

Environmental, Social and Governance (ESG) Scores from Refinitiv

June 2019



Executive summary

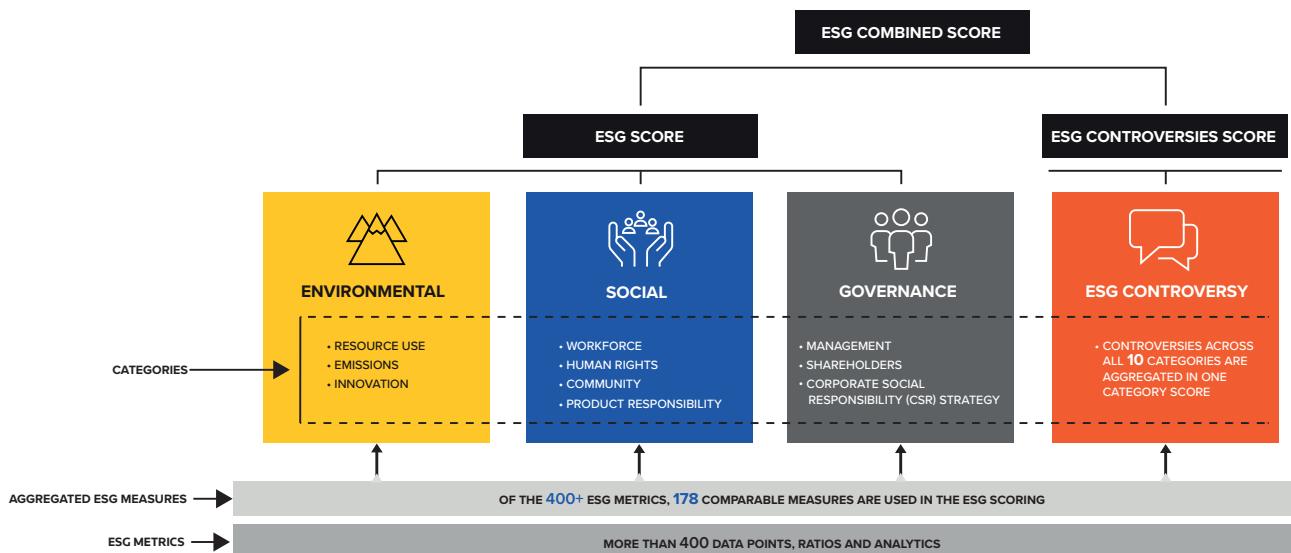
Refinitiv recognizes the increasingly critical importance of transparent, accurate and comparable Environmental, Social and Governance (ESG) data for the financial industry. Refinitiv strives to be the trusted and preferred partner for ESG data and solutions, and is committed to bringing an array of best-in-class data, analytics and workflow solutions to the market which allow customers to use Refinitiv data as the backbone of their ESG process.

With Refinitiv you can easily integrate ESG factors into portfolio analysis, equity research, screening or quantitative analysis. We offer users the possibility to combine and analyze ESG data using cutting-edge applications for in-depth analysis.

ESG Scores from Refinitiv are designed to transparently and objectively measure a company's relative ESG performance, commitment and effectiveness across 10 main themes (emissions, environmental product innovation, human rights, shareholders, etc.) based on company-reported data. We also provide an overall ESG Combined (ESGC) Score which is discounted for significant ESG controversies impacting the corporations in our coverage.

The ratings are available on over 7,000 companies globally with time series data going back to 2002. They are simple to understand percentile rank scores benchmarked against Thomson Reuters Business Classifications (TRBC) from Refinitiv for all environmental and social categories as well as the Controversies Score and against the country for all governance categories.

Refinitiv offers one of the most comprehensive ESG databases in the industry, covering over 70% of global market cap, across more than 400 different ESG metrics, with history going back to 2002.

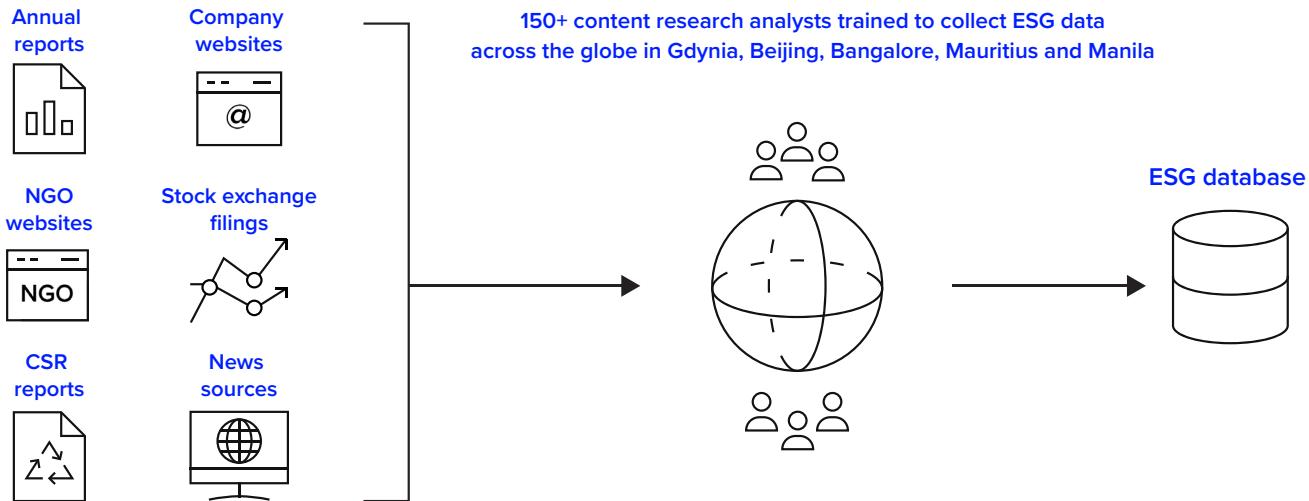


1. Interactive Brokers displays the first significant digit of the percentile value from 0 to 10.

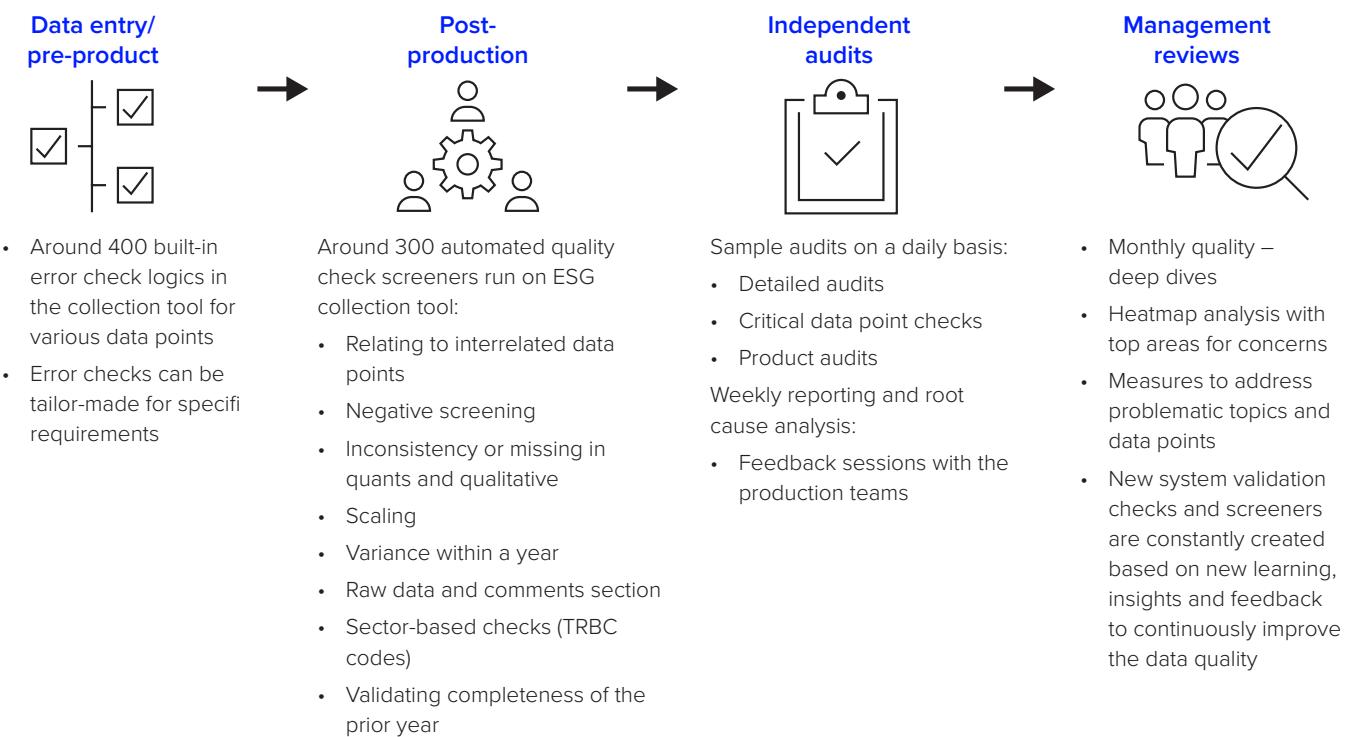
Data process

With over 150 content research analysts who are trained to collect ESG data, Refinitiv has one of the largest ESG content collection operations in the world. With local language expertise and operating from different locations across the globe, we process numerous publicly available information sources with the aim of providing up-to-date, objective and comprehensive coverage. There are over 400 ESG measures, which our analysts process manually for each company within the ESG universe, with each measure going through a careful process to standardize the information and guarantee it is comparable across the entire range of companies.

The database is updated on a continuous basis aligned with corporate reporting patterns, and data is refreshed on products every week, which includes the recalculation of the ESG Scores. Updates could include a brand-new company being added to the database, the latest fiscal year update or the inclusion of a new controversy event. In most cases, ESG reported data is updated once a year in line with companies' own ESG disclosure. We refresh data more frequently in exceptional cases, when there is a significant change in the reporting or corporate structure during the year. ESG news and controversies are updated on a continuous basis and when such events occur and get picked up by global media.

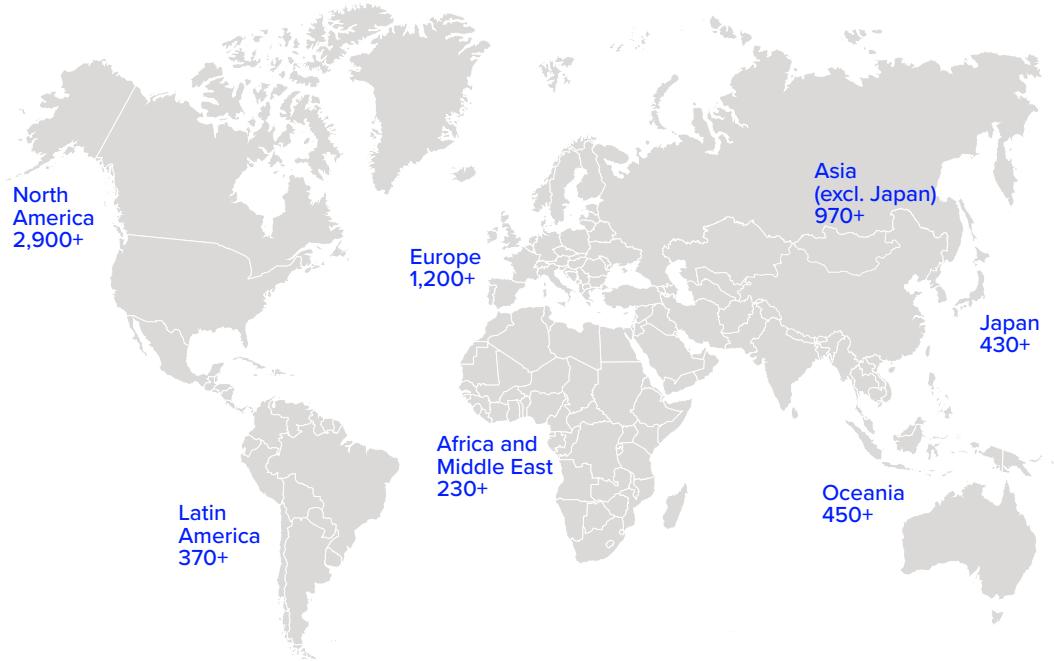


Data quality is a key part of the collection process; that is why we use a combination of both algorithmic and human processes to make sure we achieve as close to 100% data quality as possible. Below is an overview of the various methods we use to achieve this goal.

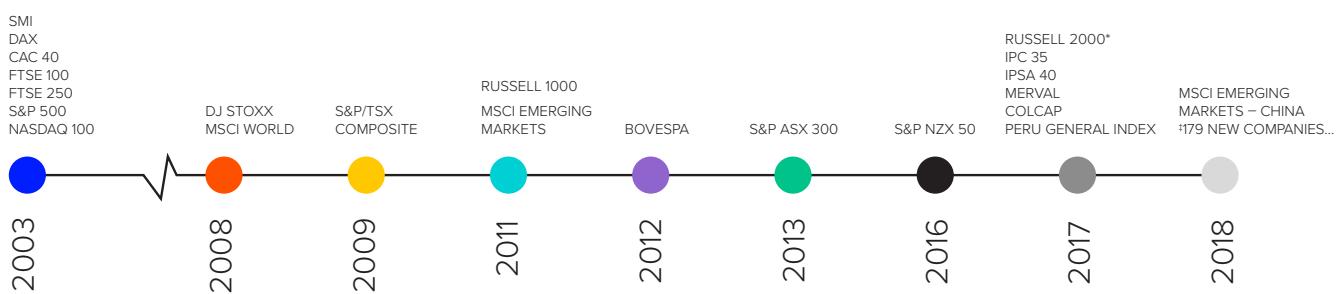


Global coverage

The ESG universe of companies for which ESG data is maintained and ESG Scores are calculated consists of more than 7,000 companies globally. Regional breakdown is provided in the illustration below:



Our coverage has evolved over time and is continuously expanding as we include more indices. Quarterly, we review the constituents of these indices and additional companies to our coverage. We are in the process of adding all the Russell 3000 Index companies to the coverage, most of which are already covered and available on our products. The illustration below shows a timeline of the index inclusion in the ESG universe.



Scores overview

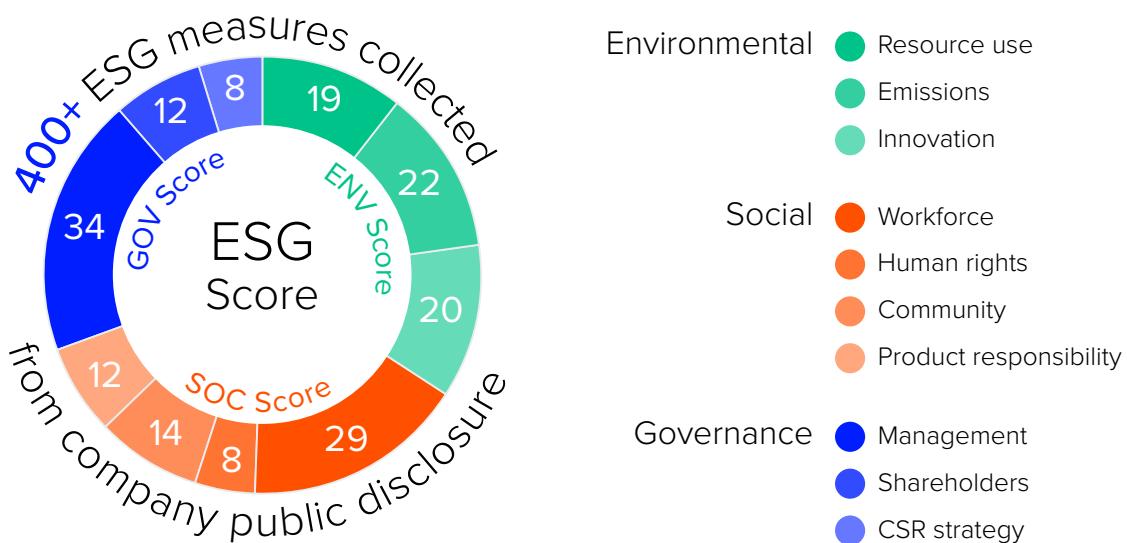
ESG Scores from Refinitiv are designed to transparently and objectively measure a company's relative ESG performance, commitment and effectiveness across 10 main themes (emissions, environmental product innovation, human rights, shareholders, etc.) based on company-reported information. An overall ESGC score is further calculated which discounts the ESG Score for news controversies which materially impact the corporations. The underlying measures are granular enough to differentiate effectively between companies that have limited reporting and are not transparent or deliver minimal implementation and execution, versus companies that "walk the talk" and emerge as leaders in their respective industries or regions.

ESG Scores are calculated and available for all companies and historical fiscal periods in the ESG global coverage. In other words, ESG Scores are available going back to fiscal year 2002 for approximately 1,000 companies (mainly U.S. and European).

There are two overall ESG Scores in the model:

1. **ESG Score** – measures company's ESG performance based on reported data in the public domain
2. **ESG Combined (ESGC) Score** – overlays the ESG Score with ESG controversies to provide a comprehensive evaluation on the company's sustainability impact and conduct

The availability of the two overall scores and underlying category assessments allows users to adopt and apply the scoring that meets their requirements, mandates or investment criteria.



Category definitions are available in the Appendix

Scores structure

The model is fully automated, data-driven and transparent, which makes it free from subjectivity and hidden calculations or inputs.

ESG Score

Refinitiv captures and calculates over 400 company-level ESG measures, of which we have carefully selected a subset of 178 of the most comparable and relevant fields to power the overall company assessment and scoring process. The underlying measures are based on considerations around comparability, data availability and industry relevance.

They are grouped into 10 categories. A combination of the 10 categories, weighted proportionately to the count of measures within each category, formulates the three Pillar Scores and the final ESG Score, which is a reflection of the company's ESG performance, commitment and effectiveness based on publicly reported information.

The category scores are rolled up into three pillar scores – environmental, social and corporate governance.

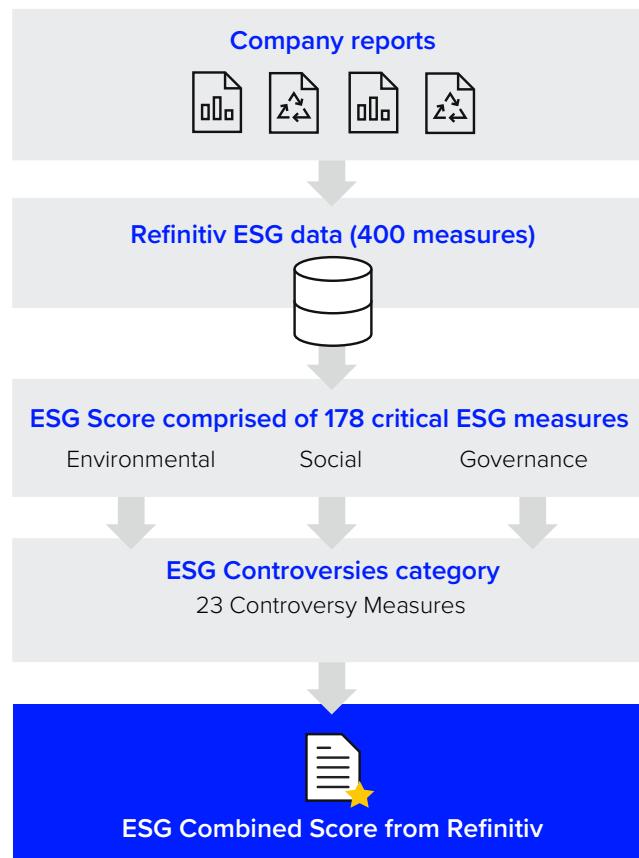
Refinitiv ESG Combined Score (ESGC Score)

The ESG Combined Scores provide a rounded and comprehensive scoring of a company's ESG performance based on the reported information in the ESG pillars with ESG controversies overlay captured from global media sources. The main objective of this score is to discount the ESG performance score based on negative media stories. It does this by incorporating the impact of significant, material ESG controversies in the overall ESG Combined Score.

When companies were involved in ESG controversies, the ESG Combined Score is calculated as the weighted average of the ESG Scores and ESG Controversies Score per fiscal period, with recent controversies reflected in the latest complete period. When companies were not involved in ESG controversies, the ESG Combined Score is equal to the ESG Score.

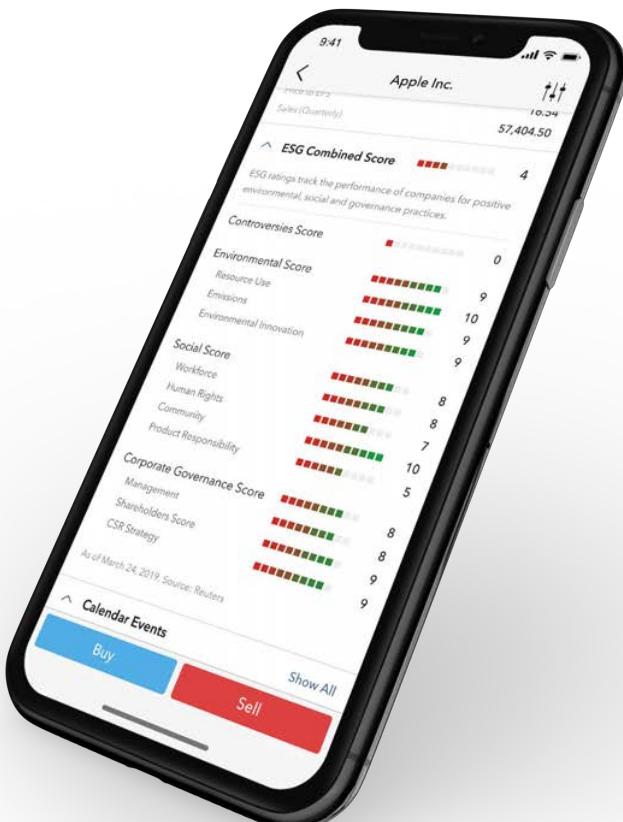
ESG Controversies Category

The ESG Controversies Score is calculated based on 23 ESG controversy topics. During the year, if a scandal occurs, the company involved is penalized and this affects their overall ESG Combined Score and grading. The impact of the event may still be seen in the following year if there are new developments related to the negative event, for example lawsuits, ongoing legislation disputes or fines. All new media materials are captured as the controversy progresses.



Easily identify companies with strong ESG practices or exposure to ESG risks

ESG Scores from Refinitiv are available on Client Portal, TWS and IBKR Mobile for seamless integration into your investment research. ESG percentile values are displayed in TWS on a colored bar scale from 0 to 10 to easily visualize and compare values. ESG Scores are available in Quote Details and Fundamentals Explorer. Scores can be scanned to quickly find companies with the highest and lowest ESG scores including: Environmental, Social or Corporate Governance Pillar score. In TWS Mosaic, click on the plus in the Monitor tile and select Mosaic Market Scanner. Under Predefined Scans, select ESG score.



Scores Calculation Methodology

This section describes in detail the ESG scoring methodology because we believe transparency is a key component of trust and confidence in the data we provide to our customers.

Category Scores Calculation

Percentile rank scoring methodology is adopted to calculate the 10 category scores and the ESG Controversies score. It is based on three factors:

- How many companies are worse than the current one?
- How many companies have the same value?
- How many companies have a value at all?

Percentile rank score is based on the rank, and therefore it is not very sensitive to outliers. The distribution of the scores generated with percentile rank score is almost flat; for this reason, average and standard deviation of the scores generated with percentile rank score are not overly useful.

$$score = \frac{n. of companies with a worst value + \frac{n. of companies with the same value included in the current one}{2}}{n. of companies with a value}$$

Each category score is the equally weighted sum of all relevant indicators for each industry used to create it. The normalized weights are calculated excluding quantitative indicators with no data available in the public domain, as it would be highly inaccurate to assign a default value with the exception of GHG emissions where we calculate estimated emissions when not reported by the companies.

Category Benchmarks

To calculate the Environmental and Social category scores, as well as the Controversies score, [TRBC Industry Group](#) is used as the benchmark, as these topics are more relevant and similar to companies within the same industries.

To calculate the Governance categories, Country of Headquarters is used as the benchmark, as best governance practices are more consistent within countries.

Category Weights

To calculate the overall Refinitiv ESG Score, automated, data-driven and objective logic that determines the weight of each category is applied.

The category weights are determined by the number of indicators that make up each category in comparison to all

indicators used in the ESG Score framework. As a result, categories that contain multiple issues like Management (composition, diversity, independence, committees, compensation, etc.) and companies report more information across these topics will have higher weight than lighter categories such as Human Rights or CSR Strategy.

Interactive Brokers calculates a summary score for the Environmental, Social and Corporate Governance Pillars using the number of indicators that make up each category in comparison to all indicators within that Pillar.

Each category consists of a different number of measures. The count of measures per category determines the weight of the respective category. Detailed counts and weights are provided in the table below:

Pillar	Category	Indicators in Rating	Category Weights	Pillar Weights
Environmental	Resource Use	19	11%	(32.35%+35.30%+32.35%)
	Emissions	22	12%	
	Innovation	20	11%	
Social	Workforce	29	16%	(45.07%+12.68%+22.53%+19.72%)
	Human Rights	8	4.50%	
	Community	14	8%	
	Product Responsibility	12	7%	
Governance	Management	34	19%	(62.30%+22.95%+14.75%)
	Shareholders	12	7%	
	CSR Strategy	8	4.50%	
TOTAL		178	100%	

Calculation of individual category scores

1. Qualitative data

Qualitative metrics are Boolean questions and the values are 'yes' or 'no'. If the company does not report on the metric, it is answered as 'no' depending on the default value of each measure (details of the default values are available in the ESG glossary, available on request). All Boolean data is converted to numeric values for the percentile score calculation, details are available in the table below:

BOOLEAN VALUE	NUMERIC VALUE
Yes	1
No	0.5

Each measure has a polarity indicating whether the higher value is positive or negative. For instance, having an emissions reduction policy is positive but having environmental controversies is negative.

2. Quantitative Data

Quantitative metrics are assigned a numeric value only if reported by the company. If a measure has a value, then percentile rank formula is applied. Quantitative measures not reported have no impact on the score, as the percentile rank considers only companies with numeric values.

Again, each measure has a polarity indicating whether the higher value is positive or negative. For instance, more water recycled is positive but more emissions is negative.

Industry group relevancy

Some indicators are industry-specific, thus not relevant for all the companies. If an indicator is not relevant for a particular sector, then the same is excluded from calculation and its value will be not relevant (N/R).

Example: The indicator responsible asset management is relevant only for the financial sector.

Appendix

Category Scores

The table below lists the category scores and their definitions:

Score	Definition
ESG Resource Use Score	The Resource Use Score reflects a company's performance and capacity to reduce the use of materials, energy or water, and to find more eco-efficient solutions by improving supply chain management.
TR ESG Emissions Score	The Emission Reduction Score measures a company's commitment and effectiveness towards reducing environmental emissions in the production and operational processes.
TR ESG Innovation Score	The Innovation Score reflects a company's capacity to reduce the environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes or eco-designed products.
TR ESG Workforce Score	The Workforce Score measures a company's effectiveness towards job satisfaction, a healthy and safe workplace, maintaining diversity and equal opportunities, and development opportunities for its workforce.
TR ESG Human Rights Score	The Human Rights Score measures a company's effectiveness towards respecting the fundamental human rights conventions.
TR ESG Community Score	The Community Score measures the company's commitment towards being a good citizen, protecting public health and respecting business ethics.
TR ESG Product Responsibility Score	The Product Responsibility Score reflects a company's capacity to produce quality goods and services integrating the customer's health and safety, integrity and data privacy.
TR ESG Management Score	The Management Score measures a company's commitment and effectiveness towards following best practice corporate governance principles.
TR ESG Shareholders Score	The Shareholders Score measures a company's effectiveness towards equal treatment of shareholders and the use of antitakeover devices.
TR ESG CSR Strategy Score	The CSR Strategy Score reflects a company's practices to communicate that it integrates the economic (financial), social and environmental dimensions into its day-to-day decision-making processes.

Category Scoring Example

In this section, we will illustrate how a category score gets calculated using the data available in the ESG database as of September 2017 for the Water & Other Utilities industry companies (for example, the Emission Category Score for fiscal year 2015 across the 15 companies in this industry).

Step-by-Step Illustration

- 22 metrics are considered in calculating Emission category scores; of these two metrics (Flaring Gases & Cement CO2 Equivalents Emissions) are excluded, as they are not relevant to this industry
- Values are extracted for all 20 metrics
- Based on the nature of the metric, relevant numeric values are assigned and calculated
- Percentile score calculation formula is applied for each measure

For example, we illustrate the calculation of the percentile rank for "Estimated CO2 Equivalents Emission Total" measure which has negative polarity – the lower the value the better.

Description	Aqua America Inc	American States Water Co	
No: of Companies with worst value	14	13	
No: of Companies with same value	1	1	
No: of Companies with value	15	15	
Company Name	Values	Percentile Scores	Percentile Score Formula Applied
Aqua America Inc	0.00009438	0.9666666667	$(14+(1/2))/15$
American States Water Co	0.00015559	0.9	$(13+(1/2))/15$
United Utilities Group PLC	0.00016684	0.8333333333	$(12+(1/2))/15$
California Water Service Group	0.00017066	0.7666666667	$(11+(1/2))/15$
Aguas Andinas SA	0.00017236	0.7	$(10+(1/2))/15$
Consolidated Water Co. Ltd.	0.00017997	0.6333333333	$(9+(1/2))/15$
Severn Trent Plc	0.00019745	0.5666666667	$(8+(1/2))/15$
Inversiones Aguas Metropolitanas SA	0.00020508	0.5	$(7+(1/2))/15$
Metro Pacific Investments Corp.	0.00021981	0.4333333333	$(6+(1/2))/15$
American Water Works Company Inc	0.00022414	0.3666666667	$(5+(1/2))/15$
Beijing Enterprises Water Group Limited	0.00027149	0.3	$(4+(1/2))/15$
Manila Water Company Inc	0.00028717	0.2333333333	$(3+(1/2))/15$
Guangdong Investment Ltd	0.0002975	0.1666666667	$(2+(1/2))/15$
Companhia de Saneamento de Minas Gerais	0.00074917	0.1	$(1+(1/2))/15$
Companhia de Saneamento Basico-Sabesp	0.00079476	0.0333333333	$(0+(1/2))/15$

Controversies Score Methodology

ESG Controversies Score is calculated based on 23 ESG controversy topics with recent controversies reflected in the latest complete period.

- Default value of all controversy measures is 0. Example: For a controversy measure, if the benchmark consists of 6 companies, 4 with a value of 0 and 2 with a value of 1 (polarity here is negative, so the higher the number the worse it is), then the formula for the companies with no controversies will be: $(2+4/2) / 6 = 67\%$ and for the companies with one controversy: $(0+2/2) / 6 = 17\%$
- All recent controversies are counted in the latest closed fiscal year and no controversy is double counted
- Controversies are benchmarked on Industry Group

For instance, last completed fiscal year for a company is Dec. 31, 2015. If there is one controversy on May 1, 2016 and one controversy on May 1, 2017, both are accounted under recent controversies and included in the scoring for FY2015.

Once FY 2016 is completed, the two recent controversies are moved to FY2016 but the one on May 1, 2016 is moved to the normal controversy DP while the one from 2017 remains under recent but accounted in FY2016.

When FY2017 is completed, it will be removed from recent in 2016 and moved to normal DP in 2017.

Except for Management Departures, all other controversies are quantitative.

Controversies Score Example

Steps:

- Extract values pertaining to controversies for all companies of FY 2015
- Sum all values for individual companies and sort companies from lowest to highest (lowest being better)
- Apply percentile rank formula to derive the ESG Controversies Scores

Company Names	Sum of All Controversies	Controversy Score	Percentile Score Formula Applied	IBKR Display
Companhia de Saneamento Basico-Sabesp	0	0.56667	$(2+(13/2))/15$	6
United Utilities Group PLC	0	0.56667	$(2+(13/2))/15$	6
Aguas Andinas SA	0	0.56667	$(2+(13/2))/15$	6
American Water Works Company Inc	0	0.56667	$(2+(13/2))/15$	6
Consolidated Water Co. Ltd.	0	0.56667	$(2+(13/2))/15$	6
Beijing Enterprises Water Group Limited	0	0.56667	$(2+(13/2))/15$	6
Guangdong Investment Ltd	0	0.56667	$(2+(13/2))/15$	6
American States Water Co	0	0.56667	$(2+(13/2))/15$	6
Inversiones Aguas Metropolitanas SA	0	0.56667	$(2+(13/2))/15$	6
California Water Service Group	0	0.56667	$(2+(13/2))/15$	6
Manila Water Company Inc	0	0.56667	$(2+(13/2))/15$	6
Aqua America Inc	0	0.56667	$(2+(13/2))/15$	6
Metro Pacific Investments Corp.	0	0.56667	$(2+(13/2))/15$	6
Companhia de Saneamento de Minas Gerais	1	0.06667	$(0+(2/2))/15$	1
Severn Trent Plc	1	0.06667	$(0+(2/2))/15$	1

Final ESG Combined Score Assembly

ESG Combined Score is calculated as the average of the ESG score and ESG Controversies Score when there were controversies during the fiscal year. When the controversies score is greater than or equal to 50%, then ESG Score is equal to ESG Combined score.

Refer to the below table for combined score logics:

Scenario	ESG Controversies Score	ESG Score	ESG Combined Score	IBKR Display ESG Score	IBKR Display ESG Combined Score
If Controversy Score >=50, then ESG Score = ESG Combined Score	57	38	38	4	4
If Controversy Score >ESG Score but less than 50, then ESG Combined Score = ESG Score	49	42	42	4	4
If Controversies Score < 50 and Controversies Score < ESG Score , then ESG Combined score = average of the ESG & Controversies Score	48	49	48.5	5	5