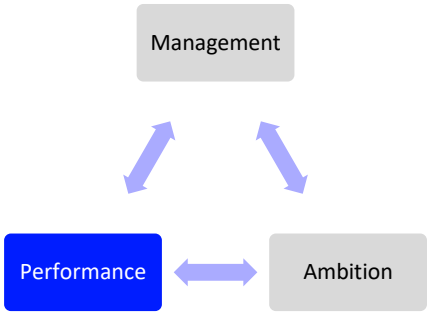
LSEG Greenhouse gas (GHG) emissions estimation model

LSEG's Climate MAP framework—standing for Management, Ambition, Performance—assesses corporate alignment with the low-carbon transition through three complementary lenses:



Management: Evaluates the company's governance and transition planning.

Ambition: Assesses company's climate goals alignment with global targets.

Performance: Measures actual emissions and progress toward decarbonization.

Within our Climate MAP framework, the LSEG GHG emissions estimation dataset plays a central role in the Performance pillar, helping to assess current emissions and monitor progress to a low-carbon economy.

The need for Greenhouse gas (GHG) emissions estimation model

Evaluating GHG emissions is essential to manage climate-related risks, comply with evolving regulations, and align portfolios with net-zero targets. It supports informed investment and lending decisions, enhances transparency for clients and stakeholders, and enables the development of sustainable financial products. As climate considerations increasingly influence financial performance, emissions data becomes a key driver of long-term value and resilience.

A company's emission can be separated into three complementary categories:

- **Scope 1 emissions**: Direct emissions from owned or controlled sources by the reporting company. For example, direct emissions from a coal-fired power plant.
- **Scope 2 emissions:** Indirect emissions from the consumption of electricity, heat, steam and cooling. For example, indirect emissions from the electricity consumption of company-owned computer servers.
- **Scope 3 emissions:** Indirect emissions from upstream and downstream activities in the company's value chain or it's products life cycle.
    - **Upstream emissions**: indirect emissions from upstream processes in the value chain that contribute to a company's products or services. For example, emissions embedded in steel for a car manufacturer.
    - **Downstream emissions:** indirect emissions from the downstream processes (e.g. distribution to the client) or final use of a company's products and services. For example, emissions from the fuel consumption of an automotive.

While the coverage and quality of corporate disclosures have improved in recent years, progress has been uneven: Scope 1 and 2 emissions are now widely reported, but disclosure of the more complex Scope 3 emissions remains modest. To meet our clients' need for comprehensive data, we have developed an estimation model to address gaps where reported data is missing.

Key features of LSEG GHG emissions estimation model

LSEG D&A approach for GHG emissions estimation is based on the following principles:

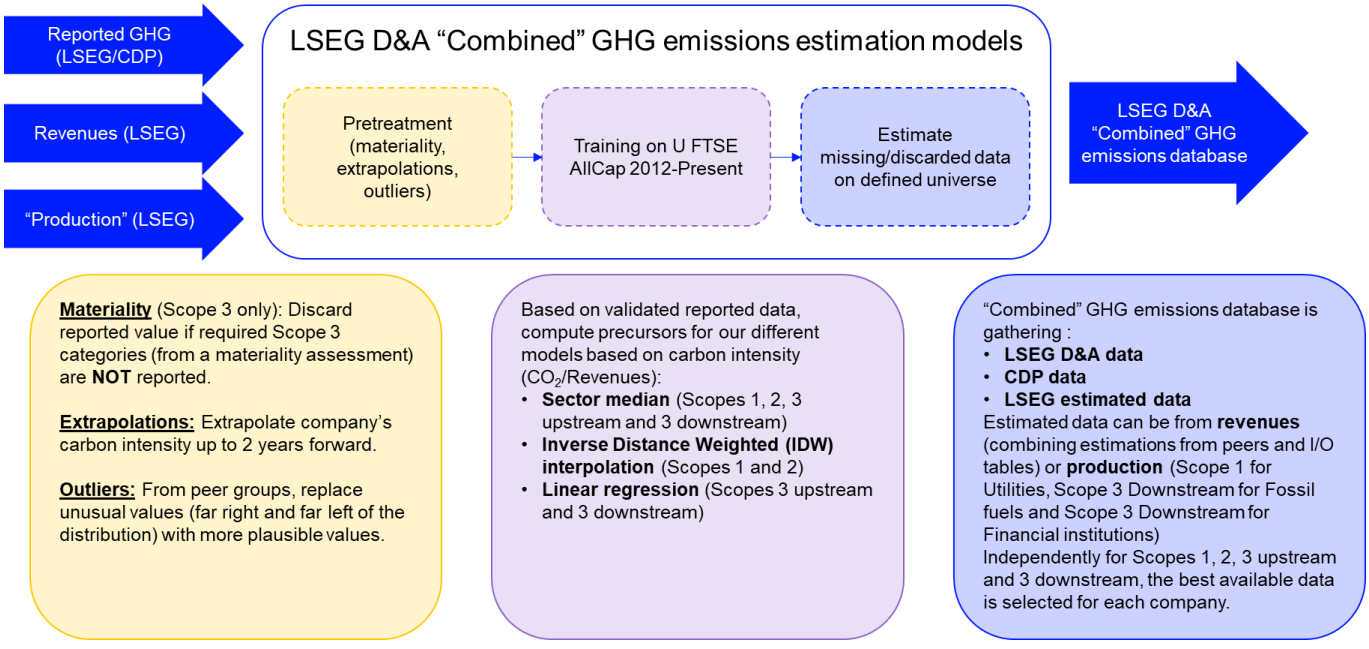
- Reported data is systematically quality-controlled prior to its use in estimation models;
- Scope 1, Scope 2, Scope 3 upstream and Scope 3 downstream emissions are estimated separately;
- A multi-model estimation strategy is used to produce more robust estimates;
- Final estimates are selected according to their quality.

To ensure transparency and suit every user's needs, we have chosen to provide three independent GHG emissions datasets:

	Description	Coverage
LSEG D&A	Detailed climate data collected, quality controlled and normalized by LSEG from companies' public disclosures, including the auditability back to source documents. High granularity with Scope 2 market-based and location-based, as well as 15 categories of Scope 3.	Close to 18,000 active companies of which almost 3,000 private
CDP	Climate data as provided by the companies in response to the CDP annual survey. High granularity with Scope 2 market-based and location-based, as well as 15 categories of Scope 3.	Close to 8,000 active companies
"Combined"	Output of LSEG GHG emissions estimation model, combining LSEG D&A data, CDP data and Estimated data. Estimated data bridge the disclosure gaps in the LSEG D&A universe and expands the universe with more than 40k companies.	Close to 60,000 active companies of which more than 6,000 private

LSEG GHG emissions estimation model – Methodology

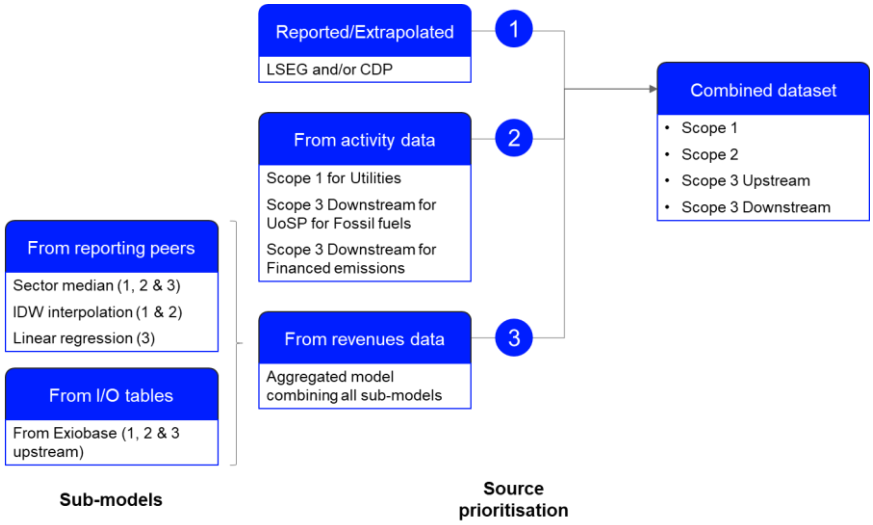
The following graph summarises the overall process of LSEG GHG emissions estimation model:



To mitigate the biases of any individual estimation technique we rely on multiple models to produce our final estimates that use alternative estimation methods, sources of data, peer group classifications, and statistical assumptions. Ultimately, we select the highest quality datapoint (following PCAF Data quality score) available for each company.

The diagram shows that we prefer reported data, unless (a) disclosed data fails the minimum data quality requirements; or (b) the disclosed Scope emissions are materially lower than those estimated by the specialised model. Where reported data is not available, we resort to specialised models; and, where these are not available either, we will rely on the estimate generated by the ensemble of the generalised models.

Please note while the overall model structure is the same, Scope 1, 2 and 3 are modelled independently inside the algorithm. Similarly, for Scope 3 all estimations are modelled for upstream and downstream separately.



From reported values

Scope 1, 2 and 3 as-reported data is captured by LSEG D&A analysts from documents that are publicly disclosed by the company such as annual reports, sustainability reports, company websites and filings. The as-reported data is collected at company-level by a team of more than 700 content specialists, and in the case of scope 1, 2 and 3, according to the specifications from the GHG Protocol, since 2002.

We also use CDP data (Scope 1, 2 and 3), with a history back to 2015.

When multiple as-reported data points are available for a given company, we use a proprietary algorithm to select the more robust datapoint.

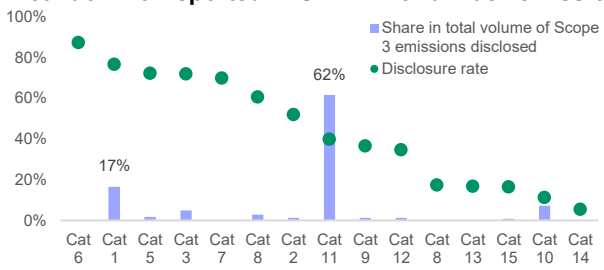
Reported data, i.e. values disclosed by the companies themselves are given the highest priority but must pass in-house coverage and quality checks. A valid reported data point will have the value "**Reported_value**" as its source attribute in the dataset.

Materiality filter (Scope 3 only)

Over half of reporting companies omit the most material Scope 3 categories from their disclosures – that is 45% of companies report on Scope 3 emissions, but only 20% provide data for the most material Scope 3 categories in their sector (from Scope for improvement: Solving the Scope 3 conundrum, January 2024).

On top of that, disclosure rates differ widely by categories, and that disclosure rates don't necessarily correlate with the materiality of individual Scope 3 categories.

Breakdown of reported FTSE All-World Index emissions



Source: FTSE Russell; January 2024

To improve the quality of our final dataset and the accuracy of our estimation models, reported data must pass a materiality filter: we check if the material categories for a given subsector (ICB4) are reported. If it's not the case, the reported value is treated as 'not valid' and replaced with an estimate (see From revenues data section).

A reported datapoint that has not passed this materiality filter test and has been replaced with an estimate will have the value "**Aggregated_model_replace_reported**" (applicable for Scope 3 upstream and downstream only).

Detailed materiality filter can be found in Annex.

Extrapolation

If a company reported its emissions in the past but does not have a reported data point for a given year, the last reported intensity value is treated as an estimate of its emission intensity, for up to two years since the last reporting. This is based on the assumption that company-level carbon intensities are stable through short period of time.

For example, if the last reported value for a company is in 2016, the same values for the given company are extrapolated only for 2017 and 2018 but the value for 2019 will be estimated through another method. The carbon intensity is then multiplied by the revenue for the current year to estimate the emissions value of the current year.

A datapoint that was estimated with this procedure will have the value "**Extrapolated**" as its source attribute in the dataset.

Outliers detection

To address extreme values, we winsorize the distribution of the natural logarithm of GHG emissions intensity to revenues of peers (based on ICB classification). Specifically, we define outliers as values falling outside the following range:

	Scope 1 and 2	Scope 3 upstream and downstream
Lower bound	Q1 - 1.5 * IQR	Q1 - 1.0 * IQR
Upper bound	Q3 + 1.5 * IQR	Q3 + 1.0 * IQR

where Q1 and Q3 are the first and third quartiles of ln(intensity), and IQR is the interquartile range.

Values outside of this range are adjusted in 2 steps. First, to avoid volatility, we extrapolate a previous non-extreme intensity of the company, by up to 2 years. A datapoint that got extrapolated will have the value "**Extrapolated**" as its source attribute in the dataset.

The remaining extreme intensities are winsorized to boundaries. Such datapoints will have the value "**Winsorized_low**" (resp. "**Winsorized_high**") for extreme low (resp. high) values as its source attribute in the dataset.

From activity data

Scope 1 for Utilities

For companies that are identified as Power Utilities, a separate model is used to estimate its Scope 1 emissions.

Company-disclosed annual power generation data by fuel types (i.e. nuclear, coal) are multiplied against their respective emission factor (i.e., emissions per unit volume or weight combusted). The emissions for the different fuel types are then summed to calculate total emissions, which in turn are used to derive intensities per year.

Outliers are then flagged from the set of intensities, by using the same boundaries as the general outliers detection process. To avoid volatility, we extrapolate a previous non-extreme intensity of the company, by up to 2 years. The remaining emissions from the outliers below the lower threshold are discarded while the outliers above the upper threshold are winsorized to the upper bound.

A datapoint that was estimated with this procedure will have the value "**Energy_model**" (if production data is available), "**Energy_extrapolated**" (if intensity was extrapolated from a given year – up to 2 years) or **Winsorized_high** (if the intensity was above the upper threshold) as its source attribute in the dataset.

Scope 3 Downstream for Fossil fuels producers

For companies that are identified as fossil fuel producers (Coal, Oil and Gas), a dedicated model is used to estimate its downstream Scope 3 emissions.

Company-disclosed annual production figures (i.e., coal, oil and gas) from the LSEG D&A Reserves dataset are multiplied against their respective emission factor (i.e. emissions per unit volume or weight combusted from IPCC guidelines).

Outliers are then flagged from the set of intensities, by calculating the 25th and 75th percentiles of the final total intensity by year and subsector (ICB4). To avoid volatility, we extrapolate a previous non-extreme intensity of the company, by up to 1 year. The remaining emissions from the outliers below *25th percentile / 5* are discarded while the outliers above *75th percentile * 10* are winsorized to the upper bound.

A datapoint that was estimated with this procedure will have the value "**Fossil_fuel_production_model**" (if production data is available), "**Fossil_ful_production_model_extrapolated**" (if intensity was extrapolated from a given year – up to 1 year if FY0 is missing, up to 2 years if FY0 is outside outliers boundaries) or **Winsorized_high** (if the intensity was above the upper threshold) as its source attribute in the dataset.as its source attribute in the dataset.

Scope 3 Downstream for Financial institutions

For companies identified as financial institutions, a top-down approach is applied, which involves multiplying the reported investment amounts for specific financial instruments on the company's balance sheet by their respective estimated carbon intensities. Two financial instruments are currently considered: loans and equity investments.

For equity investments, the Scope 1 and Scope 2 Weighted Average Carbon Intensity (WACI) of reporting companies in the FTSE All-Cap Index serves as a proxy for the global carbon intensity of equity.

For loans, the regional carbon intensity is estimated as the average of two approaches: the syndicated loans approach and the IMF data approach. The syndicated loans approach uses the average of carbon intensities of sectors, weighted by their outstanding loans amounts in a specific region and year. The IMF data approach uses national carbon intensity data reported by central banks and aggregates them at the regional level.

Finally, the emissions associated with each financial instrument are summed to get the total estimate of financed emissions. For banks, this method requires that emissions related to loan instruments are available in order to calculate the financed emissions estimate.

A datapoint that was estimated with this procedure will have the value "**Specialised_model_financials**" as its source attribute in the dataset.

For companies identified as financial institutions whose balance sheet data are unavailable or whose assessed amount are too low with respect to their EVIC, a Median Model is applied. This method leverages on the results of the Specialized Model for Financed emissions, using the median of carbon intensities (by EVIC) at the ICB3 level.

A datapoint that was estimated with this procedure will have the value "**Median_model_financials**" as its source attribute in the dataset.

From revenues data

Training Data

Sector Median model (Scope 1, 2 and 3), IDW interpolation model (Scope 1 and 2 only) and Linear Regression model (Scope 3 only) are trained using quality checked reported data (i.e. Reported, Winsorized and Extrapolated) on a universe defined as companies within FTSE All Cap Index in a 5-year rolling window (e.g. to estimate FY2024 data, we will rely on index constituents from 2020 to 2024).

Multiple model approach

To attenuate the biases of any individual estimation technique, we rely on multiple models to produce our final estimates, which use alternative estimation methods, sources of data, peer group classifications, and statistical assumptions.

The table below outlines key strengths and weaknesses of different estimation techniques used in our multi-model approach.

	Overview	Key strengths	Limitations
Sector median	Calculates median carbon intensity for individual sector 'peer groups' as defined by sector (ICB based) and region	Simple and interpretable Granularity can be adjusted to focus on specific sectors or regions	Attributing company to a single sector risks oversimplifying business models Reliant on accurate and granular industry classification system
Linear regression (Scope 3 only)	Quantifies relationship between firm attributes (sector, multiple financial variables) and reported carbon intensity	Highly flexible, allowing users to include or omit predictive variables across peer groups Based on well-known statistical principles and benefits from set of established techniques to improve output (e.g., variable transformation or regularization)	More complex implementations hinder contribution analysis of emissions results Decisions in data preparation have a significant impact on the value of the eventual predictive coefficients Highly sensitive to the underlying distributions of variables
IDW Interpolation (Scope 1 and 2 only)	Estimates carbon emissions intensity for specific business segments based on reported data by assigning a heavier weight to 'pure play' firms	Generates more nuanced estimates for complex, diversified firms with multisector exposures than simpler models 'Pure play' or specialized companies have a greater impact on activity carbon intensities than diversified companies	Complex, with multiple computations that can be difficult to communicate. Accuracy depends on numerous, specialized firms to generate intensity estimates on each industrial activity Highly dependent on quality of segment mapping
Input-Output	Derives carbon intensities for individual business segments from Environmentally Extended Input-Output (EEIO) tables	Transparent methodology and easily auditable Generates nuanced estimates for complex, diversified firms with multinational exposures Consistent boundary conditions for emissions estimates.	Outputs highly dependent on EEIO table selected and quality of segment mapping, leading to large variation between models EEIO tables are infrequently updated and do not reflect year-on-year trends in industry emissions levels

Aggregation strategy

Scope 1 and Scope 2 emissions estimates are calculated as the median of the Sector Median, Interpolation, and Input/Output estimates, for any given year of interest.

Scope 3 upstream emissions estimates are a average of the Sector Median, Linear Regression and Input/Output estimates, while Scope 3 downstream is an average of Sector Median and Linear Regression only.

A data point that was estimated with this procedure will have the value "**Aggregated_model**".

PCAF data quality score

With banks and investors encouraging greater measurement and disclosure of Financed emissions following the Partnership for Carbon Accounting Financials (PCAF) methodology, our transparent multi-model approach enables them to derive the Data Quality Score for the GHG emissions associated with listed equities and corporate bonds.

PCAF Data Quality Score are derived from the source of each datapoints with the following guidelines:

	Scope 1	Scope 2	Scope 3 upstream	Scope 3 downstream
Score 1	Reported_value AND Independent Verification of Operational GHG Emissions Data=TRUE			
Score 2	Reported_value			
Score 3	Energy_model	/	/	Fossil_fuel_production_model
Score 4	Energy_extrapolated Winsorized_low Winsorized_high Extrapolated	Winsorized_low Winsorized_high Extrapolated	Winsorized_low Winsorized_high Extrapolated	Fossil_fuel_production_model_extrapolated Winsorized_low Winsorized_high Extrapolated
Score 5	Aggregated_model	Aggregated_model	Aggregated_model Aggregated_model_replace_reported	Aggregated_model Aggregated_model_replace_reported Specialised_model_financials Median_model_financials

For aggregated scopes (i.e. Scope 3, Scope 1+2 and Scope 1+2+3), we calculate PCAF data quality score as the GHG emissions weighted average of unit scopes.

"Combined" GHG emissions dataset

LDP

"Combined" GHG emissions dataset is available in Climate Data Package in the Bulk-Climate-Global-Measures-Full-v1-Analytics file.

We provide the following datapoints covering Scope 1, Scope 2, Scope 3 upstream and Scope 3 downstream:

	Scope 1	Scope 2	Scope 3 upstream	Scope 3 downstream
Absolute GHG emissions (tCO_2e)	Scope1EstimatedTotal	Scope2EstimatedTotal	Scope3EstimatedUpstreamTotal	Scope3EstimatedDownstreamTotal
Source	Scope1EstimatedMethod	Scope2EstimatedMethod	Scope3EstimatedUpstreamMethod	Scope3EstimatedDownstreamMethod
PCAF Data quality score	Scope1EstimatedPCAFQualityScore	Scope2EstimatedPCAFQualityScore	Scope3UpstreamEstimatedPCAFQualityScore	Scope3DownstreamEstimatedPCAFQualityScore
Intensity by revenues (tCO_2e/MUSD)	Scope1EstimatedTotalsToRevenues	Scope2EstimatedTotalsToRevenues	Scope3UpstreamEstimatedTotalToRevenues	Scope3DownstreamEstimatedTotalToRevenues
Intensity by EVIC (tCO_2e/MUSD)	Scope1EstimatedTotalToEVIC	Scope2EstimatedTotalToEVIC	Scope3UpstreamEstimatedTotalToEVIC	Scope3DownstreamEstimatedTotalToEVIC

We also provide the following aggregated datapoints:

	Scope 3	Scope 1+2	Scope 1+2+3
Absolute GHG emissions (tCO_2e)	Scope3EstimatedTotal	Scope1andScope2EstimatedTotal	Scope1andScope2andScope3EstTotal
Source	*Only available at Upstream and Downstream level*	*Only available at Scope 1 and Scope 2 level*	*Only available at Scope 1, Scope 2, Scope 3 Upstream and Scope 3 Downstream level*
PCAF Data quality score	Scope3EstimatedPCAFQualityScore	Scope1andScope2EstimatedPCAFQualityScore	Scope1andScope2andScope3EstimatedPCAFQualityScore
Intensity by revenues (tCO_2e/MUSD)	Scope3EstimatedTotalToRevenues	Scope1andScope2EstimatedTotalsToRevenues	Scope1andScope2andScope3EstTotalsToRevenues
Intensity by EVIC (tCO_2e/MUSD)	Scope3EstimatedTotalToEVIC	Scope1andScope2EstimatedTotalToEVIC	Scope1andScope2andScope3EstTotalsToEVIC

Datastream

"Combined" GHG emissions dataset is also available in Datastream.

We provide the following datapoints covering Scope 1, Scope 2, Scope 3 upstream and Scope 3 downstream:

	Scope 1	Scope 2	Scope 3 upstream	Scope 3 downstream
Absolute GHG emissions (tCO_2e)	ENERDP747	ENERDP751	ENERDP374	ENERDP371
Source	ENERDP749	ENERDP753	ENERDP375	ENERDP372
PCAF Data quality score	*Will be made available soon*			
Intensity by revenues (tCO_2e/MUSD)	ENERO113V	ENERO115V	ENERO119V	ENERO121V
Intensity by EVIC (tCO_2e/MUSD)	ENERO112V	ENERO114V	ENERO118V	ENERO120V

We also provide the following aggregated datapoints:

	Scope 3	Scope 1+2	Scope 1+2+3
Absolute GHG emissions (tCO_2e)	ENERDP377	ENERDP755	/
Source	*Only available at Upstream and Downstream level*	*Only available at Scope 1 and Scope 2 level*	*Only available at Scope 1, Scope 2, Scope 3 Upstream and Scope 3 Downstream level*
PCAF Data quality score	*Will be made available soon*		
Intensity by revenues (tCO_2e/MUSD)	ENERO123V	ENERO117V	ENER132V
Intensity by EVIC (tCO_2e/MUSD)	ENERO122V	ENERO116V	ENERO133V

Workspace

Our combined dataset is also available on Workspace, in the Performance tab of our Climate MAP application (CLIMAP).

We provide the following datapoints covering Scope 1, Scope 2, Scope 3 upstream and Scope 3 downstream:

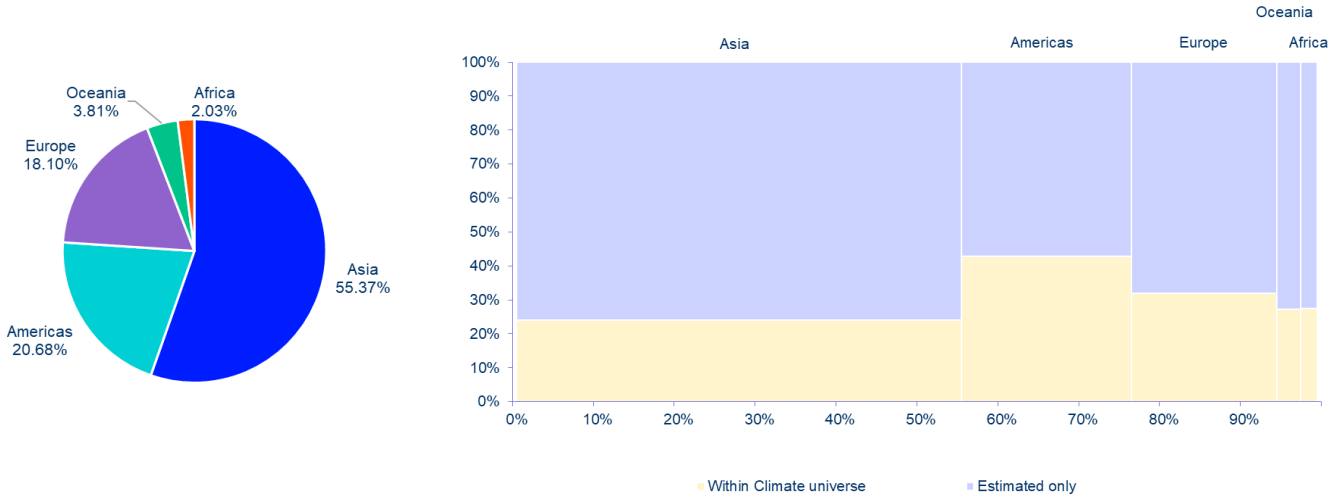
	Scope 1	Scope 2	Scope 3 upstream	Scope 3 downstream
Absolute GHG emissions (tCO_2e)	TR.Scope1EstTotal	TR.Scope2EstTotal	TR.Scope3EstUpstreamTotal	TR.Scope3EstDownstreamTotal
Source	TR.Scope1EstMethod	TR.Scope2EstMethod	TR.Scope3EstUpstreamMethod	TR.Scope3EstDownstreamMethod
PCAF Data quality score	TR.PCAFQualityScope1Est	TR.PCAFQualityScope2Est	TR.PCAFQualityScope3UpstreamEst	TR.PCAFQualityScope3DownstreamEst
Intensity by revenues (tCO_2e/MUSD)	TR.Scope1EstTotalsToRevenues	TR.Scope2EstTotalsToRevenues	TR.Scope3UpstreamEstTotalToRevenues	TR.Scope3DownstreamEstTotalToRevenues
Intensity by EVIC (tCO_2e/MUSD)	TR.Scope1EstTotalToEVIC	TR.Scope2EstTotalToEVIC	TR.Scope3UpstreamEstTotalToEVIC	TR.Scope3DownstreamEstTotalToEVIC

We also provide the following aggregated datapoints:

	Scope 3	Scope 1+2	Scope 1+2+3
Absolute GHG emissions (tCO_2e)	TR.Scope3EstTotal	TR.Scope1and2EstTotal	TR.Scope1andScope2andScope3EstTotal
Source	*Only available at Upstream and Downstream level*	*Only available at Scope 1 and Scope 2 level*	*Only available at Scope 1, Scope 2, Scope 3 Upstream and Scope 3 Downstream level*
PCAF Data quality score	TR.PCAFQualityScope3Est	TR.PCAFQualityScope1and2Est	TR.PCAFQualityScope1and2and3Est
Intensity by revenues (tCO_2e/MUSD)	TR.Scope3EstTotalToRevenues	TR.Scope1andScope2EstTotalsToRevenues	TR.AnalyticScope1andScope2andScope3EstTotalsToRevenues
Intensity by EVIC (tCO_2e/MUSD)	TR.Scope3EstTotalToEVIC	TR.Scope1andScope2EstTotalToEVIC	TR.AnalyticScope1andScope2andScope3EstTotalsToEVIC

Global coverage details

The current coverage is close to 60,000 active companies of which more than 6,000 private.



Source: LSEG D&A, June 2025

Data process and data quality

LSEG has over 600 content research analysts collecting company level SFI data, of which more than 100 specialise in Climate Data. This represents one of the biggest collection operations teams in the industry. With local language expertise and operating from different locations across the globe, we process a range of publicly available sources with the aim of providing up-to-date, objective and comprehensive coverage.

Each data measure undergoes a careful process to standardise the information ensuring it's comparable across the entire range of companies in our Climate data universe. LSEG Data and Analytics uses a combination of both algorithmic and human processes to ensure we achieve as close to 100% data quality as possible:

- LSEG analysts conduct the initial company assessment. A secondary set of controls is carried out by highly trained senior analysts who have accountability for the accuracy of data collected by research analysts
- 2,000 built-in error check and logics are applied within the collection tool for various datapoints, including indicators that affect Management Quality scores
- Analyst review is followed by a separate, more experienced analyst reviewing company assessments completely to ensure accuracy and consistency and avoid potential data gaps (score drops or improvement)
- Based on the series of checks conducted, quality reports are published on a weekly and monthly basis. These will be used on quality deep dives and related heatmap analysis, which proactively identifies potentially problematic topics and indicators.

On top of these checks, a dedicated Model Management team overlooking the models and performing additional quality checks in order to ensure consistent dataset over the universe. Using both algorithmic and human processes, the checks are covering:

- Additional checks on input data (e.g. comparisons between two runs of the model, anomaly detection)
- Checks within the model (e.g. outliers detection)
- Output data checks (e.g. coverage, variance over time, variance among peers, volatility over time, etc.)

Data governance

Our GHG emissions estimation model is governed through the LSEG D&A Sustainable Finance and Investment ("SFI") Regulatory Governance Committee ("SRGC"). The SRGC oversees the application, development and changes to SFI data sets and reviews all regulatory-aligned methodologies and policies related to LSEG SFI datasets. It also monitors and implements new regulatory requirements and industry standards. The forum is comprised of representatives from all areas of the business involved in the administration of LSEG ESG datasets, including individuals identified as having key roles and responsibilities within the SFI business, Risk and Compliance. The SFI business is also governed by a Product and Commercials Board (PCB) that provides commercial and product-related decision-making capabilities to ensure that new and existing products and commercial models lead to successful outcomes and satisfied customers.

Feedback and changes

How to raise a query

LSEG Data & Analytics clients can raise questions about our Greenhouse gas estimation model via the link below. Our Sustainable Finance and Investment Model Management team who maintains and performs checks against the model will work alongside our Content teams to provide a response. The Greenhouse gas estimation model from LSEG is refreshed quarterly and any changes applied because of client feedback will need to be carefully considered before a future release.

Product and Content Support | MyAccount

Methodology changes

The relevance and suitability of our Greenhouse Gas estimation methodology is reviewed periodically to ensure its effectiveness and alignment with the evolving needs of clients and the industry. However, changes to our methodology are implemented cautiously and infrequently, with the aim of maintaining stability and minimizing disruption to the users of the data. This approach is adopted to maintain consistency, allow for accurate trend analysis and to preserve confidence among LSEG D&A customers.

Should any iterations be required to the methodology, we follow a systematic process before releasing. This ensures enhancements are implemented in a thoughtful and responsible manner. As new regulations are introduced and reporting standards evolve, the data metrics and methodology used is periodically evaluated to ensure its relevance and accuracy. Similarly, when new logic is developed, or existing logic modified, impact analysis is performed to understand the potential effects on the output. This analysis helps in identifying any potential limitations, biases, or unintended consequences that may arise from the changes.

Changes, enhancements, and impact analysis is thoroughly documented to maintain transparency and accountability. These documents are shared via client notifications which can be subscribed to via the Product & Content Support url listed above. Client notifications are typically issued within a 30–90-day advance notice depending on the complexity of change introduced. This allows our customers to review and understand changes then make any necessary preparations to accommodate them.

Further reading

The following research papers, authored by our team, provide in-depth analysis and perspectives on greenhouse gas emissions and our estimation model:

- Mind the gaps: Clarifying corporate carbon, May 2022
- Scope for improvement: Solving the Scope 3 conundrum, January 2024

For an investor-focused perspective, we also invite you to explore the following papers authored by our team in partnership with the UN-convened Net Zero Asset Owner Alliance (NZAOA):

- Decarbonization In equity Benchmarks: Smoke still rising, September 2022
- Decarbonisation in equity benchmarks: tracking the portfolio carbon transition, November 2023
- Decarbonisation in portfolio benchmarks: tracking the portfolio carbon transition, September 2024

Discover more about **LSEG Climate Transition Data**

Annex

The following table summarises the materiality filter applied following FTSE Russell Industry Classification Benchmark (ICB). Material categories are in Orange.

ICB1 Industry	ICB2 Supersector	ICB3 Sector	ICB4 Subsector	Cat. 1	Cat. 2	Cat. 3	Cat. 4	Cat. 5	Cat. 6	Cat. 7	Cat. 8	Cat. 9	Cat. 10	Cat. 11	Cat. 12	Cat. 13	Cat. 14	Cat. 15
10 Technology	1010 Technology	101010 Software and Computer Services	10101010 Computer Services	■										■				
			10101015 Software	■										■				
			10101020 Consumer Digital Services	■	■													
		101020 Technology Hardware and Equipment	10102010 Semiconductors	■										■				
			10102015 Electronic Components	■										■				
			10102020 Production Technology Equipment											■				
			10102030 Computer Hardware	■										■				
			10102035 Electronic Office Equipment	■										■				
15 Telecommunications	1510 Telecommunications	151010 Telecommunications Equipment	15101010 Telecommunications Equipment											■				
		151020 Telecommunications Service Providers	15102010 Cable Television Services	■	■													
			15102015 Telecommunications Services	■	■													
20 Health Care	2010 Health Care	201010 Health Care Providers	20101010 Health Care Facilities	■														
			20101020 Health Care Management Services	■														
			20101025 Health Care Services	■														
			20101030 Health Care: Misc.	■														
		201020 Medical Equipment and Services	20102010 Medical Equipment	■										■				
			20102015 Medical Supplies	■										■				
			20102020 Medical Services	■										■				
		201030 Pharmaceuticals and Biotechnology	20103010 Biotechnology	■	■													
			20103015 Pharmaceuticals	■														
			20103020 Cannabis Producers	■														
30 Financials	3010 Banks	301010 Banks	30101010 Banks															■
	3020 Financial Services	302010 Finance and Credit Services	30201020 Consumer Lending															■
			30201025 Mortgage Finance															■
			30201030 Financial Data Providers	■														
		302020 Investment Banking and Brokerage Services	30202000 Diversified Financial Services															■
			30202010 Asset Managers and Custodians															■
			30202015 Investment Services															■
		302030 Mortgage Real Estate Investment Trusts	30203000 Mortgage REITs: Diversified															■
			30203010 Mortgage REITs: Commercial															■
			30203020 Mortgage REITs: Residential															■
		302040 Closed End Investments	30204000 Closed End Investments															■
		302050 Open End and Miscellaneous Investment Vehicles	30205000 Open End and Miscellaneous Investment Vehicles															■
	3030 Insurance	303010 Life Insurance	30301010 Life Insurance															■
		303020 Non-life Insurance	30302010 Full Line Insurance															■
			30302015 Insurance Brokers															■
			30302020 Reinsurance															■
			30302025 Property and Casualty Insurance															■
35 Real Estate	3510 Real Estate	351010 Real Estate Investment and Services Development	35101010 Real Estate Holding and Development											■		■		
			35101015 Real Estate Services											■				

ICB1 Industry	ICB2 Supersector	ICB3 Sector	ICB4 Subsector	Cat. 1	Cat. 2	Cat. 3	Cat. 4	Cat. 5	Cat. 6	Cat. 7	Cat. 8	Cat. 9	Cat. 10	Cat. 11	Cat. 12	Cat. 13	Cat. 14	Cat. 15
		351020 Real Estate Investment Trusts	35102000 Diversified REITs		■											■		
			35102010 Health Care REITs		■											■		
			35102015 Hotel and Lodging REITs		■											■		
			35102020 Industrial REITs		■											■		
			35102025 Infrastructure REITs		■											■		
			35102030 Office REITs		■											■		
			35102040 Residential REITs		■											■		
			35102045 Retail REITs		■											■		
			35102050 Storage REITs		■											■		
			35102060 Timber REITs		■											■		
			35102070 Other Specialty REITs		■											■		
40 Consumer Discretionary	4010 Automobiles and Parts	401010 Automobiles and Parts	40101010 Auto Services											■				
			40101015 Tires											■				
			40101020 Automobiles											■				
			40101025 Auto Parts	■										■				
	4020 Consumer Products and Services	402010 Consumer Services	40201010 Education Services	■										■				
			40201020 Funeral Parlors and Cemetery	■										■				
			40201030 Printing and Copying Services	■										■				
			40201040 Rental and Leasing Services: Consumer	■										■				
			40201050 Storage Facilities	■										■				
			40201060 Vending and Catering Service	■										■				
			40201070 Consumer Services: Misc.	■										■				
		402020 Household Goods and Home Construction	40202010 Home Construction	■										■				
			40202015 Household Furnishings	■										■				
			40202020 Household Appliance	■										■				
			40202025 Household Equipment and Products	■										■				
		402030 Leisure Goods	40203010 Consumer Electronics	■										■				
			40203040 Electronic Entertainment	■										■				
			40203045 Toys	■										■				
			40203050 Recreational Products	■										■				
			40203055 Recreational Vehicles and Boats	■										■				
			40203060 Photography	■										■				
		402040 Personal Goods	40204020 Clothing and Accessories	■										■				
			40204025 Footwear	■														
			40204030 Luxury Items	■														
			40204035 Cosmetics	■														
	4030 Media	403010 Media	40301010 Entertainment	■										■				
			40301020 Media Agencies	■										■				
			40301030 Publishing	■										■				
			40301035 Radio and TV Broadcasters	■										■				
	4040 Retail	404010 Retailers	40401010 Diversified Retailers	■														
			40401020 Apparel Retailers	■										■				
			40401025 Home Improvement Retailers	■										■				
			40401030 Specialty Retailers	■										■				
	4050 Travel and Leisure	405010 Travel and Leisure	40501010 Airlines	■		■												
			40501015 Travel and Tourism	■													■	

ICB1 Industry	ICB2 Supersector	ICB3 Sector	ICB4 Subsector	Cat. 1	Cat. 2	Cat. 3	Cat. 4	Cat. 5	Cat. 6	Cat. 7	Cat. 8	Cat. 9	Cat. 10	Cat. 11	Cat. 12	Cat. 13	Cat. 14	Cat. 15
			40501020 Casinos and Gambling	■													■	
			40501025 Hotels and Motels	■													■	
			40501030 Recreational Services	■													■	
			40501040 Restaurants and Bars	■													■	
45 Consumer Staples	4510 Food, Beverage and Tobacco	451010 Beverages	45101010 Brewers	■														
			45101015 Distillers and Vintners	■														
			45101020 Soft Drinks	■														
		451020 Food Producers	45102010 Farming, Fishing, Ranching and Plantations	■														
			45102020 Food Products	■														
			45102030 Fruit and Grain Processing	■														
			45102035 Sugar	■														
		451030 Tobacco	45103010 Tobacco	■														
	4520 Personal Care, Drug and Grocery Stores	452010 Personal Care, Drug and Grocery Stores	45201010 Food Retailers and Wholesalers	■														
			45201015 Drug Retailers	■										■				
			45201020 Personal Products	■										■				
			45201030 Nondurable Household Products	■										■				
			45201040 Miscellaneous Consumer Staple Goods	■										■				
50 Industrials	5010 Construction and Materials	501010 Construction and Materials	50101010 Construction	■										■				
			50101015 Engineering and Contracting Services	■														
			50101020 Building, Roofing/Wallboard and Plumbing	■										■				
			50101025 Building: Climate Control	■										■				
			50101030 Cement	■										■				
			50101035 Building Materials: Other											■				
	5020 Industrial Goods and Services	502010 Aerospace and Defense	50201010 Aerospace	■										■				
			50201020 Defense	■										■				
		502020 Electronic and Electrical Equipment	50202010 Electrical Components											■				
			50202020 Electronic Equipment: Control and Filter	■										■				
			50202025 Electronic Equipment: Gauges and Meters	■										■				
			50202030 Electronic Equipment: Pollution Control	■										■				
			50202040 Electronic Equipment: Other	■										■				
		502030 General Industrials	50203000 Diversified Industrials	■										■				
			50203010 Paints and Coatings	■										■				
			50203015 Plastics	■										■				
			50203020 Glass	■										■				
			50203030 Containers and Packaging	■														
		502040 Industrial Engineering	50204000 Machinery: Industrial											■				
			50204010 Machinery: Agricultural											■				
			50204020 Machinery: Construction and Handling											■				
			50204030 Machinery: Engines											■				
			50204040 Machinery: Tools											■				
			50204050 Machinery: Specialty											■				
		502050 Industrial Support Services	50205010 Industrial Suppliers	■										■				
			50205015 Transaction Processing Services	■														
			50205020 Professional Business Support Services	■														
			50205025 Business Training and Employment Agencies	■														
			50205030 Forms and Bulk Printing Services	■														

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			50205040 Security Services	■										■				
		502060 Industrial Transportation	50206010 Trucking											■				
			50206015 Commercial Vehicles and Parts											■				
			50206020 Railroads											■				
			50206025 Railroad Equipment											■				
			50206030 Marine Transportation											■				
			50206040 Delivery Services											■				
			50206050 Commercial Vehicle-Equipment Leasing											■				
			50206060 Transportation Services									■		■				
55 Basic Materials	5510 Basic Resources	551010 Industrial Materials	55101000 Diversified Materials	■											■			
			55101010 Forestry	■											■			
			55101015 Paper	■														
			55101020 Textile Products	■											■			
		551020 Industrial Metals and Mining	55102000 General Mining	■									■					
			55102010 Iron and Steel	■									■					
			55102015 Metal Fabricating	■									■					
			55102035 Aluminum	■									■					
			55102040 Copper	■									■					
			55102050 Nonferrous Metals	■									■					
		551030 Precious Metals and Mining	55103020 Diamonds and Gemstones	■		■												
			55103025 Gold Mining	■		■												
			55103030 Platinum and Precious Metals	■		■												
	5520 Chemicals	552010 Chemicals	55201000 Chemicals: Diversified	■										■				
			55201010 Chemicals and Synthetic Fibers	■														
			55201015 Fertilizers	■														
			55201020 Specialty Chemicals	■										■				
60 Energy	6010 Energy	601010 Oil, Gas and Coal	60101000 Integrated Oil and Gas											■				
			60101010 Oil: Crude Producers											■				
			60101015 Offshore Drilling and Other Services											■				
			60101020 Oil Refining and Marketing											■				
			60101030 Oil Equipment and Services											■				
			60101035 Pipelines											■				
			60101040 Coal											■				
		601020 Alternative Energy	60102010 Alternative Fuels	■										■				
			60102020 Renewable Energy Equipment	■										■				
65 Utilities	6510 Utilities	651010 Electricity	65101010 Alternative Electricity			■								■				
			65101015 Conventional Electricity			■								■				
		651020 Gas, Water and Multi-utilities	65102000 Multi-Utilities											■				
			65102020 Gas Distribution											■				
			65102030 Water											■				
		651030 Waste and Disposal Services	65103035 Waste and Disposal Services	■			■											

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