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Market Intelligence

Trucost Environmental Data Methodology Guide

Corporate Environmental Performance



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Document Overview

What You Will Find in This User Guide

The purpose of this document is to provide a description of the methods by which Trucost environmental data is collected, standardized, and calculated.

Supporting Documentation

There are several supporting documents available on the [Support Center website](#):

- *Trucost Environmental Data - Xpressfeed™ User Guide* – This user guide provides an overview of Trucost environmental data through Xpressfeed, including the data structure of the packages, database schema, specific details about working with the data, and a common way of querying Trucost data with SQL examples.
- *Trucost Environmental Data Item List* – This spreadsheet provides table names by package and dataitemids/data item names/data item definitions that exist in each table.
- *S&P Capital IQ Base Files User Guide* – The Base Files associate companies, symbols, securities, and other objects across all S&P Capital IQ data sets. This guide describes the data structure of the Base Files as well as integration of the Base Files with other S&P Capital IQ data sets.
- *Xpressfeed Loader User Guide* – This user guide outlines the features and capabilities of the Xpressfeed Loader. The Xpressfeed Loader generates a database schema and structure and loads the data records as a set of fully indexed tables. The Loader automates the daily updates of records and keeps your database up to date.
- *Xpressfeed File Delivery Technical Guide* – This guide provides information for clients who download S&P Global Market Intelligence data files directly from our server and write their own loading procedures.
- *File Format Spreadsheets* – These spreadsheets contain full and change file zip file prefixes, individual text file names, and information for each column in the file (e.g., column names, column data types, whether the column is nullable, and primary keys).

- *Xpressfeed File Delivery Schedule* – This spreadsheet provides expected full and change file delivery times as well as the length of time the files remain on the server.
- *SNL Reference Data User Guide* – This user guide provides the schema for the SNL Reference package and detailed descriptions of all tables and fields; information on how to link SNL Reference data to S&P Capital IQ data sets or to Compustat data using the Company Cross Reference File; and common ways of querying SNL Reference data and SQL examples.

If you are linking to other S&P Global Market Intelligence data sets, supporting documents are available on the [Support Center website](#).

Data Collection

What is Trucost Data?

Trucost data contains quantitative information on the environmental performance of over 15,000 of the world's largest listed companies, representing 95% of global market capitalization. Trucost data is associated with approximately 500 distinct industry sectors across over 100 environmental key performance indicators (KPIs). The data covers hundreds of environmental issues encompassing carbon and other pollutants, water dependency, natural resource efficiency, and waste disposal.

Data universe

- Trucost's *Core Plus* universe (includes its *Core* universe) consists of:
 - S&P Broad Market Index (BMI) (approximately 11,500 large-, mid-, small- and micro-cap companies)
 - S&P China A SmallCap 300 Index
 - S&P 500 Index
 - S&P Global 1200 Index
 - S&P/TOPIX 150 Index
 - S&P/TSX Composite Index
 - S&P/ASX 200 Index
 - S&P/ASX 300 Index
 - TSE TOPIX Index
 - Other large listed companies added per client request (approximately 1,500 companies)
- Trucost's *Cemetery* universe consists of approximately 1,000 delisted or defunct companies.

Historical coverage

Historical coverage for small- and mid-cap companies starts from 2016; historical coverage for large-cap companies goes back to 2005.

Research Process

Trucost follows a four-step research process designed to minimize the environmental reporting burden of companies (“survey fatigue”) and to provide a transparent system for companies to verify their environmental performance profile, and, at any time, contribute to their most recently available data.

Four-step research process

1. MAP company business segments:

Trucost maps company business segments to more than 450 business activities in the Trucost model. The model is based on the North American Industry Classification System (NAICS), but goes into greater granularity in some areas, such as power generating utilities.

2. ESTIMATE data-modelled profile:

Once company business segments have been mapped to Trucost sectors and their share of revenue apportioned to each, Trucost is able to efficiently generate a data-modelled profile for the company. Trucost uses its environmentally extended input/output (EEIO) model to estimate data for over 800 environmental and operational metrics across the entire operations of companies, from the raw materials they depend on in their supply chains to the electricity they purchase to power their operations.

3. COLLECT public disclosure:

Trucost searches for environmental performance information in annual reports, sustainability reports, websites, and other publicly disclosed sources. Third party datasets, like disclosures to the CDP, are also reviewed. We then standardize reported environmental performance data to best practice guidelines so that it can be compared across companies, regions, and business activities. To correct reporting errors, vigorous data control procedures are applied, such as sector specialist data reviews, automated outlier identifications and year-on-year comparisons. Wherever a material metric is not disclosed, Trucost uses its modelled value, thus ensuring that all data gaps have been filled.

4. ENGAGE with company:

Trucost then conducts an annual engagement with every company, providing the opportunity to verify environmental performance and provide additional information. Companies are further welcomed to contact Trucost analysts at any point in their environmental reporting cycle to provide their most recently available data. This ensures Trucost’s data is both accurate and up to date.

Sources of Trucost Data

The data comes from a variety of sources, including company annual reports, direct disclosures, scientific literature, and a wide array of national, international, and industry databases, industry “top-down” data, as well as sector-specific “bottom-up” data.

The table below provides a list of typical data sources for economic output, prices, resources, and emissions.

Data Category	Example Sources
Sector economic output	<ul style="list-style-type: none"> United States Bureau of Economic Analysis (BEA)
Resource use – energy, water, and land	<ul style="list-style-type: none"> Industry and academic reports United States Department of Energy (DOE)

Data Category	Example Sources
	<ul style="list-style-type: none">• Eurostat• Company annual reports• Data published on company websites or other public sources• Security and Exchange Commission (SEC) filings• Environmental data sources (CSR, Sustainability Environmental Reports, the CDP, EPA filings)
Emissions – greenhouse gases, air pollutants, land pollutants, and water pollutants	<ul style="list-style-type: none">• Intergovernmental Panel on Climate Change (IPCC)• Toxic Release Inventories• Food and Agriculture Organization of the United Nations• United States Energy Information Agency• International Energy Agency (IEA)• Direct disclosures (data shared directly by companies via Trucost's direct engagement and data verification process.

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Data Standardization/Calculation

Trucost combines a rigorous [research process](#) with its proprietary economic modeling to respond to the growing demand for:

- greater transparency about corporate environmental performance
- greater consistency in corporate environmental reporting
- standardized corporate environmental reporting, making it easier for market participants to compare the liabilities of different companies
- correction of reporting errors

Estimating Environmental Impacts

Trucost's Environmentally Extended Input-Output Model ("Trucost's EEIO")

Trucost's EEIO is our core environmental profiling model for estimating the environmental impacts across company operations and supply chain tiers right back to primary resource extraction, secondary processing, and final product assembly. This is done in the absence of company disclosure.

Trucost's EEIO model brings together its vast database of industry-specific environmental impact data with quantitative macroeconomic data on the flow of goods and services between different sectors in the economy. Trucost's EEIO model enables us to estimate environmental impacts for a company's own operations and across its entire global supply chain, associated with approximately 500 distinct industry sectors across over 100 environmental key performance indicators (KPIs).

Our model covers the most material drivers of impacts across greenhouse gas emissions, pollution of air, land & water, waste generation, and water & other natural resource use. These environmental intensity factors are reported in units of emissions or resource use per million dollar of economic output, and are derived from a wide array of national, international, and industry databases. Trucost tests this data against the many thousands of disclosures we collect from companies during our annual engagement program. Where available, Trucost uses country-specific information to inform global average intensity factors, which are weighted by production value. This approach allows us to take into account differences in the emissions profiles of different sectors within the global model.

Trucost has been collecting environmental data since 2000 and is able to test this model against many years of data on quantitative environmental disclosures from thousands of companies.

Strengths of Trucost's EEIO

Quality of Data Sources

Trucost applies best-in-class scientific literature to calculate the environmental impacts of different business activities, including industry “top-down” data from the World Bank and U.S. Environmental Protection Agency, as well as sector-specific “bottom-up” data from the U.N. and peer-reviewed academic studies.

Granularity of Analysis

Many publicly available EEIO models may cover only a small proportion of business activities. Trucost's global model is derived from the U.S. economy, due to its broad economic scope. To further ensure the model is representative of dispersed company operations, Trucost applies global environmental factors and expands its scope to cover discrete business activities. In particular, Trucost splits up high-impact business sectors, such as utilities and agriculture, to account for variations within the most environmentally significant business sectors.

Regularity of Updates

A frequent criticism of publicly available EEIO models is that they are out of date. Every year, Trucost updates its environmental impact data and engages with companies to incorporate the latest publicly disclosed and not publicly disclosed environmental performance information.

Scope of Environmental Indicators

Some models only estimate GHG emissions, but Trucost's approach calculates the environmental performance of companies across approximately 500 distinct industry sectors.

Calculation Overview

Environmental impacts attributable to a business are calculated by Trucost using environmental intensities expressed as pollutant or resource use per unit of revenue. These are calculated by obtaining emissions or resource data by sector, and using this data in conjunction with financial data to create environmental intensities. The intensities are applied to financial information gained from ‘make and use’ tables provided by the United States Bureau of Economic Analysis to enable Trucost to calculate the environmental impacts of a company's supply chain. Trucost has adapted these tables so that it can calculate the operational and supply chain emissions or resource use of approximately 500 distinct industry sectors.

Specific Concepts

Sectors: areas of economic activity (business activities)

Environmental intensity: a metric of the environmental impacts of an economic activity per unit of revenue

Operational environmental impacts: environmental impacts across a company's own operations

Supply chain environmental impacts: environmental impacts across a company's entire global supply chain

Key Methodological Steps within Trucost's EEIO model

1. Selection of the sector(s) of interest from a list of approximately 500 distinct industry sectors
2. Calculation of environmental intensities
3. Modeling of operational environmental impacts
4. Modeling of supply chain environmental impacts
5. Outputs

Illustration of the methodological steps

The table below outlines the key methodological steps in this process as well as giving some examples at each of these stages.

Methodological Steps	Examples
1. Selection of the sector(s) of interest from a list of approximately 500 distinct industry sectors	Cotton farming; natural gas extraction; coal power generation; plastic bottle manufacturing
2. Calculation of environmental intensities	<ul style="list-style-type: none"> • The environmental intensities are calculated in terms of metric tons or cubic meters per unit of revenue. • Data is utilized from a wide array of supra-national, international, national, and industry bodies across a wide range of sectors and geographies. • Impacts are calculated in one of six categories including: <ul style="list-style-type: none"> o Greenhouse gas emissions o Air pollutants o Land and water pollutants o Waste production o Water consumption o Natural resource use
3. Modeling of operational environmental impacts	Calculated using industry-specific environmental intensity factors for each of the sectors in which a company operates.
4. Modeling of supply chain environmental impacts	<p>By combining the industry-specific environmental intensity described above with an expanded input-output database derived from the latest 'make and use' tables published by the United States Bureau of Economic Analysis, Trucost estimates the environmental impacts within supply chains by applying environmental intensities to the flows of monetary transactions.</p> <p>The 'make and use' tables are expanded (1) to detail the ratio of expenditure from one sector with every other sector of the economy, termed "intermediate demands" and (2) to provide additional detail on a</p>

Methodological Steps	Examples
	<p>number of environmentally important sectors, such as the mining, power generation and wholesale and retail trade sectors, by disaggregating the tables proportionally.</p> <p>Note: Trucost uses the US economy as a proxy for the world economy and as a starting point for the creation of its supply chain model.</p>
5. Outputs	<p>Over 100 qualified environmental impacts are classified into the categories listed above, which enables:</p> <ul style="list-style-type: none"> • Identification of the companies or portfolios generating the greatest absolute and relative environmental impacts • Identification of the most material environmental impacts for each company of portfolio. • Comparison of operational vs. supply-chain impacts

State of environmental reporting

What is the state of environmental reporting?

Despite growing demand for companies to provide transparency about their environmental performance, corporate reporting remains patchy. Some regions are leading the way while others are lagging. Published disclosure is often incomplete or non-standard, making it difficult to compare the liabilities of different companies. Reporting errors can be prevalent. Trucost analysis finds that for the majority of companies, environmental risk is often concealed within supply chain tiers, a scope of impact that is significantly underreported.

Company Selection

How does Trucost schedule the companies in its research process?

As a general rule, Trucost prioritizes companies based on the companies' fiscal year (FY).

As an additional overlay, when a company discloses environmental data in sources that are not yet available at the point of researching (e.g., Sustainability/CDR Reports, CDP responses), the company's data for that financial year will become 'final' and shared in data products after the equivalent data sources are published and their data has been incorporated into Trucost's data. This approach enables Trucost to provide data that is available at the end of its typical research life-cycle as opposed to data that is expected to be amended after later reports or CDP data becoming released (or derived from previous year data or early disclosure sources).

Company Data

What data does Trucost collect from companies?

Trucost collects company environmental data, including performance data and disclosure metrics on greenhouse gas (GHG) emissions, water use, pollution impacts, and waste disposal. Trucost also collects information on a company's business activities.

Data Revisions

How often is Trucost data revised?

Trucost's research process is annual—each Trucost environmental data point is for a complete company financial year. Trucost adds a new company year to its database as companies complete their financial years and relevant data is publicly disclosed.

In addition, it is common for a company's data disclosure to have valuable information pertaining to previous financial years (time-series performance). This allows Trucost to refine its modeling or take a disclosed value for a prior year instead of previously estimated values. Trucost's research process is continuous; such historical revisions may occur at any point in the year. Company data re-statements are not typically taken into account in the data, apart from cases where there has been an error in disclosures.

Environmental Reporting Gaps

How does Trucost navigate the absence of company reported information?

Trucost uses economic modeling techniques to complete disclosure gaps for hundreds of environmental impact metrics across the entire operation of companies, from the raw materials on which they depend in their supply chains to the electricity they purchase to power their operations. This approach allows for comparisons between all companies, regardless of disclosure levels. Subsequently, Trucost engages annually with every company it assesses to verify its research and collect the latest information, which, although available, is undisclosed.

Comparisons made with other data sources

When collating data, are comparisons made with other data sources?

Yes. Trucost sense checks all data points as companies often make mistakes in their reporting. When considering a data point, Trucost is looking at what its modeling process estimates should be. As part of its research process, Trucost checks the environmental data of companies in sectors and checks for outliers using statistical testing techniques, and further investigates and qualifies notable exceptions to sector averages. Similarly, Trucost compares company environmental metrics year-to-year to investigate any large fluctuations in data, with legitimate variations qualified and quality checked.

Changes in data year-to-year

What explains some large changes in data year-to-year?

Commonly, significant year-to-year changes in company data can be explained by at least one of the following reasons:

- Significant year-to-year changes in revenues and the business activities in which the company is engaged
- Changes in reporting methodologies adopted by companies
- Increased scope of company reporting compared to previous years (it may not have been apparent that the original scope was narrower than desired). Previous year data would subsequently be adjusted to ensure consistency
- Corporate actions (e.g., spin off, acquisition, and merger)
- Significant changes in company operations (e.g. where a company drastically improves its energy efficiency or carbon reduction strategies)
- Improvements in the level of accuracy of a company's measures of their environmental impacts
- A company's first year of data can cause figures rather different to previous modelled values.

Sector classification

What sector classification does Trucost data use?

Trucost data splits the world economy into hundreds of distinct business activities based on the North American Classification System (NAICS), however Trucost classifications are more granular in some areas such as power generating utilities.

Environmental intensity

What is an environmental intensity?

An 'environmental intensity' is a metric that denominates a quantity of environmental impact, such as greenhouse gas emissions or water, with another data point: a *normalizing factor*. Trucost's standard intensity metrics denominate environmental impacts by a company's annual consolidated revenues in millions of US dollars, for example, carbon intensity would be in the units: *tCO₂e/US\$ mn Revenues*. Environmental intensities are useful in comparing companies both within and across different sectors. These metrics can control for different company characteristics, such as size, making it possible to assess the environmental efficiency of a company.

Why are environmental intensities denominated by company revenues?

Environmental impacts, such as greenhouse gas emissions or water, are generated by a company's direct and indirect operations, therefore a suitable normalizing factor should also be correlated with direct and supply chain operations in order for the environmental intensity metric to more closely reflect the environmental efficiencies of companies. Since it is deemed that a company's revenues are reasonably correlated with its scale of operations, at least within a sector, revenues have become the market-standard normalizing factor for environmental intensities (i.e., all other things held constant, the greater a company's revenues, the greater its environmental impact).

It is also deemed desirable for the intensity metric to be in some way linked to a company's financial performance in order to begin to understand the relationship between environmental impact and financial risk. Hence, intensity metrics which normalize environmental impact by revenue, such as *tCO₂e/US\$ mn Revenues*, indicate the dependency on the generation of environmental impacts a company has in generating revenues.

Environmental damage costs

What are 'environmental damage costs' and how should I interpret them?

'Damage costs' are estimates of the negative externality associated with the use of a resource or the emission of a pollutant. They reflect the environmental impact of a business activity in monetary terms. Damage costs are based on the assumption that the cost of maintaining an environmental benefit is a reasonable estimate of its value. They are calculated by multiplying company data on the quantity of resources used or pollutants emitted (i.e., tCO₂e, m³ of water use, kg of waste generated etc.) by Trucost's *environmental valuation coefficients*.

An externality, or *external cost*, is a consequence of an industrial or commercial activity that affects other parties (such as society or the environment), but is not reflected in market prices. An 'environmental damage cost' is the quantification of the negative externalities caused by a company's use of a resource or emission of a pollutant across all *impact categories*.

'Impact categories' are the different environmental impacts deriving from a company's activities. These categories cover the company's greenhouse gases, water use, waste generated, land, water and air pollutants generated, and natural resources used.

Environmental damage costs can be either direct or indirect. *Direct damage costs* are those associated with a company's direct operations, while *indirect damage costs* are those that are borne in the company's supply chain. *Total damage costs* are the sum of both of these.

'Damage costs' are a useful measure of a company's overall environmental impact, since they are denominated in a common unit (US\$ million) and bring together a range of environmental impacts with different units (for example, greenhouse gas emissions are measured in tCO₂e, while water used is measured in cubic meters). Damage costs can also be used alongside other financial metrics, since they are based on a US\$ unit.

Fossil fuel companies

What are 'fossil fuel companies'?

Trucost's standard definition of 'fossil fuel companies' are those engaged in primary fossil fuel extractive industries as defined by the following 7 Trucost Sectors: '*Bituminous Coal and Lignite Surface Mining*', '*Bituminous Coal Underground Mining*', '*Crude Petroleum and Natural Gas Extraction*', '*Drilling Oil and Gas Wells*', '*Natural Gas Liquid Extraction*', '*Support Activities for Oil and Gas Operations*', and '*Tar Sands Extraction*'.

Coal companies

What are 'coal companies'?

Trucost's standard definition of 'coal companies' are those engaged in coal extraction and power generation, as defined by 3 Trucost Sectors: '*Bituminous Coal and Lignite Surface Mining*', '*Bituminous Coal Underground Mining*', and '*Coal Power Generation*'.

Renewable companies

What are 'renewable companies'?

Trucost's standard definition of 'renewables companies' are those engaged in renewables power generation that can be seen in their renewable generation data (GWhs) where disclosed. Alternatively, these companies can be seen in Trucost's sector revenues data, defined by having business activities in 6 Trucost Sectors: '*Biomass Power Generation*'; '*Geothermal Power Generation*'; '*Hydroelectric Power Generation*'; '*Solar Power Generation*'; '*Wave & Tidal Power Generation*'; and '*Wind Power Generation*'.

Fossil fuel power generation companies

What are 'fossil fuel power generation companies'?

Trucost's standard definition of companies engaged in fossil fuel power generation activities are those with some generation production data (GWhs) from any coal, natural gas (including LNG, LPG) and petroleum (including conventional, unconventional or fuel oils).

Alternatively, sector revenues data can be used to screen for companies engaged in fossil fuel power generation, as defined by 3 Trucost Sectors: '*Coal Power Generation*', '*Natural Gas Power Generation*' and '*Petroleum Power Generation*'.

Corporate Actions

How does Trucost account for corporate actions?

Trucost's data accounts for M&A activity, though there tends to be a lag in the data reflecting such activities. The reason for this is fundamental to our research methodology: Each observation in our data is a complete financial year. Therefore, should any M&A

activity occur, this will only be reflected in our data once (i) the financial year has concluded; (ii) the company has disclosed its year-end performance data, and; (iii) Trucost has analyzed, quality checked and engaged with the company to attempt to validate our data for it. Regarding the specific actions taken, these will differ depending on each scenario.

Acquisitions

In such cases, we are likely to consolidate the entities into the Trucost *institutionId* profile of the 'acquirer', and retire the 'acquired' company in subsequent financial years. The acquired company then has its designation changed from being a member of our Core or Core Plus universe (the universe of companies Trucost commits to analyzing on an annual basis) to our 'cemetery universe' (those companies no longer maintained).

The acquired company's historical data will remain under its prior profile to reflect its prior identity as independent of its acquirer. The specific treatment of each company where acquisitions occur mid-financial year will also depend on how the companies in question report their year-end financial data.

For example, some companies will report this final year's financial data (e.g. consolidated revenues) as separate companies, in which case Trucost would assign the environmental data for each company to them as separate entities.

Another example would be where the acquired company does not report and the acquiring company internalizes the complete financial year's performance of the company acquired. In such a case, no financial year's data is entered in the acquired company's legacy Trucost profile with all of this company's performance, in addition to its own, being accounted for in the profile of the acquirer.

One final scenario is where each company reports partial financial year data (e.g. the 8 month's performance prior to the acquisition for the acquired, and a complete financial year for the acquirer, though with the last 4 months representing an alternate corporate structure). For Trucost's data to be comparable across all companies, each observation must be complete 12 month financial years. Therefore, in the case of the acquired the 8 months of data would not be collected in the data. This financial year in the company's history would therefore be missing with the company's final data point being its previous complete financial year prior to its acquisition. The acquiring company's data however would be collected since it would reflect a complete 12 month cycle.

Mergers

In the case of mergers where there is no clear acquirer, and often where the merger results in the formation of a new corporate, Trucost would retire both entities to its cemetery universe and create a new profile for the new company without any data history. For example, in September 2017, *DuPont* and *The Dow Chemical Company* merged to become *DowDuPont*. This new corporate entity will have a new Trucost profile and *institutionId* created where data for this new corporate entity will be collected or modelled once it has completed its first complete 12-month financial year.

De-mergers

For de-mergers, only once the new companies have completed their first full financial year after the corporate action will these companies be accounted for in Trucost's data. Often this implies that the incomplete financial year in which the de-merger occurred is not captured in either company's history, or the profile of the pre-de-merged company.

Name changes

Some companies may change their names due to rebranding or other reasons while their corporate structure remains unchanged. In such cases, the company retains its same Trucost profile and *institutionId*, but its name is amended to reflect its current name. This

new name would also be referenced against any historical data for the company, even in years prior to the name change.

M&A Activity and security identifiers

Often the securities owned by an investor pre- and post-corporate actions will have the same identifiers (e.g. ISINs) despite now relating to a new corporate entity. In regards to mapping these securities to Trucost's data, mappings in existence prior to the corporate action would remain until Trucost's database has a new profile for the new entity and has this identifier reassigned to it. This implies that for a period of time the security's attributed data does not necessarily reflect the company's true operational impacts.

Revision History

The changes made to this document include the following:

Document Version	Date	Changes
1.0	07/09/2019	Initial version
1.1	06/01/2020	<ul style="list-style-type: none">• Research Process<ul style="list-style-type: none">○ Updated the section on the four-step research process.• Sources of Trucost Data<ul style="list-style-type: none">○ Updated the list of typical data sources for economic output, prices, resources, and emissions.• Data Standardization/Calculation<ul style="list-style-type: none">○ Updated the section on the key methodological steps within Trucost's EEIO model.
1.2	10/09/2020	<ul style="list-style-type: none">• FAQs>Sector Classification<ul style="list-style-type: none">○ Expanded the discussion for sector classification.

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