis and is one of many possible pathways.

Figure 8 - Global share of zero emissions vehicles of total sales for light-duty vehicles, IEA NZE (%)

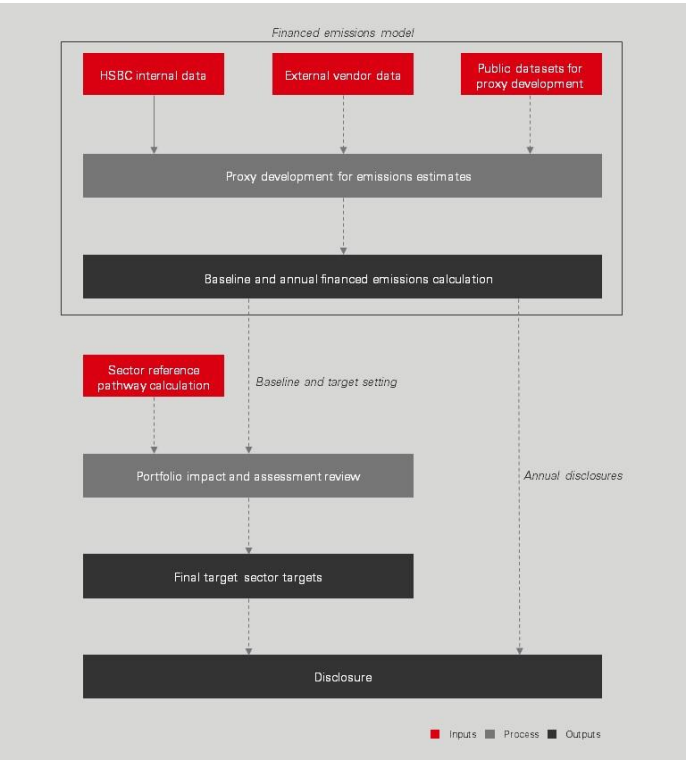


Source: International Energy Agency (2021), World Energy Outlook 2021, IEA

How we measure financed emissions

Financed emissions link the financing we provide to our customers and their activities in the real economy, helping to provide an indication of the greenhouse gas ('GHG') emissions associated with those activities. These downstream emissions from loans and investments form part of our Scope 3 category 15 reporting.

Figure 9 - Financed emissions process flow



On-balance sheet financed emissions

On-balance sheet financed emissions for wholesale credit lending financed emissions are calculated at a counterparty level, and aggregated to sector level. The PCAF Standard formula, shown below, quantifies emissions which are being produced by a counterparty, and attributes a proportion of these emissions to the institution responsible for financing them (c = counterparty).

$$On\text{-}balance\ sheet\ financed\ emissions = \sum_{c} attribution\ factor \times\ counterparty\ emissions$$

On-balance sheet financed emissions for project finance are calculated at a project-level based on PCAF guidance. These are aggregated at a sector-level. The calculation, shown below, is similar in concept to wholesale credit, except that the components are project-specific (p = project). Where we determine that there is insufficient data at the project level, we classify emissions using the approach for wholesale credit lending referred to above.

$$On\text{-}balance\ sheet\ financed\ emissions = \sum_{p} attribution\ factor \times\ project\ emissions$$

Attribution factor

We account for a portion of the annual emissions of the financed counterparty by determining the ratio between our outstanding amount of counterparty finance (numerator) and the economic value of the financed counterparty (denominator). This ratio is called the attribution factor.

$$Attribution\ factor = \sum \frac{outstanding\ amount}{economic\ value}$$

The outstanding amounts for on-balance sheet financed emissions are represented by the drawn amount of funds provided to counterparties based on the end of year balance sheet. We believe this better reflects current financing and funds currently contributing to activity in the real economy. It aligns with the PCAF Standard which recommends using the value of debt owed by a counterparty, defined as the disbursed amount minus any repayments.

Economic value is represented using three different measures in a waterfall approach, shown in Table 8.

Table 8 - On-balance sheet financed emissions economic value waterfall approach

1	Enterprise value including cash ('EVIC')	EVIC is used for listed counterparties where data is available. It is calculated as the enterprise value plus cash and cash equivalents. Depending on the data source, it can be calculated in two ways: $EVIC = Enterprise\ value + cash$ or $EVIC = Market\ capitalisation + book\ value\ of\ debt$
2	Total debt and equity	Where we do not have market capitalisation values, the total book values of debt and equity are used to calculate enterprise value, based on year-end reported financials: $Debt + equity = short\ term\ debt + long\ term\ debt + total\ equity\ or\ net\ worth$
3	Total assets	When neither EVIC data nor the total book values of debt and equity are available, we follow PCAF guidance which stipulates that financial institutions are allowed to fall back on the total balance sheet value (total assets) as a proxy for company value.

We perform a number of checks to validate data underpinning our financed emissions calculation, including working with our business functions and strategy teams to review inputs.

When calculating sector level emissions intensities, we aggregate counterparty financed emissions and production values using use a balance sheet weighted approach. This means that the attribution factor for our lending to each client is weighted relative to the client's economic value.

Emissions

When estimating emissions, we adopt the PCAF data quality hierarchy to help provide transparency in our calculation methodologies. Proxies are based on reported emissions, physical activity-based emissions, or economic activity-based emissions (see Table 9) and data is prioritised according to source and robustness. Asset level data provides us with asset-level information for each counterparty, including production data for each asset per year and an emissions intensity number for each asset.

Table 9 - PCAF data quality score hierarchy

PCAF data quality score[12]	Proxy type	Data required	Description
1	Reported emissions	Counterparty reported emissions data (verified) Total counterparty economic value	Verified third-party data from external data vendors
2		Counterparty reported emission data (unverified) Total counterparty economic value	Un-verified third-party data from external data vendors
3	Estimate of physical intensity	Outstanding amount provided to the counterparty Total counterparty economic value Counterparty production data	Emissions are calculated using primary physical activity data and emissions factors specific to that primary data.
4	Estimate of revenue intensity	Outstanding amount provided to the counterparty Total counterparty economic value Counterparty revenue or financial proxy for counterparty revenue	Sector-based emissions factors. Average taken based upon broad market sector averages.
5	Estimate of asset intensity	Outstanding amount provided to the counterparty	Sector-based emissions factors. Average taken using asset intensity factors for all counterparties where data is available.

We calculate emissions for each of the GHG accounting scopes separately. There are occasions where we are unable to source external data covering all three GHG scopes. In such instances we use scaling factors to infer the missing emissions, which allows us to calculate the emissions for scopes 1, 2 and 3.

- Scaling factors used to calculate sector emissions factors using production data from Asset Resolution (PCAF data quality score 3)

  Emissions factors provided with production data from Asset Resolution cover total emissions (scope 1, 2 and 3) Therefore, we derive a counterparty level scaling factor to split emissions between scope 1, 2 and scope 3.

- Scaling factors used to calculate sector emissions factors using revenue intensity ratios (PCAF data quality score 4).

  We derive a sector level scaling factor based upon the relationship between revenue intensities across scopes of emissions, and use this to calculate any missing GHG scope 3 emissions scopes for counterparties.

- Sector averages were used to calibrate asset-based emissions intensities (PCAF data quality score 5).

  We derive a sector-level asset intensity based on the relationship between total emissions and total company value to calculate scope 1 and 2 emissions separately. We then use scaling factors to infer Scope 3, where applicable, due to lower data availability for Scope 3.

[12] Score 1 = highest quality; score 5 = lowest quality

When data quality scores of two proxy calculations are similar, proxies are selected based on:	
Availability	Are there any data gaps?
Transparency	What types of data sources were identified and investigated? Is the data publicly available?
Accuracy	What are the assumptions made? How accurate are the results?
Simplicity	How simple is this to input into the model? Is it easily replicable across clients?
Relevance	How relevant is the calculation for different types of clients?

Our methodology is based upon the PCAF Standard for estimating financed emissions. However, for particular counterparties it has been necessary to deviate from the Standard. This has generally been due to data availability - in particular for the economic value used in our estimates, production data for particular sectors, and details needed to calculate project specific emissions for our project finance portfolio. As we refine our methodology and approach, we hope to improve data linkages, work with data providers and industry bodies to improve the availability of certain data points, and to collect additional data from companies directly as part of our ongoing engagement process.

Sector classification

The scope of clients analysed is determined based on sector classifications used within wholesale banking. These are assigned using expert judgement from global relationship managers. For the wholesale lending portfolio, we use NACE[13] codes. NACE codes are assigned at the individual counterparty level, and we then determine the counterparty group level NACE code by assessing lending limits provided by HSBC to each individual counterparty within the counterparty group. The NACE code that applies to the individual counterparty with the largest total lending limit is then assigned to the counterparty group as a whole. The NACE codes included in our analysis are shown in the Appendix.

In circumstances where the largest total lending limit is associated with a financial or holding company NACE code, but the primary economic activity of that counterparty group is one of the sectors we are analysing, we would still include the counterparty group in our analysis. As data availability improves, we plan to strengthen our analysis of counterparty groups by providing greater granularity, focusing our analysis at the individual counterparty level.

When a company has activities in more than one sector, we assign that company to the sector where it has the largest borrowing limits. This is validated by the businesses based on their relationship and knowledge of the customer's activity. We believe this is consistent with the PCAF principle of 'follow the money' for the treatment of conglomerates and financed emissions.

For project finance, we use the same classification system to identify counterparty groups in scope, and include all power and utilities project finance at an individual counterparty level, regardless of the sector its counterparty group may fall under. This conforms with Science Based Targets initiative ('SBTi') guidance.

Data sources

To calculate financed emissions, we enrich internal data with external data available at the time from vendors and company annual reports, amongst other sources.

Vendors provide both verified and unverified reported emissions quantities as well as estimated emissions quantities. However most of our clients do not yet report their emissions. Vendors source data directly from stock exchanges, company registries, and other sources to create their datasets. The remaining coverage gaps are filled using proxy estimations.

Financial data includes information present in a counterparty's financial statements or based on a counterparty's market value. This data is used for both estimating counterparty emissions, and for our attribution factor. Key data attributes are revenue or annual sales, total debt, total equity and total assets[14].

[13] NACE (Nomenclature of Economic Activities) is the European statistical classification of economic activities.

[14] Revenue represents the amount of money made through the sale of products in a year, based on the annual income statement. Total debt outstanding represents the amount a counterparty has borrowed, based on the end of year balance sheet. Total debt, along with total equity and total assets, is used in the denominator of the attribution factor where EVIC is unavailable.

Although we seek to minimise the use of non-counterparty specific data, we apply industry averages in our analysis where counterparty-specific data is unavailable. For example, a lack of standardisation for emissions intensity proxy calculations based upon conversion factors means that we have used certain UK based emission conversion factors at a global level. We will seek to adopt a more regional approach, as datasets become available.

As data availability improves and sustainability disclosures become mandatory, our PCAF data quality scores should also improve. We will continue to work with credible external providers and our customers to encourage and source client self-reported emissions.

Revision Policy

Our baseline recalculation policy determines when we might change our estimates to ensure consistency comparability, and relevance over time. We may revise climate-related information where there is a change to the model or data that could lead to significant differences in the presentation of our net zero targets and progress related to those targets.

Model governance

HSBC Holdings plc is responsible for the preparation and reporting of financed emissions information and all the supporting records, including selecting appropriate measurement and reporting criteria, in our annual report, the ESG Data Pack and the additional reports published on our website.

The model we have developed to calculate our financed emissions baseline is subject to a governance process that includes input from model users and peer review from external consultants and senior stakeholders across our businesses and functions. Subject matter experts from GBM and CMB reviewed and challenged model design choices and assumptions through a series of workshops. Model development and outputs are governed by the Climate Aligned Finance ('CAF') Programme Steering Committee. This meeting is made up of senior representatives across global lines of business (GBM and CMB) and business functions (Corporate Sustainability, Global Finance, Global Risk and Compliance, Data Architecture Office, Legal, Investor Relations). Subject matter experts and external consultants are also invited where appropriate. The CAF Steering Committee is overseen by the Group Executive Committee and the Group ESG Steering Committee.

In addition to these meetings and discussions, the end-to-end model was also subject to HSBC's three lines of defense governance processes.

Cautionary statement

This document contains both historical and forward-looking statements. All statements other than statements of historical fact are, or may be deemed to be, forward-looking statements. Forward-looking statements may be identified by the use of terms such as 'expects', 'targets', 'believes', 'seeks', 'estimates', 'may', 'intends', 'plan', 'will', 'should', 'potential', 'reasonably possible' or 'anticipates', variation of these words, the negative thereof or similar expressions. HSBC has based the forward-looking statements on current plans, information, data, estimates, expectations and projections about future events, and therefore undue reliance should not be placed on them. These forward-looking statements are subject to risks, uncertainties and assumptions about us, as described under 'Cautionary statement regarding forward-looking statements' and 'Additional cautionary statement regarding ESG and climate-related data, metrics and forward-looking statements' contained in the HSBC Holdings plc Annual Report on Form 20-F for the year ended 31 December 2022, expected to be filed with the Securities and Exchange Commission ('SEC') on or around 22 February 2023 (the '2022 Form 20-F') and in other reports on Form 6-K furnished to or filed with the SEC subsequent to the 2022 Form 20-F ('Subsequent Form 6-Ks'). HSBC undertakes no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise. In light of these risks, uncertainties and assumptions, the forward-looking events discussed herein might not occur. Investors are cautioned not to place undue reliance on any forward-looking statements, which speak only as of their dates. Additional information, including information on factors which may affect the Group's business, is contained in the 2022 Form 20-F and Subsequent Form 6-Ks.

Appendix

Table 10 - Sector classification

Sector	L4 NACE codes and definitions used for wholesale lending and project finance portfolio
Oil and gas	610 - Extraction of crude petroleum
	620 - Extraction of natural gas
	3521 - Manufacture of gas; distribution of gaseous fuels through mains
Power and utilities	3511 - Electric power generation , transmission and distribution
Cement	2351 – Manufacture of cement
iron, steel and aluminium	2410 – Manufacture of basic iron and steel and of ferro-alloys 2431 – Cold drawing of bars 2442 – Aluminium production
Automotive	2910 – Manufacture of motor vehicles 2920 – Manufacture of bodies (coachwork) for motor vehicles, manufacture of trailers and semi-trailers 3091 – Manufacture of motorcycles
Aviation	5110 – Passenger air transport 5121 – Freight air transport 7735 – Renting and leasing of air transport equipment