

MSCI ESG CLIMATE CHANGE METRICS

Methodology and definitions

MSCI ESG Research LLC

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Introduction

Climate change presents one of the biggest economic and political challenges of the 21st century. In order to reduce the negative impacts of climate change, world leaders in December 2015 through the Paris Agreement decided to limit global warming this century to 2 degrees Celsius, compared with a pre-industrial period (1861-1880) benchmark, and to pursue efforts to limit the warming further to 1.5 degrees Celsius.¹ The Paris Agreement requires all member countries to reduce their greenhouse gas emissions (or carbon emissions²) and strengthen these efforts in the years ahead.

In 2018, the “Emission Gap Report” from the United Nations Environment Program (UNEP) reiterated that achieving the Paris Agreement warming-level target of 1.5 degrees Celsius would require unprecedented and urgent action to expedite the pace of “low carbon transition.”^{3,4}

In the event that the low carbon transition takes place, demand for carbon-intensive products would decline in favor of low/zero carbon products, which would put carbon-intensive companies and industries (for example, coal-based power generation; coal mining, fossil fuel-powered automobile manufacturers, etc.) at risk of having stranded assets. A company may be exposed to low carbon transition risks and opportunities through two transmission channels: (1) exposure through involvement in carbon-intensive operations, and (2) exposure through involvement in carbon-intensive products.

MSCI ESG Climate Change Metrics (formerly known as MSCI ESG Carbon Metrics) are designed to help investors understand companies’ exposure to risks associated with both these transmission channels. It includes more than 500 data points across eight datasets:

1. Carbon emissions
2. Power generation
3. Fossil fuel exposure
4. Clean-tech exposure

¹ The Paris Agreement, <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

² Greenhouse gas emissions, GHG emissions and carbon emissions are used interchangeably. In this document, we have primarily used “carbon emissions” to denote greenhouse gas emissions.

³ United Nations Environment Program (UNEP), Emissions Gap Report 2018, November 2018, http://wedocs.unep.org/bitstream/handle/20.500.11822/26895/EGR2018_FullReport_EN.pdf?isAllowed=y&sequence=1

⁴ The “low carbon transition” refers to the necessary transition of the global economy from carbon-intensive operations and energy sources to zero or low carbon operations and energy sources.

5. Risk exposure and forward-looking risk management assessment
6. Low carbon transition risk assessment
7. Carbon for Sovereigns
8. Carbon emissions estimation for private companies with low disclosure

Each of these datasets is explained in detail in the following sections.

Carbon Emissions

In order to help investors screen their portfolios for companies with carbon-intensive operations, MSCI ESG Research provides carbon emissions (in other words, greenhouse gas emissions) data for the companies in our coverage universe. Please refer to Appendix 1 for more details on the coverage universe for each dataset.

Carbon emissions are classified per the Greenhouse Gas Protocol (GHG Protocol).⁵ The greenhouse gases included in the GHG Protocol are:

1. Carbon Dioxide (CO₂)
2. Methane (CH₄)
3. Nitrous Oxide (N₂O)
4. Hydrofluorocarbons (HFCs)
5. Perfluorocarbons (PFCs)
6. Sulphur Hexafluoride (SF₆)
7. Nitrogen Trifluoride (NF₃)

Per the GHG Protocol, emissions of these gases are grouped in three categories known as Scope 1, Scope 2 and Scope 3 (described below) and are often expressed as "carbon equivalent emissions" or "carbon dioxide equivalent emissions."

- Scope 1 carbon emissions are those directly occurring "from sources that are owned or controlled by the institution, including: on-campus stationary combustion of fossil fuels; mobile combustion of fossil fuels by institution owned/controlled vehicles; and "fugitive" emissions. Fugitive emissions result from intentional or unintentional releases of GHGs, including the leakage of hydrofluorocarbons (HFCs) from refrigeration and air conditioning equipment as well as the release of methane (CH₄) from institution-owned farm animals."
- Scope 2 carbon emissions are "indirect emissions generated in the production of electricity consumed by the institution."
- Scope 3 carbon emissions encompass all other indirect emissions that are "a consequence of the activities of the institution, but occur from sources not owned or controlled by the institution" such as commuting; waste disposal; embodied emissions from extraction, production, and transportation of

⁵ Greenhouse Gas Protocol; <https://ghgprotocol.org/corporate-standard>;

purchased goods; outsourced activities; contractor-owned vehicles; and line loss from electricity transmission and distribution."

As per the GHG Protocol, Scope 3 carbon emissions can be classified into two broad categories:

- Upstream Scope 3 emissions: defined as indirect carbon emissions related to purchased or acquired goods and services; and
- Downstream Scope 3 emissions: defined as indirect carbon emissions related to sold goods and services.

The GHG Protocol further divides these two categories into 15 sub-categories, as described below:

Upstream Scope 3 Emissions:

1. Purchased goods and services
2. Capital goods
3. Fuel and energy-related activities
4. Upstream transportation and distribution
5. Waste generated in operations
6. Business travel
7. Employee commuting
8. Leased assets (upstream)

Downstream Scope 3 Emissions

9. Downstream transportation and distribution
10. Processing of sold products
11. Use of sold products
12. End-of-life treatment of sold products
13. Leased assets (downstream)
14. Franchises
15. Investments

Carbon Emissions Data Collection: Disclosed vs. Estimates

Data Collection Process

MSCI ESG Research collects carbon emissions data for the companies in the coverage universe. Data is collected once per year from most recent corporate sources, including annual reports, Corporate Social Responsibility reports or websites. In addition, MSCI ESG Research uses the carbon emissions data reported through CDP (formerly the Carbon Disclosure Project) or government databases when reported data is not available through direct corporate disclosure.

To ensure consistency, MSCI ESG Research estimates emissions if a company's reporting does not align with the GHG Protocol framework or does not represent emissions across all its geographies and operations. To do so, we apply our proprietary Scope 1+2 Carbon Emissions Estimation models, which are described below. The same applies for companies that do not report Scope 1+2 Carbon Emissions data.

Estimating Carbon Emissions: Scope 1+2

If a company does not report its Scope 1+2 carbon emissions data, we estimate it using our proprietary Scope 1+2 carbon emissions estimation model described below.

Under MSCI ESG Research's Scope 1+2 carbon emissions estimation approach, data disclosed by the companies (current and historical) is used to estimate carbon intensity at the company level and at the industry segment level. Our estimation model for Scope 1+2 carbon emissions has three distinct modules:

1. **Production model** - For power-generating electric utilities, we use fuel-mix (power generation mix) data to estimate Scope 1 carbon emissions from their power-generation activities. In the first step, we collect total power generation volume by fuel type, including:
 - a. Coal
 - b. Liquid Fuels
 - c. Natural Gas
 - d. Nuclear Power
 - e. Renewable Energy

In the next step, we then multiply the power-generation volume by fuel type by the respective average carbon emission factor to calculate the carbon emissions by fuel type. In the last step, we sum the estimated carbon

⁶For Automobile Manufacturers in MSCI ACWI Index involved in the light vehicle manufacturing.

emissions by fuel type to compute the company's Scope 1 emissions from power generation.

2. **Company-specific intensity model** - For companies that have reported carbon emissions data in the past but not for all years, we use a company-specific intensity model. First, we calculate the company's own carbon emissions intensity based on reported carbon emissions and revenue data from past years, where $\text{intensity} = \text{emissions} / \text{revenue}$. We then multiply this calculated intensity figure by the revenue for the year(s) missing reported carbon emissions to derive an estimated carbon emissions figure.

Because these estimates are based on data previously reported by the company, they already reflect the specifics of the businesses and geographies in which the company operates and its own production processes. However, we do not use this model for companies that have undergone corporate actions (for example, mergers & acquisitions) even if such companies have reported data in the past because the reported data may not represent the company's current operational characteristics.

3. **Industry segment-specific intensity model** - For companies that have not reported any carbon emissions data in the past, we use an industry segment-specific intensity model. This model has the following steps:
 - a. Estimate average carbon emissions intensity for 1,000+ industry segments using company specific carbon emission intensities.
 - b. Apply these average intensities to each of the company's reported industry segments for the year in question and multiply each intensity figure by the relevant segment's revenue to calculate estimated emissions.
 - c. Sum the estimated emissions for each industry segment to calculate the company's total estimated carbon emissions for the year in question.

Please note that prior to 2015 emissions estimates, industry-specific carbon intensities were estimated at Global Industry Classification Standard⁷ (GICS®) Sub-Industry level rather than at industry segment level. For more information, please refer to the Carbon Estimation Methodology document on ESG Manager.

Appendix 2 contains a list of Scope 1+2 carbon emissions screening factors. For further details on the Scope 1+2 carbon emissions estimation methodology, please refer to the MSCI Carbon Emissions Estimation methodology document available on ESG Manager.

⁷ GICS is the global industry classification standard jointly developed by MSCI and S&P Global Market Intelligence. For more information, please see <http://www.msci.com/products/indices/sector/gics/>

Estimating Carbon Emissions: Scope 3 Upstream

For estimating Scope 3 upstream emissions, we use an industry segment-specific intensity model. The model uses the following steps:

1. Estimate Scope 3 upstream carbon emissions intensity for 1,000+ industry segments using (1) the company-reported upstream Scope 3 emissions intensity data and (2) the carbon intensity data provided by the Comprehensive Environmental Data Archive (CEDA).⁸
2. Apply these average intensities to each of the company's reported industry segments for the year in question and multiply each intensity figure by the relevant segment's revenue to calculate estimated emissions.
3. Sum the estimated emissions for each business segment to calculate the company's total estimated carbon emissions for the year in question.
4. In addition to the total upstream Scope 3 emissions that include emissions associated with both direct (Tier 1) and indirect suppliers, we also provide the Tier 1 upstream Scope 3 emissions that consider direct suppliers only. To estimate the Tier 1 upstream Scope 3 emissions, we first compute the ratio of Tier 1 upstream Scope 3 emissions intensity and the total upstream Scope 3 emissions intensity using the CEDA data. In the next step, we estimate the Tier 1 upstream Scope 3 carbon emissions intensity for 1,000+ industry segments by multiplying this ratio with the Scope 3 upstream emissions intensity computed in Step 1. We then follow the calculations similar to Step 2 and Step 3 to estimate the Tier 1 upstream Scope 3 carbon emissions.

Appendix 3 contains a list of Scope 3 upstream carbon emissions screening factors.

Estimating Carbon Emissions: Scope 3 Downstream for Automobile Manufacturers

For Automobile Manufacturers, Scope 3 downstream carbon emissions resulting from the use of their sold products could form a substantial part of their overall carbon footprint. In order to estimate this category of emissions (Scope 3 downstream emissions due to "use of sold products"), we follow the guidelines in the GHG Protocol⁹, using the following formula:

⁸ The Comprehensive Environmental Data Archive (CEDA) is a suite of environmentally extended input-output databases that are designed to assist various environmental systems analyses and Life Cycle Assessments (LCA), including carbon footprinting, water footprinting and embodied energy analysis. The dataset is developed by Industrial Ecology Research Services (IERS) LLC.

⁹ http://www.ghgprotocol.org/sites/default/files/ghgp/standards/Scope3_Calculation_Guidance_0.pdf

CO2 emissions from use of sold products = $\sum \text{total lifetime expected uses of product}_i \times \text{number of product sold in reporting period}_i \times \text{fuel consumed per use}_i \times \text{emission factor for fuel}_i$

Here “i” refers to the product type.

For Automobile Manufacturers, the above formula is modified as:

CO2 emissions from use of sold vehicles = $\sum \text{total lifetime expected uses of sold vehicles (kms)}_i \times \text{number of vehicles sold in reporting period by vehicle type (no.)}_i \times \text{carbon efficiency of the vehicle type (gCO2/km)}_i$

Where carbon efficiency of a given vehicle type is computed as:

= $\text{Fuel consumed per km (liters/km)} \times \text{emission factor for fuel (gCO2/liter)}$

Because there is less disclosure of data points required to estimate CO2 emissions for heavy vehicles, in the current dataset the estimates are provided for light vehicles (passenger cars and light commercial vehicles) only.

For light vehicles, the three factors in the above equation are estimated as follows:

1. **Total lifetime expected use of sold vehicles:** We assume the life of a light vehicle to be 10 years and per-year use of a light vehicle to be 15,000 km driven. The total lifetime expected use is thus estimated to be 150,000 kms driven. These values are in line with the lifetime mileage values used by some automobile manufacturers to estimate and report their Scope 3 downstream emissions (for “use of sold products” category).
2. **Number of vehicles sold by vehicle type:** We have defined five categories (vehicle types) under light vehicles. Please refer to Exhibit 1 for more details on the vehicle types and their definitions. In order to estimate the number of light vehicles sold by category / vehicle type, we refer to the company disclosures (annual reports, company website etc.).
3. **Carbon efficiency of the vehicle type:** In order to estimate the carbon efficiency of different vehicles types, we use the following sources:
 - a. Company sources: emissions g/km for each type of vehicle; average fleet emissions etc.
 - b. Regulatory sources such as the U.S. Environment Protection Agency (EPA), the European Environment Agency, the Ministry of Industry, and Information Technology of the People’s Republic of China etc.
 - c. If no disclosures are available, we estimate the carbon efficiency based on the country emission standards and the geographic

make-up of a company's revenue.

To estimate the carbon efficiency of vehicles, we consider only direct /tailpipe emissions.

Exhibit 1: Light Vehicle Types & Definitions

Vehicle Type	Definition
Passenger Car	Passenger Cars excluding multi-utility vehicles, sport-utility vehicles (SUVs), and cars weighing more than 10,000 pounds (4,535 kg).
MPVs/SUVs/LCVs	Multi-purpose vehicles, Light Commercial Vehicles, SUVs, Cross Types, Pickups, with weight of more than 10,000 lbs (4,535 kg). If car is considered a MPV/SUV but weighs less than 10,000 pounds classify as "Passenger Car."
Sports Car	Car designed for spirited performance, usually two-seater, two-door automobile.
Hybrid Vehicles	Vehicle that is powered by a combustion and electric engine; there are different types of hybrid vehicles from mild to plug-in hybrid. Only vehicles emitting less than 50g carbon emissions per km are considered under this category.
Zero emission vehicles	Vehicle that is only powered by electric energy/ hydrogen and therefore emits zero direct emissions; not plug-in electric vehicles

This dataset is available for Automobile manufacturers in the MSCI ACWI Index coverage universe. Please refer to Appendix 3 for more details on the Scope 3 downstream emissions data points available for Automobile Manufacturers.

Appendix 3 also contains a list of other company-reported Scope 3 downstream carbon emissions data.

Ongoing Monitoring and Update Cycle

Carbon emissions data is updated throughout the year following the publication of companies' annual filings on a rolling schedule, within four months for companies in the MSCI ACWI Index and a 12-month timeframe for all others in coverage.

For MSCI ACWI Index companies scheduled for annual update in a given month, data is generally available in ESG Manager five business days before the end of that month.

Carbon Emission Estimates Update Cycle

The bulk update of carbon emissions and intensity estimates for companies with no disclosed data takes place at the beginning of each year. This bulk update is performed after completing full research of companies in the coverage from the previous year for the disclosed data and after obtaining the data from CDP, which is made available in the fourth quarter of each year.

Using MSCI ESG Research collected data and the CDP data, we generate emissions and intensity estimates for companies with no disclosed data. The carbon emission estimates generated are two fiscal years behind the current year (in other words, estimates for FY2017 are published in early 2019).

Power Generation

In order to help clients screen their portfolios/universes for companies involved in carbon-intensive power-generation operations, MSCI ESG Research provides a power-generation module containing power-generation volumes, installed capacity data and power-generation revenue by fuel type for 9,300+ companies. Please refer to Appendix 1 for more details on the coverage universe. Appendix 4 contains a list of power-generation-related screening factors.

Estimation Process: Installed Capacity, Power-Generation Volume and Fuel Mix

Installed Capacity

We use company-reported installed capacity (MW) by fuel type, where available. Where companies report total installed capacity and percentages by fuel type rather than installed capacity by fuel type in MW, we multiply the total by the percentage for each fuel type to calculate MW figures.

Power-Generation Volume

- We use company-reported power-generation volume (MWh) by fuel type, where available. Where companies report total power-generation volume and percentages by fuel type rather than power-generation volume by fuel type (MWh), we multiply the total by the percentage for each fuel type to calculate MWh figures.
- If the company reports total power-generation volume and % installed capacity by fuel type instead of power-generation volume by fuel type, then we first multiply the % installed capacity by fuel type to respective average plant load factors to estimate the proportion of power generation by fuel type. In the next step, we convert those proportion values to percentages and then multiply those percentages by the total power-generation volume to estimate the power-generation volume by fuel type.

Fuel Mix

- We estimate a company's fuel mix by taking the ratio of power-generation volume by fuel type (reported or estimated) and the total power-generation volume.
- When total power-generation volume is not available but the installed capacity by fuel type is available, we first multiply the % installed capacity by fuel type to respective average plant load factors to estimate the proportion of power generation by fuel type. In the next step, we re-scale these proportion values to estimate the fuel-mix percentages.

Estimation Process: Revenue Derived from PowerGeneration by Fuel Type

Many companies do not disclose the revenue derived from power generation by fuel type; we use a two-step process to estimate these figures:

Estimation of total power-generation revenue

- If the company reports power-generation volume by fuel type or if it reports power-generation volume and uses only one type of fuel for power generation, and it reports the price of electricity realized, then we estimate the power-generation revenue by fuel type as the product of generation volume and electricity price.
- When the revenue from power-generation business of a vertically integrated electric utility company, involved in both electricity generation and transmission and distribution business, is not disclosed but the combined revenue of both the businesses is disclosed, we estimate the power-generation revenue for that company in the proportion of its own electricity generation (MWh) to total electricity transmitted (MWh).
- When **the revenue from power generation is not disclosed or is not possible to estimate using the above methods, we first estimate the revenue proportion of different business segments by multiplying the asset turnover ratios¹⁰ of different business segments by total assets employed in respective businesses. In the next step, we convert these proportion values to percentages and multiply the total revenue to estimate the revenue at the business segment level (including for power-generation business).**

Estimation of power-generation revenue by fuel type

- If the company reports revenue from power generation by fuel type or if it reports revenue from power generation and uses only one type of fuel, we use this figure.
- If a company's total power generation revenue is known (either reported or estimated), but its make-up by fuel type is not known, then we multiply the total power-generation revenue by that company's fuel mix to estimate the power-generation revenue by fuel type.

¹⁰ For a company, asset turnover ratio of a given business activity is the ratio of its revenue from and its assets employed in that particular business activity.

Treatment of Discontinued Operations- Power

The decommission of power plants (Coal, Liquid Fuel, Natural gas, Nuclear, Hydropower or renewables, etc), suspension of power plants, or divestment/ selling ownership of power plants have an impact to energy generation by fuel type.

If such an event happens at any point during a financial year, MSCI uses the percentage share of energy generation to calculate the power generation revenue by fuel type if granular revenue by fuel type is not directly reported.

Impact of revenue from such discontinued operations will be removed from Power generation revenues provided at company level once the company stops reporting any operations from a particular fuel type in its disclosures.

Installed capacity flags will be removed immediately when MSCI is informed about the decommissioning, suspension, or sale of the asset in question.

Treatment of Subsidiaries Involved in Power Generation

In cases where a subsidiary's power generation revenue and volume (in MWh/MW) are not accounted for by the parent company in its disclosure, we first check whether the subsidiary's financial data is consolidated by the parent company. If it is being consolidated, we map 100% of its power-generation revenue and volume to the parent company. Otherwise, the parent company is allocated power-generation revenue and volume proportionate to its equity ownership in the subsidiary.

Ongoing Monitoring and Update Cycle

Power generation data is updated throughout the year following the publication of companies' annual filings on a rolling schedule, within four months for companies in the MSCI ACWI Index and in a 12-month time frame for all others in coverage.

For MSCI ACWI Index companies scheduled for annual update in a given month, data is generally available in ESG Manager five business days before the end of that month.

Fossil Fuel Exposure

In order to help clients screen their portfolios/universes for companies with fossil fuel exposure, MSCI ESG Research identifies companies with fossil fuel reserves and revenue.

Fossil Fuel Reserves Data

MSCI ESG Research provides reported fossil fuel reserves data under the following reserve categories for 9,300+ companies (including the MSCI ACWI IMI).

1. Metallurgical coal
2. Thermal coal
3. Conventional oil
4. Shale oil
5. Oil shale & tar sands
6. Natural gas
7. Shale gas

Please refer to Appendix 5 for a detailed description of these categories. Also refer to Appendix 6 for the full list of fossil fuel reserves screening factors.

Data Collection Process

MSCI ESG Research has a dedicated team of analysts responsible for identifying companies with fossil fuel reserves and revenue. Sources include company publications (e.g. annual reports, 10K, 20F) and other public records (such as sustainability reports). Fossil fuel reserves data is updated annually.

As part of our research for fossil fuel reserves, we first identify potential companies with fossil fuel reserves by applying certain criteria including:

- Companies that previously were identified as having fossil fuel reserves
- Companies from likely GICS sub-industries (for example, Diversified Metals & Mining, Oil and Gas Exploration and Production)
- Companies with business segments indicating involvement in oil and gas or mining activities
- Keywords in the company's business description indicating involvement in fossil fuel reserves

In order to achieve consistency with industry reporting standards, MSCI ESG Research collects proved and probable reserves (in other words, 2P) for coal and proved reserves (1P) for oil and natural gas. In some cases, we also consider 2P reserve values for oil and natural gas, if a company does not disclose its 1P reserves. To convert these reserves to potential emissions, we use the following formula from the Potsdam Institute for Climate Impact Research:¹¹

$$E = R \times V \times C \times f$$

Where:

E : Potential emissions (MtCO₂ = Megatons / Million tons of carbon dioxide),

R : Proven recoverable reserves (Gg = gigagrams),

V : Net calorific value of the fuel (TJ/Gg = terajoules per gigagram), (Exhibit 2)

C : Carbon content of the fuel (tC/TJ = tons of carbon per terajoule) (Exhibit 2)

f : a conversion factor (MtCO₂/tC, which is the ratio of the molecular weight of carbon dioxide to carbon divided by 10⁶ = (44/12)/10⁶ = 3.6667 x 10⁻⁶).

Exhibit 2: Net Calorific Value and Carbon Content of Different Types of Fossil Fuels¹²

Fossil Fuel Type	Net calorific value of the fuel (terajoules per gigagram)	Carbon content of the fuel (tons of carbon per terajoule)
Thermal Coal	18.9	26.3
Metallurgical Coal	28.2	25.8
Conventional Oil	42.3	20.0
Shale Oil	38.1	20.0
Oil Shale and Tar Sands	8.9	29.1
Natural Gas	48.0	15.3
Shale Gas	48.0	15.3

¹¹ <http://www.nature.com/nature/journal/v458/n7242/extref/nature08017-s1.pdf>; page 7, Last accessed on February 21, 2018.

¹² Source: MCSI ESG Research, Intergovernmental Panel on Climate Change (2006 IPCC Guidelines for National Greenhouse Gas Inventories; https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf; Table 1.2 and 1.3)

Fossil Fuel Revenue Data

Oil and Gas Revenue related to Extraction and Production

To help clients screen their portfolios for companies involved in various types of oil and gas production, MSCI ESG Research provides an oil and gas revenue exposure module for Integrated Oil and Gas and Exploration and Production companies for the coverage universe described below:

MSCI ESG Research aims to report percentage of revenue (reported or estimated) generated from oil and gas production activities listed below as a percentage of total reported revenue. Specifically, oil and gas revenue are broken down into the following categories¹:

- Oil and Gas extraction and production revenue (%)
- Conventional oil and gas extraction and production revenue (%)
- Unconventional oil and gas extraction and production revenue (%)
- Oil sands extraction and production revenue (%)
- Shale oil extraction and production revenue (%)
- Shale gas extraction and production revenue (%)
- Arctic oil extraction and production revenue (%)
- Arctic gas extraction and production revenue (%)

These revenue factors do **not** include:

- Revenue from non-extraction activities (for example, exploration, surveying, processing, refining);
- Ownership of fossil fuel reserves with no associated extraction and production revenues (as for companies with reserves not yet explored or exploited); Revenue from intra-company sales;
- Revenues from drilling oil and gas wells service providers

Estimation Process: Oil and Gas Extraction and Production Revenue by Category

We use company-reported extraction and production revenue by category, if available. In other cases, when there is no disclosure, we provide estimates. The estimation process is described below:

¹ The following data points are available for the MSCI ACWI Index universe, expanding to MSCI ACWI IMI by late 2019 (9,300+ companies), unless stated otherwise:

- If the revenue from oil and gas production is reported and the company reports only one type of proven fossil fuel reserve (100% oil sands, 100% oil shale etc.), then we use this reserve type to determine the revenue category.
- If total production volume is reported and the company reports only one type of proven fossil fuel reserve (100% oil sands, 100% oil shale etc.), and if the realized price by geographic location is reported by the company, then we estimate the revenue as the product (multiplication) of production volume and the respective reported realized prices.
- If production volume by Oil and Gas type or field is reported and if the realized price by type and by geographic location is reported by the company, then we estimate the revenue by category as the multiplication of production volume and the respective reported realized prices.
- If the production volume is not reported, then we estimate the relevant production volume using the number of productive wells reported by the company for that specific type of production, field or geographic location.
 - To estimate the production volume by type, we first estimate the split between Oil and Gas productive wells based on the company's reserves, and then multiply the number of productive wells by the Energy Information Administration (EIA) average wells production number.¹³
- If the total production volume cannot be estimated or if the company is not disclosing realized prices but the company is involved in the production, then the company is flagged for evidence of corresponding Oil and Gas production type. However, no revenue estimates are provided for such cases.

Conventional vs. Unconventional Oil and Gas Production

Conventional oil and gas production:

- Includes production related to hydrocarbon liquids and gas found in conventional reservoirs and extracted using traditional onshore or offshore drilling techniques (in other words, vertical drilling)
- This category also includes the Arctic oil and gas production, deep-water offshore Oil and Gas production, offshore shallow water oil and gas production found in conventional reservoirs and extracted using traditional drilling techniques¹⁴

Unconventional oil and gas production:

¹³ The EIA reports that in 2017 the average oil well production was 19 barrels/ day and the average gas production 132000 scf/day. https://www.eia.gov/petroleum/wells/pdf/full_report.pdf

¹⁴ Please note that we are introduced in April 2019 some "Febelfin"-specific factors to tailor for the Belgian financial sector federation's definition of conventional and unconventional Oil and Gas.

- Includes shale Oil and Gas, oil sands production. Please refer to Appendix 5 for detailed definitions of shale Oil and Gas and oil sands.
- Includes production related to hydrocarbon liquids and gas found in conventional reservoirs, but extracted using unconventional drilling techniques (i.e. horizontal drilling, hydraulic fracking etc.).
- It also includes any other kind of production activity classified by the company as unconventional Oil and Gas production.
- In case of lack of disclosures for the breakdown between conventional and unconventional revenues for a company involved in both, conventional and unconventional oil and gas production, the company will be flagged for unconventional production (shale oil, shale gas or oil sands), and the total extraction and production revenues will be attributed to conventional revenues.

Treatment of Discontinued Operations- Oil and Gas

Suspension of oil and gas operations or selling an oil/gas division are likely to have an impact to the maximum revenue percentage provided at company level. If such an event occurs during a financial year, MSCI uses the revenues contributed by the operations in question to calculate the maximum revenue percentage (for that year).

Impact of revenue from such discontinued operations will be removed from maximum revenue percentage provided at company level once the company stops reporting any revenue from these operations in its disclosures.

In case the suspension, decommissioning or sale of an oil and gas asset has an impact on its reserves, reserves flags and volumes will be removed immediately when MSCI is informed about the suspension, decommissioning, or sale of the asset in question.

Oil and Gas Revenue related to Other Business Activities in the ValueChain

MSCI ESG Research collects data on revenue derived from following Oil and Gas-related business activities (beyond Extraction and Production):

- Oil and Gas equipment and services;
- Oil and Gas refining;
- Oil and Gas pipelines and transportation;
- Oil and Gas distribution and retailing;
- Petrochemical products;
- Trading of Oil and Gas and related products; and

- Biofuel

Thermal Coal Mining Revenue Data

In addition to Oil and Gas revenue, MSCI ESG Research also identifies revenue associated with thermal coal mining. Screen definitions and revenue estimation process for thermal coal mining are provided below.

Screen Definitions

This screen identifies the percentage of revenue (either reported or estimated) that companies derive from the mining of thermal coal (including lignite, bituminous, anthracite and steam coal) and its sale to external parties, and contract mining services.

MSCI ESG Research's thermal coal revenue research does not include:

- Revenue from metallurgical coal (in other words, coal used in the production of steel);
- Coal mined for internal power generation (for example, in the case of vertically integrated power producers);
- Intra-company sales of mined thermal coal;
- Revenue from coal trading;
- Royalty income for companies not involved in thermal coal extraction operations.

Revenue Estimation Process

MSCI ESG Research relies on company-reported information in public documents, investor presentations, websites, etc. to estimate revenues derived only from mining thermal coal.

Revenue may be reported by production type, project or region. Revenue derived from joint ventures, associates and affiliates are included in the estimation, if the information is provided in publicly available information of the company; companies are attributed production volume or revenue equivalent to their ownership share. To determine when coal mined by the company is relevant to this screen, we review information about its customers and operations as well as directly reported revenue figures.

- **By production type:** If revenue from thermal coal is reported directly, this figure is used. Where necessary, we make adjustments to exclude revenue from intra-company sales of thermal coal or other coal-related revenues that are not included in this screen.
- **By project:** If revenue is reported by project, we identify which (including joint ventures) are thermal coal projects and sum the revenues associated with them.

- **By region:** If revenue is reported by region, we map which company projects (including joint ventures) are located in each region. Where possible, we then use project production volumes and average sales price data for the fiscal year in question to estimate revenues for each relevant project. Please refer to the Appendix 7 for the complete list of Thermal Coal and Oil and Gas revenuescreening factors and definitions.

Metallurgical Coal Mining Revenue Data

In addition to Oil and Gas revenue, MSCI ESG Research also identifies revenue associated with metallurgical coal mining. Screen definitions and revenue estimation process for metallurgical coal mining are provided below.

Screen Definitions

This screen identifies the percentage of revenue (either reported or estimated) that companies derive from the mining of metallurgical coal (including coking coal) and its sale to external parties, and contract mining services.

MSCI ESG Research's metallurgical coal revenue research does not include:

- Revenue from thermal coal (in other words, coal used for power generation);
- Coal mined for internal use in steel production;
- Intra-company sales of mined metallurgical coal;
- Revenue from coal trading;
- Royalty income for companies not involved in metallurgical coal extraction operations.

Revenue Estimation Process

MSCI ESG Research relies on company-reported information in public documents, investor presentations, websites, etc. to estimate revenues derived only from mining metallurgical coal.

Revenue may be reported by production type, project or region. Revenue derived from joint ventures, associates and affiliates are included in the estimation, if the information is provided in publicly available information of the company; companies are attributed production volume or revenue equivalent to their ownership share.; companies are attributed production volume or revenue equivalent to their ownership share. To determine when coal mined by the company is relevant to this screen, we review information about its customers and operations as well as directly reported revenue figures.

- **By production type:** If revenue from metallurgical coal is reported directly, this figure is used. Where necessary, adjustments are made to exclude revenue from intra-company sales of metallurgical coal or other coal-related

revenues that are not included in this screen.

- **By project:** If revenue is reported by project, we identify which (including joint ventures) are metallurgical coal projects and sum the revenues associated with them.
- **By region:** If revenue is reported by region, we map which company projects (including joint ventures) are located in each region. Where possible, we then use project production volumes and average sales price data for the fiscal year in question to estimate revenues for each relevant project. Please refer to the Appendix 7 for the complete list of Metallurgical Coal screening factors and definitions.

Treatment of Discontinued Operations- Thermal & Metallurgical Coal

Sale of coal mines, suspension of operations at a mine, or selling a coal division have an impact to the maximum revenue percentage provided at company level. If such an event happens during a financial year, MSCI uses the revenues contributed by the respective operations to calculate the maximum revenue percentage (for that year).

Impact of revenue from such discontinued operations will be removed from maximum revenue percentage once the company stops reporting any revenue from these operations in its disclosures.

In case the suspension, decommissioning or sale of a mine has an impact on its reserves, reserves flags and volumes will be removed immediately when MSCI is informed about the suspension, decommissioning, or sale of the asset in question.

Ownership and Fossil Fuel Reserves

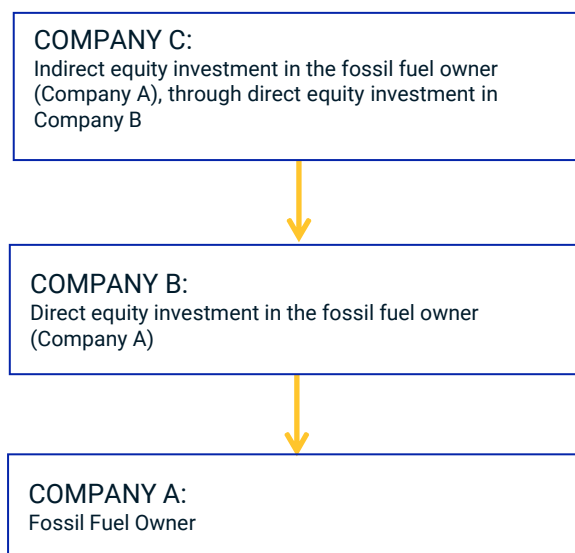
A company may have exposure to fossil fuels through its direct or indirect equity investment in other companies owning fossil fuel reserves. We use the following guidelines to flag such companies.

A company (Company B, refer to Exhibit 3) with direct equity investment in another company owning fossil fuel reserves (Company A) is allocated fossil fuel reserves and revenues proportionate to its equity ownership in the latter.

A company (Company C) with indirect equity investment in another company owning fossil fuel reserves (Company A) is flagged for fossil fuel reserve and revenue evidence subject to following two thresholds:

- Fossil fuel owner (Company A) accounts for more than 10 percent of its total assets or;
- It has a more than 20-percent interest in the fossil fuel owner (Company A).

Exhibit 3: Ownership and Fossil Fuel Reserves



Pre-Defined Fossil Fuel Screens

MSCI ESG Climate Change Metrics offers pre-defined screens to measure and help clients identify exposure to fossil fuels. Please refer to Appendix 8 for more details on pre-defined screens.

Urgewald Data

MSCI is making Urgewald's Global Coal Exit List (GCEL) data available through ESG Manager. The screen identifies companies expanding their coal mining activities, developing new coal power plants or building other coal-related infrastructure, such as coal export terminals or coal railway lines. The data are provided as is, without any intervention from MSCI ESG Research.

MSCI will be publishing annually data from Urgewald's Global Coal Exit List indicating expansion based on the following criteria:

Power: Companies planning to develop new coal-fired power capacity of at least 100 MW.

Mining: Companies involved in coal exploration activities; planning to develop new coal mines or extending existing coal mines.

Services: Companies involved in the development or expansion of coal transportation assets or other coal-related infrastructure such as coal-to-gas facilities.

Additionally, MSCI will be providing GCEL's coal power expansion plans data in total MW and prorated for companies with projects that have been announced, pre-permitted, permitted or under-construction. Datapoints with the company's website and related reports is also provided.

The coverage is based on Urgewald's listed equities mapped to MSCI's Carbon coverage universe.

Companies in the GCEL list but outside of MSCI standard climate coverage may be omitted from the original list.

For any additional information including queries on companies, clients should reach directly to Urgewald at msci.clients.requests@urgewald.org.

EU Paris Alignment – Minimum Exclusion Components supporting template 1 for the EBA Pillar 3 ESG disclosure

These screens have been developed as a tool to support compliance of banks with climate-related regulations, specifically alignment to the Paris Climate Agreement as defined per the EU Paris-aligned Benchmarks and referenced in the climate disclosure regulations from the European Banking Authority (EBA Pillar 3 – disclosure of ESG risk). The screens identify the exposure of companies under climate change metrics coverage from revenues from fossil fuel related sectors, companies involved in significant environmental controversies and identify exposure to companies excluded from EU Paris-aligned Benchmarks.

The European Banking Authority (EBA) from December 2023 will require banks to disclose specific information about climate-related risks and how they plan to address them. The EBA will require banks to disclose their exposure to transition risks, including their exposure to carbon-intensive activities, fossil fuels and financed emissions and physical risks, in the form of assets directly at risk from the impacts of climate change. Banks will also be required to disclose to what extent their financing activities are likely to meet net zero goals. As part of the template 1, banks would be required to identify their exposure to companies excluded from EU Paris-aligned Benchmarks.

The below screens are built on MSCI's Climate Change Metrics fossil fuel data set

Paris Aligned minimal exclusion criteria (EBA Pillar III Template 1)

- Thermal Coal revenue: All companies deriving 1% or more revenue (either reported or estimated) from the exploration, mining, extraction, and distribution of hard coal (including lignite, bituminous, anthracite and steam coal) and its sale to external parties. It excludes revenue from metallurgical coal, coal mined for internal power generation (e.g., in the case of vertically integrated power producers), intracompany sales of mined thermal coal, and revenue from coal

trading (either reported or estimated). It also excludes revenue from the refining of hard coal.

- Oil revenue: All companies deriving 10% or more revenue from oil related activities, including distribution / retail, extraction and production, pipelines and transportation and refining but excluding biofuel production, petrochemicals production, revenue from equipment and services companies and sales and trading activities.
- Gas revenue: All companies deriving 50% or more revenue from gas related activities, including exploration, extraction, manufacturing, or distribution of gaseous fuels.
- Power Generation revenue: All companies deriving 50% or more revenue from power generation with Carbon emissions intensity higher than 100 gCO₂e/kWh. MSCI's factor to address these criteria considers intensity on a total company basis, considering all publicly disclosed information on total Scope 1 and 2 emissions and total power generation.
- Environmental controversies: Companies involved in significant environmental controversy and in violation of one or more of the environmental objectives referred to in Article 9 of Regulation EU (2020/852). These are defined as environmental controversies of severe and very severe nature based on MSCI's assessment
- Exclusion from EU Paris Aligned Benchmarks: All companies that are involved in the activities marked above, hence excluded from EU Paris Aligned benchmarks in accordance with points (d) to (g) of Article 12.1 and in accordance with Article 12.2 of Climate Benchmark Standards Regulation.

Ongoing Monitoring and Update Cycle

Data for Fossil Fuel Exposure is updated throughout the year following the publication of companies' annual filings on a rolling schedule, within two months for companies in the MSCI ACWI Index and a three-month time frame for all other companies in coverage.

For companies scheduled for an annual update in a given month, data is generally available in ESG Manager five business days before the end of that month.

Data	Factor Name	Description
>=1% revenue: coal involvement	REV_COAL_INVLVMT_1PCT	This factor identifies companies with revenue from exploration, mining, extraction or distribution of hard coal and lignite totaling at least to 1% or more of annual revenues
>=10% revenue: oil involvement	REV_OIL_INVLVMT_10PCT	This factor identifies companies with revenue from exploration, extraction, distribution and refining of oil fuels totaling at least to 10% or more of annual revenues
>=50% revenue : gas involvement	REV_GAS_INVLVMT_50PCT	This factor identifies companies with revenue from exploration, extraction, manufacturing or distribution of gaseous fuels totaling at least to 50% of annual revenue.
>=50% revenue: power generation with intensity >100 gCO₂e/kWh	REV_PWRGEN_50PCT	This factor identifies companies that generate at least 50% annual revenue from power generation with GHG intensity above 100 gCO ₂ e/kWh
Significant Environmental Controversy	ENVRNMNT_CONTRO	This factor identifies companies that are involved in significant harm against one or more of the environmental objectives referred to in Article 9 of Regulation EU (2020/852)-Defined as companies with a severe or very severe Environmental Controversy Score of 0 or 1
Exclusion from EU Paris aligned Benchmarks	EU_PAB_EXCLUSION	This factor identifies companies that excluded from EU Paris aligned benchmarks in accordance with points (d) to (g) of Article 12.1 and in accordance with Article 12.2 of Climate Benchmark Standards Regulation

Clean Tech Exposure

In order to understand companies' exposure to clean technology products and services, MSCI ESG Research provides revenue estimates for the following categories through its Sustainable Impact Metrics product:

- Alternative Energy
- Energy Efficiency
- Green Building
- Sustainable Water
- Pollution Prevention

For further details, please refer to the MSCI ESG Sustainable Impact Metrics methodology document available on ESG Manager. The coverage universe for this dataset is the MSCI ACWI IMI.

Capital Expenditure Data and Renewable Energy CapEx Ratio

Company capital expenditure (CapEx) plans are available as part of this data set. The latest reported historical CapEx values are also provided for companies where forward-looking plans are not available. Company-disclosed CapEx plans are captured within the below categories.

Factor descriptions are available in Appendix 9.

Exhibit 4: Business Activity Categorization of CapEx Data

Business activity	Description of Business Activity	Reference
Electric networks	Electricity distribution and transmission	1
Gas networks	Utility gas distribution and transmission (excludes unregulated oil and gas transportation)	2
Heat networks	District heating and/or cooling networks	3
Total networks	Sub-total	4 = 1+2+3
Coal	Coal-fired power generation	5
Oil	Oil-fired power generation	6
Gas	Gas-fired power generation	7
Nuclear	Nuclear power generation	8
Total thermal generation	Sub-total	9=5+6+7+8
Hydro	Hydro-power generation	10
Wind	Wind power generation	11
Solar	Solar power generation	12
Biomass	Biomass power generation	13
Other renewables	Unspecified renewables technology or not specified as wind, solar and/or biomass	14
Total Renewables generation	Sub-total	15=10+11+12+13+14
Other 'green'	Electric vehicles charging infrastructure, smart grids and networks, low carbon customer solutions (energy efficiency, customer renewables installation, etc.)	16
Other	All other expenditure	17
Total capital expenditure	Sub-total	18=4+9+10+16+17

Data Collection

We use the company-disclosed CapEx amount by business activity and by fuel type for power generation, where available. Where companies disclose total capital expenditure and proportions by business activity and/or fuel type expressed in percentage terms, we multiply the total value by the proportion for each category to calculate CapEx per business activity and fuel type.

Where a company's disclosure is not available at the most granular level, we capture the data at an aggregated category level if possible (e.g. if capital expenditure in thermal power plants is available, but the exact fuel is unspecified, the amount would be captured within 'Total thermal generation' sub-total. We would not estimate the split by fuel and would leave those categories blank. Therefore, a null value may not signify zero CapEx in a category, rather it may signify a lack of information at that level of granularity.

Where a company has no disclosed capital expenditure in a given business activity and we have evidence that the company's business mix does not include this activity, this is indicated as a zero in the dataset (e.g. a company has no gas transportation network business and there is no mention of capital expenditure in gas networks in its disclosures).

Sectors currently covered by the dataset include companies classified as integrated oil and gas, oil and gas exploration and production, and utilities following the Global Industry Classification Standard.²

For the purpose of this dataset, technologies considered 'renewable' include hydro-power generation (regardless of scale), wind, solar, biomass, geothermal, wave. This set of technologies may not fully correspond to some regulatory classifications, including EU regulations such as the EU Taxonomy on Sustainable Finance. Our selection of technologies has been driven by data availability. Companies often disclose CapEx in renewable technologies without specifying the technology breakdown. Hydro-power and biomass are often included as renewable in company disclosures and as a result are included as such in our data template.

Where there is no forward-looking disclosure available, a breakdown of the latest reported historical capital expenditure is used. Allocation of latest reported CapEx follows the same principles as described above. The timeframe of CapEx data captured for each company is indicated in the supporting data fields (forward-looking or historical and CapEx plan start and end year).

Renewable Energy Capex Ratio

The renewable energy CapEx ratio is calculated following the guidance in the EU Commission Delegated Regulation 2020/1816. This is defined as capital expenditure in renewable energy as a share of total company capital expenditure

² The Global Industry Classification Standard (GICS) was developed by and is the exclusive property of MSCI and Standard & Poor's. "Global Industry Classification Standard (GICS)" is a service mark of MSCI and Standard & Poor's.

(e.g. category 15 divided by category 18 as per Exhibit 4 above). The calculation uses MSCI ESG Research's definition of renewable energy as defined above.

Exhibit 5: Renewable CapEx Ratio Calculations for Two Companies

Sector	Company	Renewable energy CapEx (EUR billion)	Total CapEx (EUR billion)	Renewable energy CapEx ratio	Source
Utilities	Enel Spa	12.5	29	43% = 12.5/29	CapEx plan for 2020-2022
Energy	ENI Spa	2.6	29	9% = 2.6/29	CapEx plan for 2020-2023

Caveats and assumptions:

- Ratio is dependent on the definition of 'renewable energy'** - The ratio captures a limited set of lower carbon intensity activities, i.e. lower carbon power generation technologies only. Diversification into all other low carbon solutions or business activities such as electric vehicles infrastructure, energy efficiency, low carbon customer solutions, biofuels and others are currently excluded from the ratio.
- Ratio should be interpreted with caution for diversified businesses** - Comparison of investments in renewable energy generation against total company CapEx could lead to varying interpretations, especially for diversified utilities.

For example, Enel's renewable energy CapEx ratio is calculated at 43%. This differs materially from its share of planned renewable power generation capacity additions relative to total company capacity additions (11,900 MW of solar, wind and hydro capacity additions represent 100% of Enel's planned capacity additions for the period 2020-2022). The reason for the difference is the denominator – the renewable energy CapEx ratio measures renewable energy CapEx against total company CapEx (including CapEx earmarked for business other than power generation). The ratio using capacity additions data measures renewables investments as a share within the power generation segment only.

Each approach may have merits and limitations depending on the intended use. Granular CapEx data by business segment and by fuel type (subject to data availability) is available through this dataset to provide transparency and to inform other ratios calculated by the user.

Risk Exposure & Forward-Looking Risk Management Assessment

As part of MSCI ESG Ratings, we assess companies' exposure to and management of several climate-related "issues." An issue is considered to be a "Key Issue" for a company if the company may be forced to internalize associated unanticipated costs related to it in the future. The risk exposure assessment is intended to assess the extent to which a company is exposed to a material issue (or Key Issue). Under risk management assessment, we assess the strength of a company's strategy and other-forward looking measures to mitigate the risk. We provide risk exposure and risk management assessment on several climate-related Key Issues:

1. Carbon Emissions
2. Product Carbon Footprint
3. Financing Environmental Impact
4. Climate Change Vulnerability
5. Water Stress
6. Opportunities in Clean Tech
7. Opportunities in Renewable Energy
8. Opportunities in Green Building

Risk Exposure Assessment

Our assessment of risk exposure may comprise three areas of analysis, depending on the Key Issue:

1. **Business Segment Risk Exposure** – analyzes the breakdown of a company’s business in terms of revenues, assets or operations to understand its exposure to risks driven by climate change.
2. **Geographic Segment Risk Exposure** – analyzes the breakdown of a company’s geographic segments in terms of revenues, assets or operations to understand its exposure to risks driven by climate change.
3. **Company-Level Risk Exposure factors** – such as number of employees, size, reliance on government contracts or reliance on outsourced production to understand its exposure to risks driven by climate change.

To assess **Business Segment Risk Exposure**, we collect data on the breakdown of a company’s revenues and/or operations by Standard Industry Classification (SIC) Code. Each of over 1,000 SIC Codes receives a risk (or opportunity) score based on our analysis of large amounts of data relevant to each Key Issue.

Business segment risk scores typically measure the expected external impact of a given business activity, for example, expected carbon emissions per dollar of revenue, expected accident or fatality rate, expected water consumption, expected toxicity of output, etc.

To assess **Geographic Segment Risk Exposure**, we analyze the geographic segmentation of sales, assets and operations. In general, segments are defined as countries of operations, but for some Key Issues we assess geographic exposure at a sub-national level, for example mapping facilities to distinct water basins. Furthermore, when country-level segmentation is not available, we estimate country exposure by using the gross domestic product (GDP)-weighted breakdown of regions. Geographic Segment Exposure Scores are assigned to each country for Key Issues in which we observe differences across countries in the level of risk or opportunity, based on factors such as:

- Stringency and expected change in regulations
- Country-level risk factors such as differential employee fatality rates or corruption levels
- For opportunities, differences in incentive structures and subsidies by country

Finally, for certain Key Issues we assess **additional measures of exposure**, including number of employees, reliance on government contracts, volume of sensitive commodities sourced, estimated percentage of production that is outsourced, etc.

Forward-Looking Risk Management Assessment

The management assessment of the above Key Issues typically falls into three broad categories:

1. **Strategy & Governance:** Although specific indicators differ across Key Issues, the Strategy & Governance section typically evaluates organizational capacity and company management's level of commitment to addressing the key risks and opportunities, including the level and extent of organizational responsibility for the specific risks/opportunities, strength and scope of policy commitments and strength and scope of commitment to standards.
2. **Initiatives & Programs:** The Initiatives section typically evaluates the strength and scope of the initiatives, programs and targets in place to improve performance on the issue.
3. **Performance:** The Performance section evaluates the company's track record on managing the specific risk or opportunity. Performance involves collecting, standardizing and benchmarking a range of quantitative indicators, where applicable, as well as an evaluation of qualitative indications of performance. As part of the qualitative indication of a company's performance, we incorporate information on controversies in which a company has been implicated.

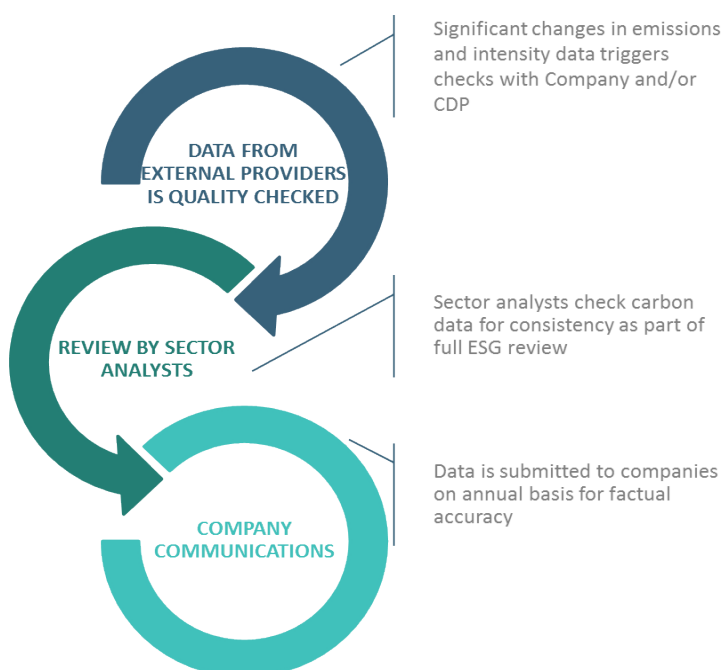
For further details, please refer to the MSCI ESG Ratings and MSCI ESG Metrics methodology documents available on ESG Manager.

Quality Review Process

MSCI ESG Research's quality review process includes:

- Peer Review: Carbon emissions, power-generation and fossil fuel reserves data is cross-checked by peers.
- Industry Leads Review: data is reviewed by senior analysts covering the Energy, Utility and Materials sectors.
- Company Data Verification: companies reporting carbon emissions, power generation and fossil fuel reserves data are invited to confirm the data.

Exhibit 6: MSCI ESG Research's Process to Address Data Quality



Low Carbon Transition Risk Assessment

MSCI ESG Research provides the Low Carbon Transition Risk Assessment for companies covered. This assessment is designed to identify potential leaders and laggards by holistically measuring companies' exposure to and management of risks and opportunities related to low carbon transition.

This assessment uses previously discussed datasets (for example, carbon emissions, power generation, fossil fuel revenue, clean-tech exposure, forward-looking risk management etc.) as input and provides comprehensive assessment of low carbon transition risk at the company level. The final output of this assessment is two company-level factors, as described below:

(1) Low Carbon Transition Category: This factor groups companies in five categories that highlight the risks and opportunities they are most likely to face in the transition (Exhibit 7).

(2) Low Carbon Transition Score: This score is based on a multi-dimensional risks and opportunities assessment and considers both predominant and secondary risks a company faces. It is industry-agnostic and represents an absolute assessment of a company's position vis-à-vis the transition.

For further details, please refer to the “Climate Change Metrics – Low Carbon Transition Risk Assessment” methodology document available on ESG Manager.

Exhibit 7: Low Carbon Transition Categories and Scores

LOW CARBON TRANSITION SCORE	LOW CARBON TRANSITION CATEGORY		LOW CARBON TRANSITION RISK / OPPORTUNITY	COMPANY EXAMPLES
Score = 0	ASSET STRANDING		Potential to experience “stranding” of physical / natural assets due to regulatory, market, or technological forces arising from low carbon transition.	Coal mining & coal based power generation; Oil sands exploration/production
	TRANSITION	PRODUCT	Reduced demand for carbon-intensive products and services. Leaders and laggards are defined by the ability to shift product portfolio to low-carbon products.	Oil & gas exploration & production; Petrol/diesel based automobile manufacturers, thermal power plant turbine manufacturers etc.
		OPERATIONAL	Increased operational and/or capital cost due to carbon taxes and/or investment in carbon emission mitigation measures leading to lower profitability of the companies.	Fossil fuel based power generation, cement, steel etc.
	NEUTRAL		Limited exposure to low carbon transition carbon risk. Though companies in this category could have exposure to physical risk and/or indirect exposure to low carbon transition risk via lending, investment etc.	Consumer staples, healthcare, etc.
Score = 10	SOLUTIONS		Potential to benefit through the growth of low-carbon products and services.	Renewable electricity, electric vehicles, solar cell manufacturers etc.

Carbon for Sovereigns

MSCI ESG Research provides 28 data points for sovereign issuers to highlight a country's exposure to transition risk and physical and economic vulnerability related to climate change (Appendix 10). The data is collected from sources such as the United Nations (UN), World Bank, Central Intelligence Agency (CIA), etc. and is updated annually. It also includes a number of carbon emissions factors (CO₂ and GHG), their corresponding intensities and trend calculation that can be used to calculate the carbon footprint of sovereign investments. This dataset covers 198 sovereign issuers.

In October 2023, MSCI ESG Research added 61 factors including production-based and consumption-based emissions for sovereign emissions based on Partnership for Carbon Accounting Financials (PCAF) principles. The details of the methodology can be found in the **Total Portfolio Footprinting Methodology** document available on ESG Manager.

MSCI Bloomberg Paris Aligned Indexes

MSCI in cooperation with Bloomberg has constructed an index based on a selection of companies which have decarbonized by more than 7% over the last 2 years. MSCI ESG Research is making available 3 years of historical data for Scopes 1, 2 and 3 emissions, sales, EVIC, and intensity. For more information on the datapoints please refer to Appendix 11

Carbon Emissions Estimation for Private Companies with Low Disclosure

This section details the methodological approach adopted for estimating the Scope 1 and Scope 2 carbon emissions for private companies with low levels of disclosure.¹⁷ This estimation approach requires following company level data points:

1. Company's industry.¹⁸
2. Revenue (in USD)

Scope 1, Scope 2 and Scope 1+2 carbon emissions are estimated using the following formulas:

Scope 1 Carbon emissions (metric tons) = Scope 1 industry intensity (metric tons / USD million revenue) x Revenue (USD million)

Scope 2 Carbon emissions (metric tons) = Scope 2 industry intensity (metric tons / USD million revenue) x Revenue (USD million)

Scope 1+2 Carbon emissions (metric tons) = Scope 1+2 industry intensity (metric tons / USD million revenue) x Revenue (USD million)

To inform Scope 1, Scope 2 and Scope 1+2 industry intensities in the above formulas, we use emission intensities from our GICS Sub-Industry (GICS SI) Intensity Model.

GICS Sub-Industry (GICS SI) Intensity Model

Below are the steps we take to estimate Scope 1, Scope 2, and Scope 1+2 emissions intensity at the GICS Sub-Industry (GICS SI) level.

1. We use "company specific carbon emission intensities" of companies reporting their carbon emissions data to compute the GICS SI level intensities. Refer to page 9 for more details on "company specific carbon emissions intensities" estimation methodology.
2. Within a given GICS SI, we first remove outliers by excluding the companies with "company specific carbon emission intensities" below the 10th percentile or above the 90th percentile.
3. After removing the outliers, we calculate the GICS SI level intensity as the average of remaining values.

Confidence level of GICS SI carbon intensities

To determine the confidence level of the estimated GICS SI emission intensities, we calculate the coefficient of variance (CV) as the ratio of standard deviation (SD) of company-specific carbon intensities and estimated GICS SI intensity.

¹⁷This dataset, Carbon Emissions Estimates for Private Companies, is not a part of standard Climate Change Metrics package and is licensed to users separately.

¹⁸ Refers to company's GICS sub-industry. If the GICS sub-industry information is not available, then the industry is assigned according to principal business activity of the company.

Here, the standard deviation is computed after removing the outliers. We have set five levels of confidence in the results, as shown in the table below, the highest when the coefficient of variance is less than 0.25, and the lowest when it is above 1.00.

Exhibit 8: Confidence levels of GICS SI intensities

1. Coefficient of Variance	2. Confidence Level
0.00 to less than 0.25	High
0.25 to less than 0.50	Moderately High
0.50 to less than 0.75	Moderate
0.75 to less than 1.00	Moderately Low
Above 1.00	Low

To assign the estimation key for Scope 1+2 emissions, we take a combination of the scope 1 and scope 2 estimation keys. The logic is described in below table.

Exhibit 9: Estimation key combination logic for Scope 1+2 (GICS-SI intensity model)

KEY Combinations		Scope 1 Key				
		E.GICSSI-High	E.GICSSI-Moderately High	E.GICSSI-Moderate	E.GICSSI-Moderately Low	E.GICSSI-Low
Scope 2 Key	E.GICSSI-High	E.GICSSI-High	E.GICSSI-Moderately High	E.GICSSI-Moderate	E.GICSSI-Moderately Low	E.GICSSI-Low
	E.GICSSI-Moderately High	E.GICSSI-Moderately High	E.GICSSI-Moderately High	E.GICSSI-Moderate	E.GICSSI-Moderately Low	E.GICSSI-Low
	E.GICSSI-Moderate	E.GICSSI-Moderate	E.GICSSI-Moderate	E.GICSSI-Moderate	E.GICSSI-Moderately Low	E.GICSSI-Low
	E.GICSSI-Moderately Low	E.GICSSI-Moderately Low	E.GICSSI-Moderately Low	E.GICSSI-Moderately Low	E.GICSSI-Moderately Low	E.GICSSI-Low
	E.GICSSI-Low	E.GICSSI-Low	E.GICSSI-Low	E.GICSSI-Low	E.GICSSI-Low	E.GICSSI-Low

The table below provides brief description of the carbon emissions factors available for private companies:

Exhibit 10: Carbon Emissions factors for Private Companies

Output Factors	Factor Short Names	Description
Carbon Emissions - Scope 1 (metric tons)	CARBON_EMISSIONS_SC OPE_1	Company's most recently reported or estimated Scope 1 carbon emissions.
Carbon Emissions - Scope 1 KEY	CARBON_EMISSIONS_SC OPE_1_KEY	Indicates whether the Scope 1 emissions figure was reported by the company or estimated.
Carbon Emissions - Scope 1 Intensity (t/USD million EVIC)	CARBON_EMISSIONS_EVI C_SCOPE_1_INTEN	Represents the company's most recently reported or estimated Scope 1 greenhouse gas emissions normalized by enterprise value including cash in million USD.
Carbon Emissions - Scope 2 (metric tons)	CARBON_EMISSIONS_SC OPE_2	Company's most recently reported or estimated Scope 2 carbon emissions.
Carbon Emissions - Scope 2 KEY	CARBON_EMISSIONS_SC OPE_2_KEY	Indicates whether the Scope 2 emissions figure was reported by the company or estimated.
Carbon Emissions - Scope 2 Intensity (t/USD million EVIC)	CARBON_EMISSIONS_EVI C_SCOPE_2_INTEN	Represents the company's most recently reported or estimated Scope 2 greenhouse gas emissions normalized by enterprise value including cash in million USD.
Carbon Emissions - Scope 1+2 (metric tons)	CARBON_EMISSIONS_SC OPE_12	Company's most recently reported or estimated Scope 1+2 carbon emissions.
Carbon Emissions - Scope 1+2 Intensity (t/USD million sales)	CARBON_EMISSIONS_SC OPE_12_INTEN	Represents the company's most recently reported or estimated Scope 1 + Scope 2 carbon emissions normalized by sales in million USD.
Carbon Emissions - Scope 1+2 Intensity (t/USD million EVIC)	CARBON_EMISSIONS_EVI C_SCOPE_12_INTEN	Represents the company's most recently reported or estimated Scope 1 and 2 emissions normalized by the most recently available enterprise value including cash (EVIC) in million USD.
Carbon Emissions - Scope 1+2 KEY	CARBON_EMISSIONS_SC OPE_12_KEY	Indicates whether the Scope 1+2 emissions figure was reported by the company or estimated.
Carbon Emissions - Scope 1+2 Intensity Year	CARBON_EMISSIONS_INT ENSITY_YEAR	Represents the most recent year for Scope 1+2 Intensity.

Appendices

Appendix 1: Coverage & Introduction Date

Dataset	Introduction Date	Coverage (As of March 2021)
Carbon Emissions: Scope 1+2 (reported and estimated), and reported data for Scope 3. Includes time series starting in FY2008	October 2014	10,000+ companies, including MSCI ACWI Investable Market Index (IMI), over 95% of equity and fixed income market value
Carbon Emissions: Scope 3 Upstream Estimates (legacy model)	September 2018, no longer updated since 2020	
Carbon Emissions: Scope 3 Downstream (Automobile Manufacturers) (legacy model)	April 2018, no longer updated since 2020	MSCI ACWI IMI
Carbon Emissions: Scope 3 upstream and downstream estimation model	May 2020	9,300+ companies, including MSCI ACWI Investable Market Index (IMI)
Power Generation Volume & Fuel Mix	MSCI ACWI: September 2016 MSCI ACWI IMI: Feb. 2017	10,000+ companies, including MSCI ACWI Investable Market Index (IMI) Over 95% of equity and fixed income market value
Power Generation Revenue	May 2017	
Fossil Fuel Reserves	October 2014	
Fossil Fuel Revenue: Thermal Coal & Oil Sands	5% and up: April 2016 0% and up: March 2017	
Fossil Fuel Revenue: Oil and Gas (except Oil Sands, & Arctic and Shale Oil and Gas,)	May 2017	

Dataset	Introduction Date	Coverage (As of March 2021)
Fossil Fuel Revenue: Arctic and Shale Oil and Gas	October 2018	
Clean-Tech Exposure	October 2014	
Green Capital Expenditure	April 2021	MSCI ACWI IMI (Utilities sector and Oil and Gas Exploration and production and Integrated Oil and Gas sub-industries)
Forward Looking Risk Management	Q2 2019 within Climate Change Metrics product, Part of ESG Ratings dataset since 2007 and expanded over the years	10,000+ for Carbon Emission Key Issue, ESG Ratings universe for the other Key Issues, if weighted in ESG Ratings model
Low Carbon Transition Risk Assessment	Q1 2019	10,000+ companies, including MSCI ACWI Investable Market Index (IMI), over 95% of equity and fixed income market value
Carbon for Sovereigns (emissions and other metrics)	June 2017	198 Sovereign Issuers
Sovereign Warming Potential	December 2020	162 sovereign issuers, 44 local authorities

Appendix 2: Scope 1 + 2 Carbon Emissions Factors

Factor Name	Description	Column Header
Carbon Emissions		
Carbon Emissions - Scope 1 (metric tons)	This figure represents the company's most recently reported or estimated Scope 1 greenhouse gas emissions (if available). Scope 1 emissions are those from sources owned or controlled by the company, typically direct combustion of fuel as in a furnace or vehicle.	CARBON_EMISSIONS_SCOPE_1
Carbon Emissions - Scope 1 KEY	This field indicates whether the Scope 1 emissions figure was reported by the company or estimated. See the Carbon Estimation Methodology for details.	CARBON_EMISSIONS_SCOPE_1_KEY
Carbon Emissions - Scope 2 (metric tons)	This figure represents the company's most recently reported or estimated Scope 2 greenhouse gas emissions (if available). Scope 2 emissions are those caused by the generation of electricity purchased by the company.	CARBON_EMISSIONS_SCOPE_2
Carbon Emissions - Scope 2 KEY	This field indicates whether the Scope 2 emissions figure was reported by the company or estimated. See the Carbon Estimation Methodology for details.	CARBON_EMISSIONS_SCOPE_2_KEY

Factor Name	Description	Column Header
Carbon Emissions - Scope 1+2 (metric tons)	This figure represents the company's most recently reported or estimated Scope 1 + Scope 2 greenhouse gas emissions (if available). Scope 1 emissions are those from sources owned or controlled by the company, typically direct combustion of fuel as in a furnace or vehicle. Scope 2 emissions are those caused by the generation of electricity purchased by the company.	CARBON_EMISSIONS_SCOPE_12
Carbon Emissions - Scope 1+2 KEY	This field indicates whether the Scope 1 + 2 emissions figure was reported by the company or estimated. See the Carbon Estimation Methodology for details.	CARBON_EMISSIONS_SCOPE_12_KEY
Carbon Emissions - Year	This figure represents the most recent year for Scope 1, Scope 2, Scope 1+2.	CARBON_EMISSIONS_YEAR
Carbon Emissions - Source	Source of carbon emission data, when reported.	CARBON_EMISSIONS_SOURCE
Carbon Emissions Change Notes	Field should explain why most recent carbon emissions data has been changed. This is updated when a company's most recent Scope 1 & 2 emissions/intensity has changed and when the change occurred.	CARBON_CHANGE_NOTES
Carbon Emissions Intensity		
Carbon Emissions - Scope 1 Intensity (t/USD million EVIC)	This figure represents the company's most recently reported or estimated Scope 1 greenhouse gas emissions normalized by enterprise value including cash (USD). This ratio facilitates portfolio analysis by allocating	CARBON_EMISSIONS_EVIC_SCOPE_1_INTEN

Factor Name	Description	Column Header
	emissions across equity and debt.	
Carbon Emissions - Scope 1 Intensity Projection for 2030 (tCO ₂ e/USD million sales)	Scope 1 emissions intensity projection for 2030 in tons CO ₂ e / million USD. If normalized targets are available for the company in this scope, those targets are used to calculate the carbon emissions intensity projection. In the absence of targets, the projection assumes the current carbon emissions intensity for the scope remains constant.	CARBON_EMISSIONS_INTENSITY_SCOPE_1_PROJECTED
Carbon Emissions - Scope 2 Intensity (t/USD million EVIC)	Scope 2 emissions intensity projection for 2030 in tons CO ₂ e / million USD. If normalized targets are available for the company in this scope, those targets are used to calculate the carbon emissions intensity projection. In the absence of targets, the projection assumes the current carbon emissions intensity for the scope remains constant.	CARBON_EMISSIONS_INTENSITY_SCOPE_2_PROJECTED
Carbon Emissions - Scope 2 Intensity Projection for 2030 (tCO ₂ e/USD million sales)	Scope 2 emissions intensity projection for 2030 in tons CO ₂ e / million USD. If normalized targets are available for the company in this scope, those targets are used to calculate the carbon emissions intensity projection. In the absence of targets, the projection assumes the current carbon emissions intensity for the scope remains constant.	CARBON_EMISSIONS_INTENSITY_SCOPE_2_PROJECTED
Carbon Emissions - Scope 1+2 Intensity (t/USD million sales)	This figure represents the company's most recently reported or estimated Scope 1 + Scope 2 greenhouse gas emissions normalized by sales in USD, which allows for comparison among companies of different sizes.	CARBON_EMISSIONS_SCOPE_12_INTEN

Factor Name	Description	Column Header
Carbon Emissions - Scope 1+2 Intensity Year	This figure represents the most recent year for Scope 1+2 Intensity.	CARBON_EMISSIONS_INTENSITY_YEAR
Carbon Emissions - Scope 1+2 Average Intensity (t/USD million sales) 2017-2019	This figure represents average three-year carbon emissions intensity (2017 - 2019).	CARBON_EMISSIONS_SCOPE_12_INTEN_3YAVG
Carbon Emissions - Scope 1+2 Industry Intensity (t/USD million sales)	This figure represents the most recent year for average carbon emissions intensity at the GICS Sub-industry level, which allows for comparison of carbon emissions intensities of different industries. It also allows for comparison between a company's intensity and average industry intensity.	CARBON_EMISSIONS_SCOPE_12_INDUSTRY_INTENSITY
Carbon Emissions - Scope 1+2 Intensity (t/USD million EVIC)	This figure represents the company's most recently reported or estimated Scope 1 and 2 emissions normalized by the most recently available enterprise value including cash (EVIC) in million USD. This ratio facilitates portfolio analysis by allocating emissions across equity and debt.	CARBON_EMISSIONS_EVIC_SCOPE_12_INTEN
Sales - Aligned with Carbon Intensity	This figure represents the company's sales (USD) used for calculating the most recent Carbon Intensity.	CARBON_SALES_INTENSITY_RECENT

Factor Name	Description	Column Header
Enterprise Value including cash (million USD) - Most Recent Value	Most recent available fiscal year-end enterprise value including cash (million USD). Enterprise Value Including Cash (EVIC) is an alternate measure to Enterprise Value (EV) to value a company by adding cash and cash equivalents to EV. Enterprise value is calculated as total company value (market capitalization of the company, preferred equity, minority interest, total debt) minus cash and cash equivalents. i.e. EVIC = Market capitalization at fiscal year-end date + preferred stock + minority interest + total debt	EVIC_USD_RECENT
Enterprise Value Including Cash (USD) - Most Recent Fiscal Year	Fiscal year of the most recently available enterprise value including cash (taken at fiscal year-end).	EVIC_USD_YEAR
Enterprise Value Including Cash (EVIC) Intensity Calculation Date	Date on which the Scope 1+2 Intensity based on enterprise value including cash (USD) was calculated.	CBN_EVIC_PUBLISHED DATE
Cooling-related Intensity Projection for 2030 (tCO ₂ e/USD million sales)	Cooling-related intensity projection for 2030 in tons CO ₂ e / million USD. Please refer to the MSCI Warming Potential methodology document for more details.	CARBON_EMISSIONS_INTENSITY_COOLING_PROJECTED

The above-mentioned factors are available for the historical carbon emissions data, which spans 2008 to the current year.

Appendix 3: Scope 3 Carbon Emissions Factors

Factor Name	Description	Column Header
Scope 3 Reported Emissions		
Carbon Emissions - Scope 3 Upstream Reported (metric tons)	This figure represents the company's most recently reported Scope 3 Upstream emissions, in metric tons CO ₂ e.	CARBON_EMISSIONS_SCOPE_3_UPSTREAM_REPORT
Carbon Emissions - Scope 3 Upstream Reported Intensity (tCO ₂ e/USD million sales)	This figure represents the company's most recently reported Scope 3 Upstream emissions normalized by sales in USD million, which allows for comparison among companies of different sizes.	CARBON_EMISSIONS_SCOPE_3_UPSTREAM_INTENSITY_REPORT
Carbon Emissions – Sales – Aligned with Scope 3 Upstream Intensity	This figure represents the company's sales (USD) used for calculating the most recent Scope 3 Upstream Intensity and Scope 3 Upstream Tier 1 Intensity.	CARBON_EMISSIONS_SCOPE_3_UPSTREAM_INTENSITY_SALES_RECENT
Carbon Emissions - Scope 3 Upstream Year	This figure represents the most recent year for Scope 3 Upstream Reported/Estimated, Scope 3 Undefined Reported, Scope 3 Upstream Tier 1 Estimated and intensity figures.	CARBON_EMISSIONS_SCOPE_3_UPSTREAM_YEAR
Carbon Emissions – Scope 3 Downstream Reported (metric tons)	This figure represents the company's most recently reported Scope 3 downstream emissions, in metric tons CO ₂ e.	CARBON_EMISSIONS_SCOPE_3_DOWNSTREAM_REPORT
Carbon Emissions – Scope 3 Reported (metric tons)	This figure represents the company's most recently reported Scope 3 greenhouse gas emissions, as reported. Scope 3 emissions include an array of indirect emissions resulting from activities such as business travel,	CARBON_EMISSIONS_SCOPE_3

Factor Name	Description	Column Header
	distribution of products by third parties and downstream use of a company's products (i.e. by customers). Most reports of Scope 3 emissions include only some portion of these.	
Carbon Emissions – Scope 3 Undefined Reported (metric tons)	This figure represents the company's most recently reported Scope 3 undefined emissions, in metric tons CO2e	CARBON_EMISSIONS_SCOPE_3_UNDEFINED_REPORT
Carbon Emissions – Scope 3 Downstream Year	This figure represents the most recent year for Scope 3 downstream and Scope 3 downstream intensity.	CARBON_EMISSIONS_SCOPE_3_DOWNSTREAM_YEAR
Scope 3 Estimated Emissions		
Scope 3 - Categories 01 & 02: Purchased Goods	Estimated emissions from purchased goods, services and capital goods, as defined by the Greenhouse Gas Protocol [tCO2e/yr]	CARBON_EMISSIONS_SCOPE_3_CATEGORY_1_2
Scope 3 - Categories 04 & 09: Transportation	Estimated emissions from upstream and downstream transportation and distribution as defined by the Greenhouse Gas Protocol [tCO2e/yr]	CARBON_EMISSIONS_SCOPE_3_CATEGORY_4_9
Scope 3 - Category 03: Energy-related Activities	Estimated emissions from fuel- and energy related activities (not included in scope 1 or scope 2) as defined by the Greenhouse Gas Protocol [tCO2e/yr]	CARBON_EMISSIONS_SCOPE_3_CATEGORY_3
Scope 3 - Category 05: Waste	Estimated emissions from waste generated in operations as defined by the Greenhouse Gas Protocol [tCO2e/yr]	CARBON_EMISSIONS_SCOPE_3_CATEGORY_5
Scope 3 - Category 06: Business Travel	Estimated emissions from business travel as defined by the Greenhouse Gas Protocol [tCO2e/yr]	CARBON_EMISSIONS_SCOPE_3_CATEGORY_6

Factor Name	Description	Column Header
Scope 3 - Category 07: Commuting	Estimated emissions from employee commuting as defined by the Greenhouse Gas Protocol [tCO ₂ e/yr]	CARBON_EMISSIONS_SCOPE_3_CAT_7
Scope 3 - Category 08: Upstream Leased Assets	Estimated emissions from upstream leased assets as defined by the Greenhouse Gas Protocol [tCO ₂ e/yr]	CARBON_EMISSIONS_SCOPE_3_CAT_8
Scope 3 - Category 10: Processing of Products	Estimated emissions from processing of sold products as defined by the Greenhouse Gas Protocol [tCO ₂ e/yr]	CARBON_EMISSIONS_SCOPE_3_CAT_10
Scope 3 - Category 11: Use of Products	Estimated emissions from use of sold products as defined by the Greenhouse Gas Protocol [tCO ₂ e/yr]	CARBON_EMISSIONS_SCOPE_3_CAT_11
Scope 3 - Category 12: Final Treatment Products	Estimated emissions from end-of-life treatment of sold products as defined by the Greenhouse Gas Protocol [tCO ₂ e/yr]	CARBON_EMISSIONS_SCOPE_3_CAT_12
Scope 3 - Category 13: Downstream Leased Assets	Estimated emissions from downstream leased assets as defined by the Greenhouse Gas Protocol [tCO ₂ e/yr]	CARBON_EMISSIONS_SCOPE_3_CAT_13
Scope 3 - Category 14: Franchises	Estimated emissions from franchises as defined by the Greenhouse Gas Protocol [tCO ₂ e/yr]	CARBON_EMISSIONS_SCOPE_3_CAT_14
Scope 3 - Category 15: Investments (all)	Estimated emissions from investments as defined by the Greenhouse Gas Protocol [tCO ₂ e/yr]. This category includes both emissions associated with the types of investments required to be accounted for by the GHG Protocol guidance (debt investments with known use of proceeds) as well as those types that companies may optionally report (debt investment without known use of proceeds, managed investments).	CARBON_EMISSIONS_SCOPE_3_CAT_15_ALL

Factor Name	Description	Column Header
Scope 3 - Category 15: Investments (required only)	Estimated emissions from investments as defined by the Greenhouse Gas Protocol [tCO ₂ e/yr]. This category only includes emissions associated with debt investments with known use of proceeds required to be accounted for by the GHG Protocol guidance	CARBON_EMISSIONS_SCOPE_3_CAT_15
Scope 3 - Downstream EVIC Intensity	This figure represents the company's most recently estimated Scope 3 downstream emissions normalized by the most recently available enterprise value including cash (EVIC) in million USD. This ratio facilitates portfolio analysis by allocating emissions across equity and debt.	CARBON_EMISSIONS_SCOPE_3_DOWN_EVIC_INTENSITY
Scope 3 - Downstream Estimated	Estimated scope 3 downstream emissions [tCO ₂ e/yr]. It includes emissions from categories 9, 10, 11, 12, 13, 14 and 15.	CARBON_EMISSIONS_SCOPE_3_DOWN
Scope 3 - Downstream Sales Intensity	This figure represents the company's most recently estimated Scope 3 downstream emissions normalized by sales in million USD, which allows for comparison between companies of different sizes. The ratio uses estimates and sales of the same year. [t/million USD]	CARBON_EMISSIONS_SCOPE_3_DOWN_SALES_INTENSITY
Scope 3 - Total EVIC Intensity	This figure represents the company's most recently estimated Scope 3 total emissions normalized by the most recently available enterprise value including cash (EVIC) in million USD. This ratio facilitates portfolio analysis by allocating emissions across equity and debt. [t/million USD]	CARBON_EMISSIONS_SCOPE_3_TOTAL_EVIC_INTENSITY

Factor Name	Description	Column Header
Scope 3 - Total Emissions Estimated	Estimated scope 3 emissions (total) as defined by the Greenhouse Gas Protocol [tCO ₂ e/yr].	CARBON_EMISSIONS_SCOPE_3_TOTAL
Scope 3 - Total Sales Intensity	This figure represents the company's most recently estimated Scope 3 total emissions normalized by sales in million USD, which allows for comparison between companies of different sizes. The ratio uses estimates and sales of the same year. [t/million USD]	CARBON_EMISSIONS_SCOPE_3_TOTAL_SALES_INTENSITY
Scope 3 - Upstream EVIC Intensity	This figure represents the company's most recently estimated Scope 3 upstream emissions normalized by the most recently available enterprise value including cash (EVIC) in million USD. This ratio facilitates portfolio analysis by allocating emissions across equity and debt. [t/million USD]	CARBON_EMISSIONS_SCOPE_3_UPSTREAM_EVIC_INTENSITY
Scope 3 - Upstream Emissions Estimated	Estimated scope 3 upstream emissions [tCO ₂ e/yr]. It includes emissions from categories 1&2, 3, 4, 5, 6, 7 and 8	CARBON_EMISSIONS_SCOPE_3_UPSTREAM_PROFILE
Scope 3 - Upstream Sales Intensity	This figure represents the company's most recently estimated Scope 3 upstream emissions normalized by sales in million USD, which allows for comparison between companies of different sizes. The ratio uses estimates and sales of the same year. [t/million USD]	CARBON_EMISSIONS_SCOPE_3_UPSTREAM_INTENSITY_PROFILE
Carbon Emissions - Scope 3 Calculation Date	This figure represents the date when the scope 3 estimations were computed.	CARBON_EMISSIONS_SCOPE_3_CALCULATION_DATE

Factor Name	Description	Column Header
Carbon Emissions - Scope 3 Intensity Projection for 2030 (tCO ₂ e/USD million sales)	Scope 3 emissions intensity projection for 2030 in tons CO ₂ e / million USD. If normalized targets are available for the company in this scope, those targets are used to calculate the carbon emissions intensity projection. In the absence of targets, the projection assumes the current carbon emissions intensity for the scope remains constant.	CARBON_EMISSIONS_INTENSITY_SCOPE_3_PROJECTED
Carbon Emissions - Scope 3 Year	This figure represents the fiscal year for scope 3 estimates.	CARBON_EMISSIONS_SCOPE_3_ESTIMATES_YEAR
Scope 3 Legacy Estimation Model		
Carbon Emissions - Sales - Aligned with Scope 3 Downstream Intensity	This figure represents the company's sales (USD) used for calculating the most recent Scope 3 Downstream Sub-Industry Specific Intensity	CARBON_EMISSIONS_SCOPE_3_DOWNSTREAM_INTENSITY_SALES_RECENT
Carbon Emissions - Scope 3 Downstream Sub-Industry Specific Emissions (metric tons)	This figure represents the company's most recently reported or estimated Scope 3 downstream emissions associated with the most relevant emissions category for a given sub-industry, in metric tons CO ₂ e.	CARBON_EMISSIONS_SCOPE_3_DOWNSTREAM_SUB_IND_EMISSIONS
Carbon Emissions - Scope 3 Downstream Sub-Industry Specific Emissions / Intensity Key	This field indicates whether the Scope 3 downstream sub-industry specific emissions and intensity figures are reported or estimated.	CARBON_EMISSIONS_SCOPE_3_DOWNSTREAM_SUB_IND_EMISSIONS_INTENSITY_KEY

Factor Name	Description	Column Header
Carbon Emissions - Scope 3 Downstream Sub-Industry Specific Emissions Category	This field indicates the most relevant Scope 3 downstream emissions category for a given sub-industry. There are 7 possible scope 3 downstream categories as per the Greenhouse Gas Protocol.	CARBON_EMISSIONS_SCOPE_3_DOWN_SUB_IND_EMISSIONS_CATEGORY
Carbon Emissions - Scope 3 Downstream Sub-Industry Specific Intensity	This figure represents the company's most recently reported or estimated Scope 3 downstream emissions intensity associated with the most relevant emissions category for a given sub-industry. The associated unit is available as a separate factor as this can vary depending on the sub-industry.	CARBON_EMISSIONS_SCOPE_3_DOWN_SUB_IND_INTENSITY
Carbon Emissions - Scope 3 Downstream Sub-Industry Specific Intensity Unit	This field indicates the unit associated with the Scope 3 downstream sub-industry specific intensity figure. This unit may vary from one sub-industry to another.	CARBON_EMISSIONS_SCOPE_3_DOWN_SUB_IND_INTENSITY_UNIT
Carbon Emissions - Scope 3 Upstream Tier 1 Estimated (metric tons)	This figure represents the company's most recently estimated Scope 3 Upstream Tier 1 emissions in metric tons CO ₂ e. Tier 1 upstream carbon emissions for a company are the direct emissions of its tier 1 (direct) suppliers which are associated with the goods and services procured by the company (excluding purchased electricity).	CARBON_EMISSIONS_SCOPE_3_UPSTREAM_TIER1
Carbon Emissions - Scope 3 Upstream Tier 1 Estimated Intensity (tCO ₂ e/USD million sales)	This figure represents the company's most recently estimated Scope 3 Upstream Tier 1 emissions normalized by sales in USD million, which allows for comparison between companies of different sizes. Tier 1 upstream carbon emissions for a company are the direct emissions of its tier 1 (direct) suppliers which are associated with the goods and services procured by the company (excluding purchased electricity).	CARBON_EMISSIONS_SCOPE_3_UPSTREAM_TIER1_INTENSITY

Factor Name	Description	Column Header
Carbon Emissions - Scope 3 Upstream Total Estimated (metric tons)	This figure represents the company's most recently estimated Scope 3 Upstream total emissions, in metric tons CO2e.	CARBON_EMISSIONS_SCOPE_3_UPSTREAM
Carbon Emissions - Scope 3 Upstream Total Estimated Intensity (tCO2e/USD million sales)	This figure represents the company's most recently estimated Scope 3 Upstream Total emissions normalized by sales in USD million, which allows for comparison between companies of different sizes.	CARBON_EMISSIONS_SCOPE_3_UPSTREAM_INTENSITY

Appendix 4: Power Generation: Screening Factors

Factor Name	Description	Column Header
GENERATION FOLDER		
Generation Fossil Fuels (%)	Percentage of power generation from thermal coal, liquid fuel and natural gas	GENERAT_FOSSIL_FUELS_PCT
Generation Hydro (%)	Percentage of power generation from hydro power	GENERAT_HYDRO_PCT
Generation Liquid Fuel (%)	Percentage of power generation from liquid fuel	GENERAT_LIQUID_FUEL_PCT
Generation Natural Gas (%)	Percentage of power generation from natural gas	GENERAT_NATURAL_GAS_PCT
Generation Nuclear (%)	Percentage of power generation from nuclear power	GENERAT_NUCLEAR_PCT
Generation Oil and Gas (%)	Percentage of power generation from liquid fuel and natural gas	GENERAT_OIL_GAS_PCT
Generation Output Fossil Fuels (MWh)	Generation Output in MWh from thermal coal, liquid fuel and natural gas	GENERAT_OUTP_FOSSIL_FUELS
Generation Output Hydro (MWh)	Generation Output in MWh from hydro	GENERAT_OUTP_HYDRO
Generation Output Liquid Fuel (MWh)	Generation Output in MWh from liquid fuel	GENERAT_OUTP_LIQUID_FUEL
Generation Output Natural Gas (MWh)	Generation Output in MWh from natural gas	GENERAT_OUTP_NATURAL_GAS
Generation Output Nuclear (MWh)	Generation Output in MWh from nuclear power	GENERAT_OUTP_NUCLEAR

Factor Name	Description	Column Header
Generation Output Renewables (MWh)	Generation Output in MWh from renewables	GENERAT_OUTP_RENEWABLES
Generation Output Thermal Coal (MWh)	Generation Output in MWh from thermal coal	GENERAT_OUTP_THERMAL_COAL
Generation Renewables (%)	Percentage of power generation from renewable energies	GENERAT_RENEWABLES_PCT
Generation Thermal Coal (%)	Percentage of power generation from thermal coal	GENERAT_THERMAL_COAL_PCT
Total Generation (MWh)	Total generation for all fuels in MWh	GENERAT_TOTAL
INSTALLED CAPACITY FOLDER		
Installed Capacity Fossil Fuels (%)	Aggregate installed capacity for coal, liquid fuel, natural gas as maximum percentage of total	INSTAL_CAP_FOSSIL_FUELS_PCT
Installed Capacity Fossil Fuels (MW)	Aggregate installed capacity for coal, liquid fuel, natural gas in MW	INSTAL_CAP_FOSSIL_FUELS
Installed Capacity Hydro (%)	Installed capacity for hydro power as maximum percentage of total	INSTAL_CAP_HYDRO_PCT
Installed Capacity Hydro (MW)	Installed capacity for hydro power in MW	INSTAL_CAP_HYDRO
Installed Capacity Liquid Fuel (%)	Installed capacity for liquid fuel as maximum percentage of total	INSTAL_CAP_LIQUID_FUEL_PCT

Factor Name	Description	Column Header
Installed Capacity Liquid Fuel (MW)	Installed capacity for liquid fuel in MW	INSTAL_CAP_LIQUID_FUEL
Installed Capacity Natural Gas (%)	Installed capacity for natural gas as maximum percentage of total	INSTAL_CAP_NATURAL_GAS_PCT
Installed Capacity Natural Gas (MW)	Installed capacity for natural gas in MW	INSTAL_CAP_NATURAL_GAS
Installed Capacity Nuclear (%)	Installed capacity for nuclear power as maximum percentage of total	INSTAL_CAP_NUCLEAR_PCT
Installed Capacity Nuclear (MW)	Installed capacity for nuclear power in MW	INSTAL_CAP_NUCLEAR
Installed Capacity Renewables (%)	Installed capacity for renewable energy as maximum percentage of total	INSTAL_CAP_RENEWABLES_PCT
Installed Capacity Renewables (MW)	Installed capacity for renewable energy in MW	INSTAL_CAP_RENEWABLES
Installed Capacity Thermal Coal (%)	Installed capacity for thermal coal as maximum percentage of total	INSTAL_CAP_THERMAL_COAL_PCT
Installed Capacity Thermal Coal (MW)	Installed capacity for thermal coal in MW	INSTAL_CAP_THERMAL_COAL

Factor Name	Description	Column Header
Installed Capacity Oil and Gas (%)	Aggregate installed capacity for liquid fuel and natural gas as maximum percentage of total. Added in April 2019.	INSTAL_CAP_OIL_GAS_PCT
Installed Capacity Total (MW)	Aggregate installed capacity for power utility generation in MW	INSTAL_CAP_TOTAL
REVENUE FOLDER		
Generation Fossil Fuels - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from fossil fuel (thermal coal, liquid fuel and natural gas) based power generation.	GENERAT_MAX_REVENUE_FOSSIL_FUELS
Generation Hydro - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from hydropower generation.	GENERAT_MAX_REVENUE_HYDRO
Generation Liquid Fuel - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from liquid fuel-based power generation.	GENERAT_MAX_REVENUE_LIQUID_FUEL
Generation Natural Gas - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from natural gas-based power generation.	GENERAT_MAX_REVENUE_NATURAL_GAS

Factor Name	Description	Column Header
Generation Oil and Gas - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from liquid fuel and natural gas-based power generation. Added in April 2019.	GENERAT_MAX_RE V_OIL_GAS
Generation Nuclear - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from nuclear energy-based power generation.	GENERAT_MAX_RE V_NUCLEAR
Generation Renewables - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from renewable energy-based power generation.	GENERAT_MAX_RE V_RENEWABLES
Generation Thermal Coal - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from thermal coal-based power generation.	GENERAT_MAX_RE V_THERMAL_COAL

Appendix 5: Fossil Fuel Reserve Categories: Description

Reserve Category	Description
Metallurgical Coal	This category includes: - Coal reserves explicitly reported as either Metallurgical Coal or Coking Coal. - In cases where the coal type is not reported by the company, the company falls in the Steel GICS sub-industry. - In cases where the company reports its coal reserves as both Metallurgical (or Coking) & Thermal (or Steam) without providing the breakdown of these two types, we account for 22% of the total coal reserves as Metallurgical Coal and the rest, 78%, as Thermal Coal.
Thermal Coal	This category includes: - Coal reserves explicitly reported as Thermal Coal, Steam Coal, Lignite or Sub-bituminous Coal. - If the coal type is not reported by the company and the company does not fall in the Steel GICS sub-industry, the reported coal reserves are considered to be Thermal Coal. - In cases where the company reports its coal reserves as both Metallurgical (or Coking) & Thermal (or Steam) without providing the breakdown of these two types, we account for 22% of the total coal reserves as Metallurgical Coal and the rest, 78%, as Thermal Coal.

Reserve Category	Description
Conventional Oil	This category includes: - Oil reserves explicitly reported as Conventional Oil reserves and extracted using conventional extraction methods such as vertical drilling, etc. - Oil reserves in conventional reservoirs and extracted using conventional extraction methods such as vertical drilling, etc. - Natural gas liquids (NGLs) and condensates from conventional reservoirs.
Shale Oil	This category includes: - Oil reserves explicitly reported as Shale Oil reserves. - Oil reserves in un-conventional reservoirs or in shale fields. - Natural gas liquids (NGLs) and condensates from un-conventional reservoirs or from shale fields. - Oil reserves extracted using unconventional extraction methods such as horizontal drilling, hydraulic fracturing etc. - Reserves reported as “tight oil”.
Oil Shale & Tar Sands	This category includes: - Oil reserves explicitly reported as Oil Shale, Kerogen, Oil Sands, Tar Sands, Synthetic Crude Oil, Extra Heavy Oil and Bitumen Reserves. - Oil reserves in oil-sands fields.

Reserve Category	Description
Natural Gas	This category includes: - Natural Gas reserves explicitly reported as Conventional Gas or Conventional Natural Gas reserves and extracted using conventional extraction methods such as vertical drilling, etc. - Natural Gas reserves in conventional reservoirs and extracted using conventional extraction methods such as vertical drilling, etc. - Liquefied Natural Gas (LNG) or Compressed Natural Gas (CNG) from conventional reservoirs (if reported as reserves by the company).
Shale Gas	This category includes: - Natural Gas reserves explicitly reported as Shale Gas or Un-conventional Gas reserves. - Natural Gas reserves in un-conventional reservoirs or in shale fields. - Liquefied Natural Gas (LNG) or Compressed Natural Gas (CNG) from un-conventional reservoirs (if reported as reserves by the company). - Natural Gas reserves extracted using unconventional extraction methods such as horizontal drilling, hydraulic fracturing, etc. - Reserves reported as Tight Gas, Coal Bed Methane or Coal Seam Gas.

Appendix 6: Fossil Fuel Screening Factors: Reserves

Factor Name	Description	Column Header
COAL - RESERVES		
Evidence of Metallurgical Coal Reserves	This field identifies companies that provide evidence of owning Metallurgical Coal, also sometimes referred to as Coking Coal Reserves, including those that own less than 50% of a reserves field. Evidence of owning reserves includes companies providing the exact volume of reserves, and companies making a statement about their ownership of reserves.	METALLURGICAL_COAL_RESERVES
Evidence of Thermal Coal Reserves	This field identifies companies that provide evidence of owning Thermal Coal, including those that own less than 50% of a reserves field. Evidence of owning reserves includes companies providing the exact volume of reserves, and companies making a statement about their ownership of reserves. Thermal coal is used to fire power plants that produce steam for electricity and industrial uses.	THERMAL_COAL_RESERVES
Evidence of Total Coal Reserves	This field identifies companies that provide evidence of owning coal reserves, including those that own less than 50% of a reserves field. Evidence of owning reserves includes companies providing the exact volume of reserves, and companies making a statement about their ownership of reserves.	COAL_RESERVES

Factor Name	Description	Column Header
Metallurgical Coal - Comments	This field includes the analyst's comments on the reserves data. It may include year of reserves data, underlying assumptions in case of estimated reserve volumes, or comments on significant changes in a company's reserves ownership, where relevant.	MET_COAL_ANALYST_COMMENTS
Metallurgical Coal - Potential Emissions (MtCO2)	This field represents the potential carbon emissions of the Metallurgical Coal reserves owned by a company using a formula from the Potsdam Institute for Climate Impact research.	MET_COAL_POTENTIAL_EMISSIONS
Metallurgical Coal - Reserves KEY (Reported/Estimated)	This field indicates whether the reserve volumes of Metallurgical Coal were reported by the company or estimated by MSCI ESG Research.	MET_COAL_RESERVES_KEY
Metallurgical Coal - Reserves Volume (metric tons)	This field represents the total volume of proved and probable reserves (1P+2P) of metallurgical coal owned by a company.	MET_COAL_RESERVES_VOLUME
Thermal Coal - Comments	This field includes the analyst's comments on the reserves data. It may include year of reserves data, underlying assumptions in case of estimated reserve volumes, or comments on significant changes in a company's reserves ownership, where relevant.	TH_COAL_ANALYST_COMMENTS
Thermal Coal - Potential Emissions (MtCO2)	This field represents the potential carbon emissions of the Thermal Coal reserves owned by a company using a formula from the Potsdam Institute for Climate Impact research.	TH_COAL_POTENTIAL_EMISSIONS

Factor Name	Description	Column Header
Thermal Coal - Reserves KEY (Reported/Estimated)	This field indicates whether the reserve volumes of thermal coal was reported by the company or estimated by MSCI ESG Research.	TH_COAL_RESERVES_KEY
Thermal Coal - Reserves Volume (metric tons)	This field represents the total volume of proved and probable reserves (1P+2P) of thermal coal owned by a company.	TH_COAL_RESERVES_VOLUME
Total Coal - Potential Emissions (MtCO2)	This field represents the potential carbon emissions of the coal reserves owned by a company. It is computed as the sum of the potential carbon emissions of the metallurgical coal reserves and thermal coal reserves owned by the company.	COAL_POTENTIAL_EMISSIONS
Total Coal - Reserves Volume (metric tons)	This field represents the total volume of proved and probable reserves (1P+2P) of coal owned by a company. It is computed as the sum of metallurgical coal and thermal coal reserves owned by the company.	COAL_RESERVES_VOLUME
OIL AND GAS RESERVES - CONVENTIONAL		
Conventional Oil - Reserves KEY (Reported/Estimated)	This field indicates whether the reserve volumes of conventional oil was reported by the company or estimated by MSCI ESG Research.	CONV_OIL_RESERVES_KEY
Conventional Oil - Comments	This field includes the analyst's comments on the reserves data. It may include year of reserves data, underlying assumptions in case of estimated reserve volumes, or comments on significant changes in a company's reserves ownership, where relevant.	CONV_OIL_ANALYST_COMMENTS

Factor Name	Description	Column Header
Conventional Oil - Potential Emissions (MtCO2)	This field represents the potential carbon emissions of the Conventional Oil reserves owned by a company using a formula from the Potsdam Institute for Climate Impact research.	CONV_OIL_PO TENTIAL_EMIS SIONS
Conventional Oil - Reserves Volume (mmboe)	This field represents the total volume of proved reserves (1P) of Conventional Oil owned by a company.	CONV_OIL_RE SERVES_VOLU ME
Evidence of Conventional Oil Reserves	This field identifies companies that provide evidence of owning Conventional Oil reserves, including those that own less than 50% of a reserves field. Evidence of owning reserves includes companies providing the exact volume of reserves, and companies making a statement about their ownership of reserves.	CONV_OIL_RE SERVES
Evidence of Natural Gas Reserves	This field identifies companies that provide evidence of owning conventional Natural Gas Reserves, including those that own less than 50% of a reserves field. Evidence of owning reserves includes companies providing the exact volume of reserves, and companies making a statement about their ownership of reserves.	NATURAL_GA S_RESERVES

Factor Name	Description	Column Header
Natural Gas - Comments	This field includes the analyst's comments on the reserves data. It may include year of reserves data, underlying assumptions in case of estimated reserve volumes, or comments on significant changes in a company's reserves ownership, where relevant.	NATURAL_GAS_ANALYST_COMMENTS
Natural Gas - Potential Emissions (MtCO2)	This field represents the potential carbon emissions of the conventional natural gas reserves owned by a company using a formula from the Potsdam Institute for Climate Impact research.	NATURAL_GAS_POTENTIAL_EMISSIONS
Natural Gas - Reserves Key (Reported/Estimated)	This field indicates whether the reserve volumes of Natural Gas (conventional) was reported by the company or estimated by MSCI ESG Research.	NATURAL_GAS_RESERVES_KEY
Natural Gas - Reserves Volume (mmboe)	This field represents the total volume of proved reserves (1P) of Natural Gas (conventional) owned by a company.	NATURAL_GAS_RESERVES_VOLUME
OIL AND GAS RESERVES - SUMMARY		
Evidence of Total Gas Reserves	This field identifies companies that provide evidence of owning Gas reserves, including those that own less than 50% of a reserves field. Evidence of owning reserves includes companies providing the exact volume of reserves, and companies making a statement about their ownership of reserves.	NAT_GAS_RESERVES

Factor Name	Description	Column Header
Evidence of Total Oil and GasReserves	This field identifies companies that provide evidence of owning oil and/or gas reserves, including those that own less than 50% of a reserves field. Evidence of owning reserves includes companies providing the exact volume of reserves, and companies making a statement about their ownership of reserves.	OIL_NAT_GAS_RESERVES
Evidence of Total Oil Reserves	This field identifies companies that provide evidence of owning oil reserves, including those that own less than 50% of a reserves field. Evidence of owning reserves includes companies providing the exact volume of reserves, and companies making a statement about their ownership of reserves.	OIL_RESERVES
Total Gas - Potential Emissions (MtCO2)	This field represents the potential carbon emissions of the gas reserves owned by a company. It is computed as the sum of the potential carbon emissions of the Natural Gas reserves and Shale Gas reserves owned by the company.	NAT_GAS_POTENTIAL_EMISSIONS
Total Gas - Reserves KEY (Reported/Estimated)	This field indicates whether the split between Oil and Gas reserves was reported by the company or estimated by MSCI ESG Research. Where a company with both Oil and Gas reservesdid not report separate volume figuresfor the two types of reserves, MSCI used the average split for the Integrated Oil and Gas sector: 53% for Oil reserves and 47% for Gas reserves.	NAT_GAS_RESERVES_KEY

Factor Name	Description	Column Header
Total Gas - Reserves Volume (mmboe)	This field represents the total volume of proved reserves (1P) of gas owned by a company. It is computed as the sum of Natural Gas and Shale Gas reserves owned by the company.	NAT_GAS_RESERVES_VOLUME
Total Oil and Gas - Potential Emissions (MtCO2)	This field represents the potential carbon emissions of the Oil & Gas owned by a company. It is computed as the sum of the potential carbon emissions of the total Oil and total Gas reserves owned by the company.	OIL_NAT_GAS_POTENTIAL_EMISSIONS
Total Oil and Gas - Reserves Volume (mmboe)	This field represents the total volume of proved reserves (1P) of Oil and Gas owned by a company. It is computed as the sum of total Oil reserves and total Gas reserves owned by the company.	OIL_NAT_GAS_RESERVES_VOLUME
Total Oil - Potential Emissions (MtCO2)	This field represents the potential carbon emissions of the Oil reserves owned by a company. It is computed as the sum of the potential carbon emissions of the Conventional Oil, Oil Shale & Tar Sands, and Shale Oil Reserves owned by the company.	OIL_POTENTIAL_EMISSIONS
Total Oil - Reserves KEY (Reported/Estimated)	This field indicates whether the split between Oil and Gas reserves was reported by the company or estimated by MSCI ESG Research. Where a company with both Oil and Gas reserves did not report separate volume figures for the two types of reserves, MSCI used the average split for the Integrated Oil and Gas sector: 53% for Oil reserves and 47% for Gas reserves.	OIL_RESERVES_KEY

Factor Name	Description	Column Header
Total Oil - Reserves Volume (mmboe)	This field represents the total volume of proved reserves (1P) of oil owned by a company. It is computed as the sum of Conventional Oil reserves, Oil Shale & Tar Sands reserves, and Shale Oil reserves owned by the company.	OIL_RESERVES_VOLUME
OIL AND GAS RESERVES - UNCONVENTIONAL		
Evidence of Oil Shale & Tar Sands Reserves	This field identifies companies that provide evidence of owning Oil Sands reserves, including those that own less than 50% of a reserves field. Evidence of owning reserves includes companies providing the exact volume of reserves, and companies making a statement about their ownership of reserves.	OIL_SANDS_RESERVES
Evidence of Shale Gas Reserves	This field identifies companies that provide evidence of owning Shale Gas reserves, including those that own less than 50% of a reserves field. Evidence of owning reserves includes companies providing the exact volume of reserves, and companies making a statement about their ownership of reserves.	SHALE_GAS_RESERVES
Evidence of Shale Oil & Shale Gas Reserves	This field identifies companies that provide evidence of owning Shale Gas and/or Shale Oil reserves, including those that own less than 50% of a reserves field. Evidence of owning reserves includes companies providing the exact volume of reserves, and companies making a statement about their ownership of reserves.	SHALE_OIL_GAS_RESERVES

Factor Name	Description	Column Header
Evidence of Shale Oil Reserves	This field identifies companies that provide evidence of owning Shale Oil reserves, including those that own less than 50% of a reserves field. Evidence of owning reserves includes companies providing the exact volume of reserves, and companies making a statement about their ownership of reserves.	SHALE_OIL_RESERVES
Oil Shale & Tar Sands - Comments	This field includes the analyst's comments on the reserves data. It may include year of reserves data, underlying assumptions in case of estimated reserve volumes, or comments on significant changes in a company's reserves ownership, where relevant.	OIL_SANDS_ANALYST_COMMENTS
Oil Shale & Tar Sands - Potential Emissions (MtCO ₂)	This field represents the potential carbon emissions of the Oil Shale & Tar Sands reserves owned by a company using a formula from the Potsdam Institute for Climate Impact research.	OIL_SANDS_POTENTIAL_EMISSIONS
Oil Shale & Tar Sands - Reserves KEY (Reported/Estimated)	This field indicates whether the reserve volumes of Oil Shale & Tar Sands was reported by the company or estimated by MSCI ESG Research.	OIL_SANDS_RESERVES_KEY
Oil Shale & Tar Sands - Reserves Volume (mmbbl)	This field represents the volume of proved reserves of Oil Shale & Tar Sands owned by a company.	OIL_SANDS_RESERVES_VOLUME

Factor Name	Description	Column Header
Shale Gas - Comments	This field includes the analyst's comments on the reserves data. It may include year of reserves data, underlying assumptions in case of estimated reserve volumes, or comments on significant changes in a company's reserves ownership, where relevant.	SHALE_GAS_ANALYST_COMMENTS
Shale Gas - Potential Emissions (MtCO ₂)	This field represents the potential carbon emissions of the Shale Gas reserves owned by a company using a formula from the Potsdam Institute for Climate Impact research.	SHALE_GAS_POTENTIAL_EMISSIONS
Shale Gas - Reserves KEY (Reported/Estimated)	This field indicates whether the reserve volumes of Shale Gas was reported by the company or estimated by MSCI ESG Research.	SHALE_GAS_RESERVES_KEY
Shale Gas - Reserves Volume (mmbbl)	This field represents the total volume of proved reserves (1P) of Shale Gas owned by a company.	SHALE_GAS_RESERVES_VOLUME
Shale Oil - Reserves KEY (Reported/Estimated)	This field indicates whether the reserve volumes of Shale Oil were reported by the company or estimated by MSCI ESG Research.	SHALE_OIL_RESERVES_KEY
Shale Oil & Shale Gas - Potential Emissions (MtCO ₂)	This field represents the potential carbon emissions of the Shale Gas and/or Shale Oil reserves owned by a company. It is computed as the sum of the potential carbon emissions of the Shale Oil and Shale Gas reserves owned by the company.	SHALE_OIL_GAS_POTENTIAL_EMISSIONS

Factor Name	Description	Column Header
Shale Oil & Shale Gas - Reserves Volume (mmboe)	This field represents the volume of proved reserves of Shale Gas and/or Shale Oil owned by a company. This also includes Tight Gas, Coal Bed Methane and Coal Seam Gas. It is computed as the sum of the Shale Oil and Shale Gas reserves owned by the company.	SHALE_OIL_GAS_RESERVES_VOLUME
Shale Oil - Comments	This field includes the analyst's comments on the reserves data. It may include year of reserves data, underlying assumptions in case of estimated reserve volumes, or comments on significant changes in a company's reserves ownership, where relevant.	SHALE_OIL_ANALYST_COMMENTS
Shale Oil - Potential Emissions (MtCO2)	This field represents the potential carbon emissions of the Shale Oil reserves owned by a company using a formula from the Potsdam Institute for Climate Impact research.	SHALE_OIL_POTENTIAL_EMISSIONS
Shale Oil - Reserves Volume (mmboe)	This field represents the total volume of proved reserves (1P) of Shale Oil owned by a company.	SHALE_OIL_RESERVES_VOLUME
Total Unconventional Oil and Gas - Potential Emissions (MtCO2)	This field represents the potential carbon emissions of the Unconventional Oil and Gas reserves owned by a company. It is computed as the sum of the potential carbon emissions of the Shale Oil reserves, Shale Gas reserves, and Oil Shale & Tar Sands reserves owned by the company.	UNCONV_OIL_GAS_POTENTIAL_EMISSIONS

Factor Name	Description	Column Header
Total Unconventional Oil and Gas - Reserves Volume (mmboe)	This field represents the total volume of proved reserves (1P) of Unconventional Oil and Gas owned by a company. It is computed as the sum of Shale Oil reserves, Shale Gas reserves and Oil Shale & Tar Sands reserves owned by the company.	UNCONV_OIL_GAS_RESERVE_S_VOLUME
FOSSIL FUEL SUMMARY FOLDER		
Carbon intensity of fossil fuel reserves (MtCO2/mmboe)	This field represents the carbon intensity of fossil fuel reserves owned by a company. Fossil reserves are defined as proved and probable reserves (i.e. 1P and 2P) for coal and proved reserves (i.e. 1P) for Oil and Natural Gas.	INTENSITY_OF_FF_RESERVES
Fossil Fuel Reserves	This field identifies companies with evidence of owning fossil fuel reserves regardless of their industries, including companies that own less than 50% of a reserves field. Fossil reserves are defined as proved and probable reserves (i.e. 1P and 2P) for Coal and proved reserves (i.e. 1P) for Oil and Natural Gas. Evidence of owning reserves includes companies providing the exact volume of reserves, and companies making a statement about their ownership of reserves.	FOSSIL_FUEL_RESERVES
GICS Sub-Industry	GICS Sub-Industry	GICS_SUB_IND

Factor Name	Description	Column Header
Industry - Energy Application	Companies with fossil fuel reserves used for energy application. This includes companies with reserves in the following industries (GICS): Oil and Gas and Consumable Fuels; Metals and Mining; Energy Equipment & Services and Utilities.	INDUSTRY_ENERGY_APPLICATION
Industry - Energy Producer	Companies involved in the exploration and production of Oil and Gas as well as in the refining and marketing of oil and gas products. This includes companies that may not have reserves in the following GICS sub-industries: Integrated Oil and Gas; Oil and Gas Exploration & Production; Oil and Gas Refining & Marketing.	INDUSTRY_ENERGY_PRODUCER
Industry - Energy Supplier	Companies involved in the manufacturing of equipment and the provision of supplies and services to the energy producers. This includes companies which may not have fossil fuel reserves in the following GICS sub-industries: Oil and Gas Drilling; Oil and Gas Equipment & Services; Oil and Gas Storage & Transportation.	INDUSTRY_ENERGY_SUPPLIER
Industry - Industrial Application	Companies involved in fossil fuel mining for use in industrial applications such as Coking Coal used for steel production or Oil used to produce chemicals. This includes companies with fossil fuel reserves in the following GICS sub-industries: Steel, Diversified Chemicals, and Commodity Chemicals.	INDUSTRY_INDUSTRIAL_APPLICATION

Factor Name	Description	Column Header
Industry - Other Application	Companies with fossil fuel reserves used for other applications than industrial and energy. This includes companies with reserves in the following GICS sub-industries: Industrial Conglomerate, Marine or Multiline Insurance.	INDUSTRY_OTHER_APPLICATION
Low Carbon Reduction	This field identifies companies with the largest contributions to climate change, e.g. largest owners of fossil fuel reserves; those with the largest carbon footprint; those with the highest carbon intensity. The largest contributions have been defined through a client consultation and refer to companies whose reserves account for more than 1% of the remaining global carbon budget (about 940 gtCO ₂), or that have a carbon footprint greater than 0.33% of the annual world carbon emissions (35 gtCO ₂), or with carbon intensity that exceeds 3,000 tCO ₂ /m USD.	LOW_CARBON_REDUCTION
Reserves Sources	Sources	FOSSIL_FUEL_RESERVES_SOURCES
Total Potential Emissions (MtCO ₂)	This field represents the potential carbon emissions of the Coal, Oil and Gas Reserves owned by a company. It is computed as the sum of the potential carbon emissions of the total Coal, total Oil and total Gas reserves owned by the company.	TOTAL_POTENTIAL_EMISSIONS

Factor Name	Description	Column Header
Total energy content of the reserves (mmboe)	This field represents the total energy content of fossil fuel reserves (in terms of mmboe) owned by a company. Fossil reserves are defined as proved and probable reserves (i.e. 1P and 2P) for Coal and proved reserves (i.e. 1P) for Oil and Natural Gas.	TOTAL_ENERGY_CONTENT
Total potential emissions excluding metallurgical coal (MtCO ₂)	This field represents the potential carbon emissions of the fossil fuel reserves, excluding Metallurgical Coal reserves, owned by a company. It is computed as the sum of the potential carbon emissions of the Thermal Coal, total Oil and total Gas reserves owned by the company.	TOTAL_POTENTIAL_EMISSIONS_EX_MET_COAL

Appendix 7: Fossil Fuel Screening Factors: Revenue

Factor Name	Description	Column Header
COAL - REVENUES		
Thermal Coal - Involvement - 0%	Companies that derive some annual revenues (>0%) from Thermal Coal.	THERMAL_COAL_INVOLVEMENT_A_NYPCT
Thermal Coal - Involvement - 10%	Companies that derive 10% or more of total annual revenues from Thermal Coal.	THERMAL_COAL_INVOLVEMENT
Thermal Coal - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) greater than 0% that a company derives from the mining of Thermal Coal (including lignite, bituminous, anthracite and steam coal) and its sale to external parties. It excludes: revenue from Metallurgical Coal; Coal mined for internal power generation (e.g. in the case of vertically integrated power producers); intra-company sales of mined Thermal Coal; and revenue from Coal trading.	THERMAL_COAL_MAX_REV_PCT
Thermal Coal - Revenues comments	This field contains notes related to a company's Thermal Coal revenues.	THERMAL_COAL_PROFILE
Metallurgical Coal - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from the mining of metallurgical coal (including coking coal) and its sale to external parties. It excludes revenue from thermal coal, intra-company sales of mined metallurgical coal, and revenue from coal trading.	MET_COAL_MAX_REV_PCT

OIL AND GAS - REVENUES		
O&G - Extraction and Production - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from the extraction and production of Oil and Gas.	OG_REV_EXTRAC TION_PROD

Factor Name	Description	Column Header
Conventional Oil and Gas Revenue (reported/estimated)	This factor identifies the maximum percentage of revenue (either reported or estimated) greater than 0% that a company derives from Conventional Oil and Gas production	CONV_OIL_GAS_MAX_REV_PCT
Unconventional oil and gas Revenue (reported/estimated)	This factor identifies the maximum percentage of revenue (either reported or estimated) greater than 0% that a company derives from Unconventional Oil and Gas production	UNCONV_OIL_GAS_MAX_REV_PCT
Oil Sands revenue (reported/estimated)	This factor identifies the maximum percentage of revenue (either reported or estimated) greater than 0% that a company derives from the production of Oil Sands	OIL_SANDS_MAX_REV_PCT
Shale oil Revenue (reported/estimated)	This factor identifies the maximum percentage of revenue (either reported or estimated) greater than 0% that a company derives from Shale Oil production.	SHALE_OIL_MAX_REV_PCT
Shale gas Revenue (reported/estimated)	This factor identifies the maximum percentage of revenue (either reported or estimated) greater than 0% that a company derives from Shale Gas production.	SHALE_GAS_REV_KEY
Shale Gas Revenue - Key	This field indicates whether the Shale Gas revenue figure was reported by the company or estimated.	SHALE_GAS_REV_KEY
Shale Oil Revenue - Key	This field indicates whether the Shale Gas revenue figure was reported by the company or estimated.	SHALE_OIL_REV_KEY

Factor Name	Description	Column Header
Arctic oil Revenue (reported/estimated)	This factor identifies the maximum percentage of revenue (either reported or estimated) greater than 0% that a company derives from Arctic Oil production. Arctic Oil production is currently considered any Oil production north of the 66.5° parallel.	ARCTIC_OIL_MAX_REV_PCT
Arctic gas Revenue (reported/estimated)	This factor identifies the maximum percentage of revenue (either reported or estimated) greater than 0% that a company derives from Arctic Gas production. Arctic Gas production is currently considered any Gas production north of the 66.5° parallel.	ARCTIC_GAS_MAX_REV_PCT
Arctic Gas Revenue - Key	This field indicates whether the revenue figure was reported by the company or estimated.	ARCTIC_GAS_REV_KEY
Arctic Oil Revenue - Key	This field indicates whether the revenue figure was reported by the company or estimated.	ARCTIC_OIL_REV_KEY
Evidence of Arctic Gas Production	This field identifies companies that provide evidence of producing Arctic Gas. This factor does not capture revenue from non-extraction activities (e.g. exploration, surveying, processing, refining); ownership of Arctic Gas reserves with no associated extraction revenue; revenue from intra-company sales.	ARCTIC_GAS_PRODUCTION

Factor Name	Description	Column Header
Evidence of Arctic Oil Production	This field identifies companies that provide evidence of producing Arctic Oil. This factor does not capture revenue from non-extraction activities (e.g. exploration, surveying, processing, refining); ownership of Arctic Oil reserves with no associated extraction revenue; revenue from intra-company sales.	ARCTIC_OIL_PRODUCTION
Evidence of Oil Sands Production	This field identifies companies that provide evidence of producing Oil Sands (mining or in situ). This factor does not capture revenue from non-extraction activities (e.g. exploration, surveying, processing, refining); ownership of Oil Sands reserves with no associated extraction revenue; revenue from intra-company sales.	OIL_SANDS_PRODUCTION
Evidence of Shale Gas Production	This field identifies companies that provide evidence of producing Gas using the method of hydraulic fracking. This factor does not capture revenue from non-extraction activities (e.g. exploration, surveying, processing, refining); ownership of shale gas reserves with no associated extraction revenue; revenue from intra-company sales.	SHALE_GAS_PRODUCTION

Factor Name	Description	Column Header
Evidence of Shale Oil Production	This field identifies companies that provide evidence of producing Oil using the method of hydraulic fracking. This factor does not capture revenue from non-extraction activities (e.g. exploration, surveying, processing, refining); ownership of shale oil reserves with no associated extraction revenue; revenue from intra-company sales.	SHALE_OIL_PRODUCTION
Oil Sands - Involvement - 0%	Companies that derive some annual revenue (>0%) from Oil Sands.	OIL_SANDS_INVOLVEMENT_ANYPCT
Oil Sands - Involvement - 10%	Companies that derive 10% or more of total annual revenues from Oil Sands.	OIL_SANDS_INVOLVEMENT
Oil Sands - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) greater than 0% that a company derives from Oil Sands extraction for a set of companies that own Oil Sands reserves and disclose evidence of deriving revenue from Oil Sands extraction. This factor does not include revenue from non-extraction activities (e.g. exploration, surveying, processing, refining); ownership of Oil Sands reserves with no associated extraction revenues; revenue from intra-company sales.	OIL_SANDS_MAX_REV_PCT
Oil Sands - Revenue comments	This field contains notes related to a company's Oil Sands revenue.	OIL_SANDS_PROFILE

Factor Name	Description	Column Header
Biofuel - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue that a company derives from biofuel production and/or sales.	REV_BIOFUELS
O&G - Distribution / Retail - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from the distribution and retailing of Oil & Gas and related products. It includes revenues from crude and petroleum products storage facilities and terminals, bulk stations, gasoline and fuel oil retail stations as well as Liquefied Petroleum Gas stations and Natural Gas distribution.	OG_REV_DISTRIBUTION
O&G - Equipment and Services - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from equipment and services for the exploration and production of Oil and Natural Gas. It includes revenue from Oil and Gas exploration services, related equipment manufacturing, seismic surveys, engineering services and heavy construction related to Oil and Gas exploration activities. It excludes revenue from extraction & production.	OG_REV_EQUIPMENT_SERVICES

Factor Name	Description	Column Header
O&G - Petrochemicals - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from petrochemical products. It includes revenue from industrial organics, inorganics, not elsewhere classified and lubes and greases.	OG_REV_PETROCHEMICALS
O&G - Pipelines and Transportation - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from Oil and Gas pipelines and transportation. It includes revenue from midstream operations but excludes revenues from terminals and storage facilities.	OG_REV_PIPELINES_TRANSP
O&G - Refining - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from refining Oil and Gas.	OG_REV_REFINING
O&G - Trading - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from the trading of Oil and Gas and related products.	OG_REV_TRADING

Factor Name	Description	Column Header
O&G Related Activities - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) that a company derives from Oil and Gas-related activities, including distribution / retail, equipment and services, extraction and production, petrochemicals, pipelines and transportation and refining but excluding biofuel production and sales and trading activities.	OG_REV
O&G - California State Department of Insurance (CA DOI) Maximum Percentage of Revenue	Maximum percentage of revenue derived from Oil and Gas activities as per the definition of California State Department of Insurance (CA DOI). It includes revenue from extraction and production, pipelines and transportation and refining but excludes revenue from distribution / retail, equipment and services, petrochemicals, biofuel production and sales and trading activities. This factor returns figures for all companies with relevant revenue regardless of the amount; the disclosure threshold recommended by the CA DOI is 50%. Note: more granularity at the O&G activity level is provided in the standard O&G revenue factors.	DOI_OIL_GAS_RE V

Factor Name	Description	Column Header
Febelfin - Unconventional Oil & Gas - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) greater than 0% that a company derives from Unconventional Oil and Gas as per the definition of Febelfin. It includes revenue from Oil Sands, Oil Shale (kerogen-rich deposits), Shale Gas, Shale Oil, Coal Seam Gas, Coal Bed Methane as well as Arctic onshore/offshore. It excludes Conventional Oil and Gas production, deepwater, shallow water and other onshore/offshore. This factor returns figures for all companies with relevant revenue, regardless of the amount; the disclosure threshold recommended by Febelfin is 10% (as of 2019). Added in April 2019.	FEBELFIN_UNCONV_OIL_GAS_MAX_REV_PCT
Febelfin - Conventional Oil and Gas - Maximum Percentage of Revenue	This factor identifies the maximum percentage of revenue (either reported or estimated) greater than 0% that a company derives from Conventional Oil and Gas per the definition of Febelfin. It includes revenue from Conventional Oil and Gas production, deepwater, shallow water and other onshore/offshore. It excludes Unconventional Oil and Gas production (Sands, Oil Shale (kerogen-rich deposits), Shale Gas, Shale Oil, Coal Seam Gas, Coal Bed Methane) as well as Arctic onshore/offshore. Added in April 2019.	FEBELFIN_CONV_OIL_GAS_MAX_REV_PCT

Appendix 8: Pre-Defined Fossil Fuel Screens

MSCI ESG Climate Change Metrics offers the following pre-defined screens to measure and help clients identify exposure to fossil fuels:

Factor Name	Description	Column Header
Fossil Fuel Reserves	This screen identifies companies with reported fossil fuel reserves, with a volume of reserves greater than 0, including Oil, Natural Gas and Coal in the coverage universe.	FOSSIL_FUEL_RE SERVES
Fossil Fuel Reserves – Energy Application	This screen identifies companies, regardless of their industries, with evidence of owning fossil fuel reserves used most likely for energy applications. For high-intensity industries (belonging to Energy and Utilities GICS Sector & Diversified Metals & Mining GICS Sub-Industry), this factor flags companies with evidence of fossil fuel reserves (excluding Metallurgical Coal). For other industries, it flags companies with evidence of fossil fuel reserves (excluding Metallurgical Coal) and deriving revenue from business segments associated with energy application of fossil fuels such as Thermal Coal mining, Oil and Gas exploration & production and downstream activities e.g. refining; distribution & retail; pipeline & transportation; trading and fossil fuel- based power generation.	FF_RESERVES_EN ERGY_APPLICATI ON

Factor Name	Description	Column Header
Low Carbon Reduction	This screen identifies companies with the largest contributions to climate change using the following criteria: • Largest owners of fossil fuel reserves • Those with the largest carbon footprint • Those with the highest carbon intensity This option is designed to identify any company whose reserves account for more than 1% of the remaining global carbon budget (about 940 GtCO₂, as of 2013), or that has a carbon footprint greater than 0.33% of the annual world carbon-dioxide emissions (~35 GtCO₂), or with carbon intensity that exceeds 3,000 tCO₂/m USD of sales.	LOW_CARBON_REDUCTION
Total Potential Emissions (MtCO ₂)	This field represents the potential carbon emissions of the Coal, Oil and Gas reserves owned by a company. It is computed as the sum of the potential carbon emissions of the total Coal, total Oil and total Gas reserves owned by the company.	TOTAL_POTENTIAL_EMISSIONS
Thermal Coal – Any Tie	This factor identifies companies with an industry tie to Thermal Coal, in particular reserve ownership, production and power generation. Note: available for ACWI, to be expanded to ACWI IMI by Q4 2019.	THERMAL_COAL_ANY_TIE

Factor Name	Description	Column Header
Oil and Gas – Any Tie	Companies with an industry tie to Oil and Gas, in particular reserve ownership, Oil and Gas-related revenue and power generation. It does not flag companies generating revenue from biofuels. Note: available for ACWI, to be expanded to ACWI IMI by Q4 2019.	OIL_GAS_ANY_TIE
Oil Sands – Any Tie	This factor identifies companies with an industry tie to Oil Sands, in particular reserve ownership and production activities. Note: available for ACWI, to be expanded to ACWI IMI by Q4 2019.	OIL_SANDS_ANY_TIE
Shale Gas/Shale Oil – Any Tie	This factor identifies companies with an industry tie to Shale Gas and Shale Oil, in particular reserve ownership and production activities. Note: this factor is available for MSCI ACWI IMI universe; within MSCI ACWI universe it is flagging companies involved in either reserve ownership and/or production; for remaining companies of MSCI ACWI IMI universe it is only flagging companies owning reserves, as production revenue will be expanded by Q4 2019.	SHALE_GAS_SHALE_OIL_ANY_TIE
Fossil Fuels – Any Tie	Companies with an industry tie to fossil fuels (Thermal Coal, Oil and Gas), in particular reserve ownership, related revenue and power generation. It does not flag companies providing evidence of owning Metallurgical Coal	FOSSIL_FUELS_ANY_TIE

Appendix 9: Capital Expenditure and Renewable Energy Capex Ratios

Factor name	Description	Column Header
CapEx plan - currency	Reporting currency of the company's most recently reported capital expenditure plan.	CAPEX_CCY
CapEx plan - start year	Start year of the company's most recently reported capital expenditure plan.	CAPEX_START_YEAR
CapEx plan - end year	The year the company's most recently reported capital expenditure plan ends. When the start year equals the end year, this indicates CapEx for a single fiscal year.	CAPEX_END_YEAR
Time horizon (forward looking or historical)	Indicates the time-horizon of the most recently reported capital expenditure plan - forward-looking planned capital expenditure or historically reported capital expenditure for a prior time period. If a forward-looking capital expenditure plan is available, this would be considered the most recent plan.	CAPEX_HORIZON
CapEx in electric networks infrastructure (millions)	Capital expenditure in electric networks infrastructure (transmission and distribution) in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_NETWORKS_ELEC_CCY

Factor name	Description	Column Header
CapEx in gas networks infrastructure (millions)	Capital expenditure in natural gas networks infrastructure (transmission and distribution) in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_NETWORKS_GAS_CCY
CapEx in district heating (millions)	Capital expenditure in district heating in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_NETWORKS_HEAT_CCY
Total CapEx in network infrastructure (millions)	Total capital expenditure for networks infrastructure (including electric, gas, and heating, as applicable to the company's business mix) in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_NETWORKS_TOTAL_CCY
CapEx in coal-fired power generation assets (millions)	Capital expenditure in coal-fired power generation assets in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_GENERATION_COAL_CCY
CapEx in natural gas-fired power generation assets (millions)	Capital expenditure in natural gas-fired power generation assets in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_GENERATION_NAT_GAS_CCY

Factor name	Description	Column Header
CapEx in liquid fuel-fired power generation assets (millions)	Capital expenditure in liquid fuel-fired power generation assets in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_GENERA T_LIQUID_FUEL_ CCY
CapEx in nuclear power generation assets (millions)	Capital expenditure in nuclear power generation assets in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_GENERA T_NUCLEAR_CC Y
Total CapEx in thermal power generation assets (millions)	Capital expenditure in thermal power generation assets (including coal, natural gas, liquid fuels and nuclear) in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_GENERA T_THERMAL_CC Y
CapEx in hydro power generation assets (millions)	Capital expenditure in hydro power generation assets in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_GENERA T_HYDRO_CCY
CapEx in wind power generation assets (millions)	Capital expenditure in wind power generation assets (onshore and offshore) in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_GENERA T_WIND_CCY

Factor name	Description	Column Header
CapEx in solar power generation assets (millions)	Capital expenditure in solar power generation assets in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_GENERA T_SOLAR_CCY
CapEx in biomass power generation assets (millions)	Capital expenditure in biomass power generation assets in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_GENERA T_BIOMASS_CCY
CapEx in other renewable power generation assets (millions)	Capital expenditure in other renewable power generation assets (wave, tidal, etc. - excluding hydro, wind, solar and biomass) in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_GENERA T_OTHER_RES_C CY
CapEx in renewable power generation assets (millions)	Total capital expenditure in renewable power generation assets (including wind, solar, biomass, hydro and other renewables) in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_GENERA T_RENEW_CCY
Total CapEx in power generation assets (millions)	Total capital expenditure attributed to any power generation assets (including all thermal and all types of renewables) in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in	CAPEX_GENERA T_TOTAL_CCY

Factor name	Description	Column Header
	millions.	
Total CapEx (millions)	Total company capital expenditure in the most recently reported capital expenditure plan, expressed in the reporting currency (CAPEX_CCY) in millions.	CAPEX_TOTAL_COMPANY_CCY
Renewable power generation CapEx as a proportion of total CapEx (%)	Capital expenditure in renewable power generation assets (wind, solar, biomass, hydro and other renewables) as a proportion of total company capital expenditure (including networks infrastructure, all power generation assets and other capital expenditure) in the most recently reported capital expenditure plan.	RENEW_ENERGY_CAPEX_VS_TOTAL_CAPEX_PCT
Thermal power generation CapEx as a proportion of total CapEx (%)	Capital expenditure in thermal power generation assets (coal, gas, oil and nuclear) as a proportion of total company capital expenditure (including networks infrastructure, all power generation assets and other capital expenditure) in the most recently reported capital expenditure plan.	THERMAL_ENERGY_CAPEX_VS_TOTAL_CAPEX_PCT

Appendix 10: Carbon for Sovereigns

Factor name	Description	Column Header
GENERAL DATA		
GDP nominal (USD)	The data point represents nominal GDP of a country in USD terms. (Source: WDI, CIA)	CARBON_GOVERNMENT_GDP_NOMINAL_USD
Public debt (% of nominal GDP)	The data point represents the latest public debt values, and is expressed as % of GDP. Public debt is the cumulative total of all government borrowings less repayments that are denominated in a country's home currency. (Source: WDI, CIA)	CARBON_GOVERNMENT_RAW_PUBLIC_DEBT
PHYSICAL AND ECONOMIC VULNERABILITY		
Agricultural and forest land	Availability of agriculture and forest land in a country. Represented in square km per 1,000 person (Source: WDI)	GOVERNMENT_RAW_AG_FOREST
Energy consumption per capita (kgoe per capita)	Represented in "kg of oil equivalent per capita." Energy use refers to use of primary energy before transformation to other end-use fuels, which is equal to indigenous production plus imports and stock changes, minus exports and fuels supplied to ships and aircraft engaged in international transport. (Source: WDI)	GOVERNMENT_RAW_EN_CONS

Factor name	Description	Column Header
Energy imports (Net, % of Energy Use)	Energy imports as % of total energy use. Net energy imports are estimated as energy use less production, both measured in oil equivalents. A negative value indicates that the country is a net exporter. Energy use refers to use of primary energy before transformation to other end-use fuels, which is equal to indigenous production plus imports and stock changes, minus exports and fuels supplied to ships and aircraft engaged in international transport. (Source: WDI)	GOVERNMENT_R AW_EN_IMP
Energy productivity	GDP per unit of energy use. GDP is presented in constant 2011 PPP USD. Unit of energy use is - kg of oil equivalent (kgoe). (Source: WDI)	GOVERNMENT_R AW_EN_PROD
Energy resource depletion (% of GNI)	Energy resource depletion is the ratio of the value of the stock of energy resources to the remaining reserve lifetime (capped at 25 years). It covers Coal, Crude Oil, and Natural Gas. Represented in terms of % of GNI. (Source: WDI)	GOVERNMENT_R AW_EN_RES_DEP

Factor name	Description	Column Header
Environmental Vulnerability Index (EVI)	The Environmental Vulnerability Index reflects the extent to which the natural environment of a country is prone to damage and degradation. This index contains indicators on weather and climate, geology, geography, ecosystem resources and services, high winds, dry periods, endemics, frequency of earthquake, tsunamis, volcanic eruptions, etc. Score indications are: below 215 (Resilient), above 215 (at Risk), above 265 (Vulnerable), above 315 (Highly vulnerable) and above 365 (Extremely vulnerable). (Source: Vulnerability Index)	CARBON_GOVERNMENT_ENV_VULNERABILITY_INDEX
Forest cover change (3-year CAGR)	% change in forest cover (3-year trend - CAGR) in a country. Negative value indicates depleting forest cover. Source: WDI	GOVERNMENT_RAW_FOR_COV
Fuel exports (% of total exports)	The data point represents mineral fuels exports as % of total exports of a country (in USD terms). (Source: WDI)	CARBON_GOVERNMENT_FUEL_EXPORTS
Net forest depletion (% of GNI)	Represents the depletion rate of forest resources as a percentage of Gross National Income (GNI). (Source: WDI)	GOVERNMENT_RAW_NET_FOR_DE

Factor name	Description	Column Header
Population affected by natural disasters (average per year per million)	People (average per year per million people) requiring immediate assistance during a period of emergency as the result of a natural disaster (drought, extreme temperature, flood, mass movement, wet storm and wildfire), including displaced, evacuated, homeless and injured people. (Sources: WDI, UNDP, HDR)	GOVERNMENT_R AW_POP_NAT_DI S
Proven fossil fuel reserves (kg of oil equivalent/capita)	Per capita availability of fossil fuel reserves (in kg of oil equivalent per person), such as Coal, Oil and Gas. (Source: EIA, CIA, WDI)	CARBON_GOVER NMENT_FOSSIL_ RESERVE
TRANSITION RISKS		
CO2 emissions (tons)	Total CO2 emissions per year in a country. Represented in tons. This data contains CO2 emission related to fossil fuel use and industrial processes (e.g. cement production etc.). (Source: EDGAR)	CARBON_GOVER NMENT_CO2
CO2 emissions (tons) trend, 3-year CAGR (%)	% change in Total CO2 emissions (3-year trend - CAGR) in a country. This data contains CO2 emission related to fossil fuel use and industrial processes (e.g. cement production etc.). (Source: EDGAR)	CARBON_GOVER NMENT_CO2_TRE ND

CO2 emissions per capita	CO2 emissions per capita per year in a country. Represented in tons per capita. This data contains CO2 emissions related to fossil fuel use and industrial processes (e.g. cement production etc.). Source: EDGAR	GOVERNMENT_R AW_CO2
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Factor name	Description	Column Header
CO2 emissions per capita (tons) trend, 3 year CAGR (%)	% change in CO2 emissions per capita (3-year trend - CAGR) in a country. This data contains CO2 emission related to fossil fuel use and industrial processes (e.g. cement production etc.). (Source: EDGAR)	CARBON_GOVERNMENT_CO2_CAPITA_TREND
CO2 intensity (kg per USD GDP nominal)	This data point represents CO2 intensity of an economy (in kg per USD GDP nominal). The higher the value the more carbon-intensive the economy is. It considers CO2 emission related to fossil fuel use and industrial processes (e.g. cement production etc.). (Sources: EDGAR, WDI)	CARBON_GOVERNMENT_CO2_INTENSITY_GDP
CO2 intensity (kg per USD GDP nominal) trend, 3-year CAGR (%)	% change in the CO2 intensity of an economy (3- year trend - CAGR). It considers CO2 emission related to fossil fuel use and industrial processes (e.g. cement production etc.). (Source: EDGAR)	CARBON_GOVERNMENT_CO2_INTENSITY_GDP_TREND
CO2 intensity (t/USD million GDP nominal)	This data point represents CO2 intensity of an economy (in tons per USD million GDP nominal). The higher the value the more carbon-intensive the economy is. It considers CO2 emission related to fossil fuel use and industrial processes (e.g. cement production etc.). (Sources: EDGAR, WDI).	CARBON_GOVERNMENT_CO2_INTENSITY_GDP_TONPERMN

Factor name	Description	Column Header
GHG emissions (% of world total)	Greenhouse gas emissions (represented in “% of world total”). Three out of six greenhouse gases, considered under Kyoto Protocol, are considered for this data point. These gases are carbon dioxide, methane and nitrous oxide. (Source: WDI, UNFCCC)	GOVERNMENT_R AW_GHG_PCT
GHG emissions (tons of CO2 eq)	Total Greenhouse gas emissions in a country represented in terms of tons CO2 equivalent. Three out of six greenhouse gases, considered under Kyoto Protocol, are considered for this data point. These gases are carbon dioxide, methane and nitrous oxide. (Source: EDGAR)	CARBON_GOVER NMENT_GHG
GHG emissions (tons of CO2 eq) trend, 3 year CAGR (%)	% change in Total GHG emissions (3-year trend - CAGR) in a country. (Source: EDGAR)	CARBON_GOVER NMENT_GHG_TR END
GHG emissions per capita (tons of CO2 eq)	Tons CO2e per capita. Three out of six greenhouse gases, considered under Kyoto Protocol, are considered for this data point. These gases are carbon dioxide, methane and nitrous oxide. (Source: EDGAR)	GOVERNMENT_R AW_GHG_CAPITA
GHG emissions per capita (tons of CO2e) trend, 3-year CAGR (%)	% change in per capita GHG emissions (3-year trend - CAGR) in a country. (Source: EDGAR)	CARBON_GOVER NMENT_GHG_CA PITA_TREND

Factor name	Description	Column Header
GHG intensity (kg per 2011 PPP USD of GDP)	This data point represents GHG intensity of an economy. The higher the value, the more carbon-intensive the economy is. Three out of six greenhouse gases, considered under Kyoto Protocol, are considered for this data point. These gases are carbon dioxide, methane and nitrous oxide. GDP is in 2011 PPP USD terms. (Source: WDI)	CARBON_GOVERNMENT_GHG_INTENSITY_PPS
GHG intensity (kg per 2011 PPP USD of GDP) trend, 3 year CAGR (%)	This data point represents % change in GHG intensity of an economy (3-year trend - CAGR). Three out of six greenhouse gases, considered under Kyoto Protocol, are considered for this data point. These gases are carbon dioxide, methane and nitrous oxide. GDP is in 2011 PPP USD terms. (Source: WDI)	CARBON_GOVERNMENT_GHG_INTENSITY_PPS_TREND
GHG intensity (kg per USD GDP nominal)	This data point represents GHG intensity of an economy (in kg per USD GDP nominal). The higher the value, the more carbon intensive the economy is. Three out of six greenhouse gases, considered under Kyoto Protocol, are considered for this data point. These gases are carbon dioxide, methane and nitrous oxide. GDP is in nominal terms. (Sources: EDGAR, WDI)	CARBON_GOVERNMENT_GHG_INTENSITY_GDP
SOVEREIGN WARMING POTENTIAL		
Sovereign Warming Potential – BAU scenario [°C]	A country's alignment temperature when referencing a business as usual scenario. This metric could be used to assess	GOVERNMENT_SOV_WARMING_BAU

Factor name	Description	Column Header
	a country's alignment to a global stabilization goal, based on the current emission profile of the country. Source: MSCI ESG Research United Nations Environment Programme (2019). Emissions Gap Report 2019. UNEP, Nairobi United Nations Population Prospects (2019), Median Variant Scenario Institute for Global Environmental Strategies	
Sovereign Warming Potential – NDC scenario [°C]	A country's alignment temperature when referencing the country's Nationally Determined Contribution (NDC). This metric could be used to assess a country's alignment to a global stabilization goal, based on the country's commitments to reduce its emission profile. NDCs embody efforts by each country to reduce national emissions and adapt to the impacts of climate change. The Paris Agreement requests each Party to prepare, communicate and maintain successive NDCs that it intends to achieve. Source: MSCI ESG Research United Nations Environment Programme (2019). Emissions Gap Report 2019. UNEP, Nairobi United Nations Population Prospects (2019), Median Variant Scenario Institute for Global Environmental Strategies	GOVERNMENT_SOV_WARMING_NDC

Factor name	Description	Column Header
GHG intensity (kg per USD GDP nominal) trend, 3-year CAGR (%)	This data point represents % change in GHG intensity of an economy (3-year trend - CAGR). Three out of six greenhouse gases, considered under Kyoto Protocol, are considered for this data point. These gases are carbon dioxide, methane and nitrous oxide. (Source: EDGAR, WDI)	CARBON_GOVERNMENT_GHG_INTENSITY_GDP_TREND
GHG intensity (t/USD million GDP nominal)	This data point represents GHG intensity of an economy (in tons per USD million GDP nominal). The higher the value, the more carbon-intensive the economy is. Three out of six greenhouse gases, considered under Kyoto Protocol, are considered for this data point. These gases are carbon dioxide, methane and nitrous oxide. GDP is in nominal terms. (Sources: EDGAR, WDI). The unit used is aligned with the one for corporates intensity data (Scope 1+2 Intensity (t/USD million sales))	CARBON_GOVERNMENT_GHG_INTENSITY_GDP_TONPERMN

Appendix 11: MSCI Bloomberg Paris Aligned Index Scope 1 + 2 Carbon Emissions Factors

Factor Name	Description	Column Header
Carbon Emissions		
carbon.emissions.scope.12.monthend	The month-end snapshot of the company's reported or estimated Scope 1 + Scope 2 emissions, as defined by the Greenhouse Gas Protocol (tCO ₂ e/yr).	CARBON_EMISSIONS_SCOPE_12_MONTHEND
carbon.emissions.scope.3.monthend	This figure represents, if available, a month-end snapshot of total estimated scope 3 emissions, as defined by the Greenhouse Gas Protocol ([tCO ₂ e/yr])	CARBON_EMISSIONS_SCOPE_3_MONTHEND
carbon.emissions.scope.12.monthend_T1	This figure represents, if available, the company's reported or estimated Scope 1 + Scope 2 greenhouse gas emissions (tCO ₂ e/yr) with a 1-year lag compared to the most recent as of date for the carbon emissions Scope 1 and Scope 2 metric, using [current year -1] month end data.	CARBON_EMISSIONS_SCOPE_12_MONTHEND_T1
carbon.emissions.scope.12.monthend_T2	This figure represents, if available, the company's reported or estimated Scope 1 + Scope 2 greenhouse gas emissions (tCO ₂ e/yr) with a 2-year lag compared to the most recent as of date for the carbon emission Scope 1 and Scope 2 metric, using [current year -2] month end data.	CARBON_EMISSIONS_SCOPE_12_MONTHEND_T2

carbon.emissions.scope.12.monthend_T3	This figure represents, if available, the company's reported or estimated Scope 1 + Scope 2 greenhouse gas emissions (tCO ₂ e/yr) with a 3-year lag compared to the most recent as of date for the carbon emissions Scope 1 and Scope 2 metric, using [Current year -3] month end data.	CARBON_EMISSIONS_SCOPE_12_MINUS3Y
carbon.emissions.scope.3.monthend_T1	This figure represents, if available, the total estimated Scope 3 emissions, as defined by the Greenhouse Gas Protocol, ([tCO ₂ e/yr]) with a 1-year lag compared to the most recent as of date for the carbon emissions Scope 3 metric, using [current year -1] month end data.	CARBON_EMISSIONS_SCOPE_3_TOTAL_MINUS1Y
carbon.emissions.scope.3.monthend_T2	This figure represents, if available, the total estimated scope 3 emissions, as defined by the Greenhouse Gas Protocol, ([tCO ₂ e/yr]) with a 2-year lag compared to most recent as of date for the carbon emissions Scope 3 metric, using [current year -2] month end data.	CARBON_EMISSIONS_SCOPE_3_TOTAL_MINUS2Y
carbon.emissions.scope.3.monthend_T3	This figure represents, if available, the total estimated scope 3 emissions, as defined by the Greenhouse Gas Protocol, ([tCO ₂ e/yr]) with a 3-year lag compared to most recent as of date for the carbon emissions Scope 3 metric, using [current year -3] month end data.	CARBON_EMISSIONS_SCOPE_3_TOTAL_MINUS3Y

Carbon Emissions Intensity		
carbon.sales.intensity.rec ent.monthend	This figure represents, if available, a month-end snapshot of the company's sales (million USD) used for calculating its most recent Carbon Intensity for Scope 1 and Scope 2.	CARBON_SALES_I NTENSITY_RECEN T_MONTH-END
carbon.sales.intensity.rec ent.monthend_T1	This figure represents, if available, the company's sales (USD million) used for calculating the most recent Carbon Intensity for Scope 1 and Scope 2 with a 1-year lag compared to most recent as of date for the carbon emissions Scope 1 and Scope 2 metric, using [current year -1] month end data.	CARBON_SALES_I NTENSITY_RECEN T_MINUS1Y
carbon.sales.intensity.rec ent.monthend_T2	This figure represents, if available, the company's sales (USD million) used for calculating the most recent Carbon Intensity for Scope 1 and Scope 2 with a 2-year lag compared to most recent as of date for the carbon emissions Scope 1 and Scope 2 metric, using [current year -2] month end data.	CARBON_SALES_I NTENSITY_RECEN T_MINUS2Y
carbon.sales.intensity.rec ent.monthend_T3	This figure represents, if available, the company's sales (USD million) used for calculating the most recent Carbon Intensity for Scope and Scope 2 with a 3-year lag compared to most recent as of date for the carbon emissions Scope 1 and Scope 2 metric, using [current year -3] month end data.	CARBON_SALES_I NTENSITY_RECEN T_MINUS3Y
evic.usd.recent.monthend	This figure represents, if available, a month-end snapshot of the company's fiscal year-end enterprise value including cash (USD million).	EVIC_USD_RECEN T_MONTHEND

evic.usd.recent.monthend _T1	This figure represents, if available, the fiscal year-end enterprise value including cash (USD million) with a 1-year lag compared to most recent as of date for the enterprise value including cash (USD million) metric, using [current year -1] month end data.	EVIC_USD_RECEN T_MINUS1Y
evic.usd.recent.monthend _T2	This figure represents, if available, the fiscal year-end enterprise value including cash (USD million) with a 2-year lag compared to the most recent as of date for the enterprise value including cash (USD million) metric, using month [current year -2] end data.	EVIC_USD_RECEN T_MINUS2Y
evic.usd.recent.monthend _T3	This figure represents, if available, the fiscal year-end enterprise value including cash (USD million) with a 3-year lag compared to the most recent as of date for the enterprise value including cash (USD million) metric, using [current year -3] month end data.	EVIC_USD_RECEN T_MINUS3Y
MONTHEND_LOOKBACK_ PERIOD	Lookback Period for the Month End – Scope 1, Scope 2, and Scope 3 Emissions and EVIC [Timeseries]	MONTHEND_LOO KBACK_PERIOD

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