MSCI ESG RATINGS METHODOLOGY

Executive Summary

MSCI ESG Research

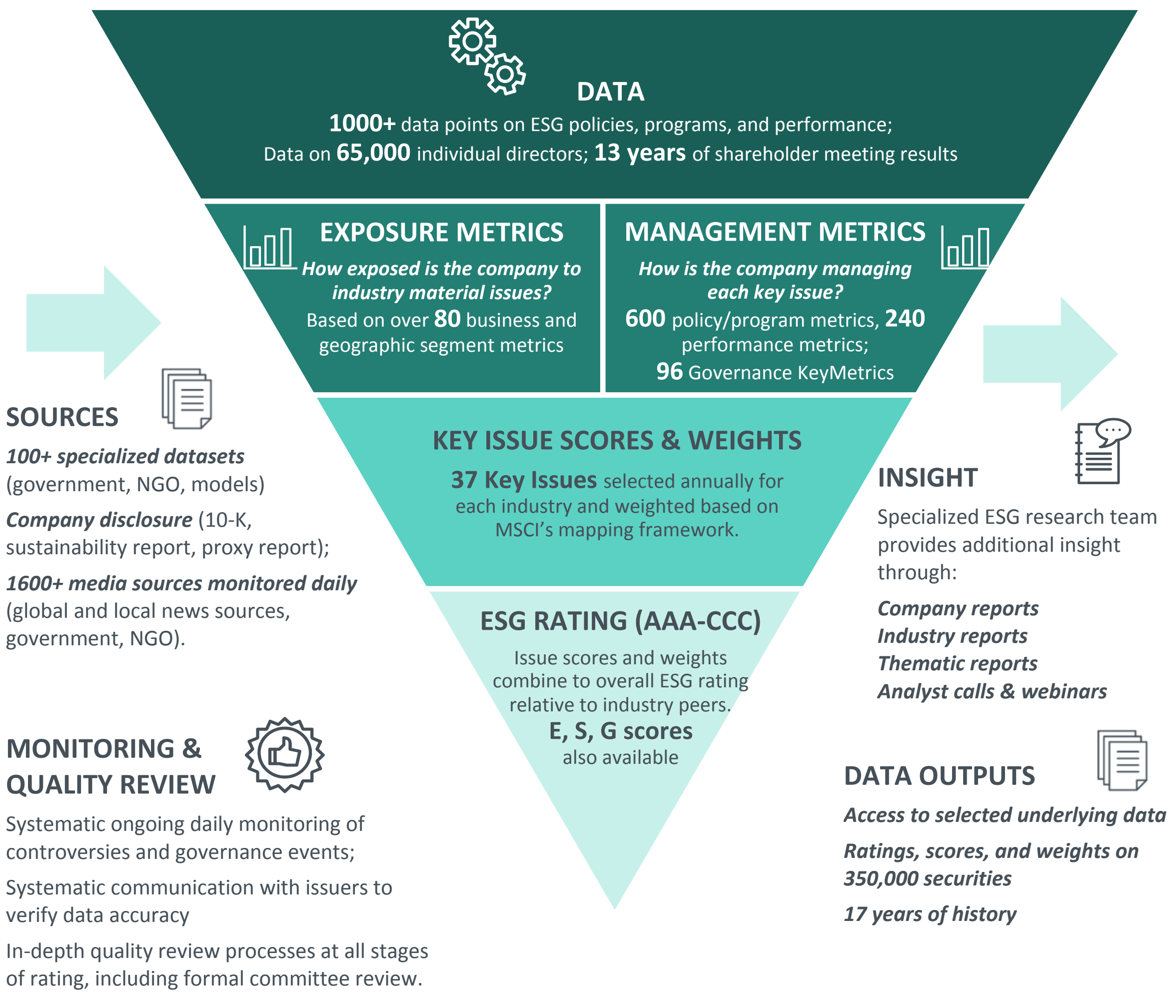
April 2018

1 EXECUTIVE SUMMARY

From natural resource scarcity to changing governance standards, from global workforce management to the evolving regulatory landscape, ESG factors can impact the long-term risk and return profile of institutional portfolios. MSCI ESG Ratings are designed to help investors to understand **ESG risks and opportunities** and integrate these factors into their portfolio construction and management process.

Our global team of 185 experienced research analysts assesses thousands of data points across 37 ESG Key Issues, focusing on the intersection between a company's core business and the industry issues that can create significant risks and opportunities for the company. Companies are rated on a AAA-CCC scale relative to the standards and performance of their industry peers.

Figure 1: ESG Rating Framework and Process Overview



1.1 MSCI ESG RATINGS METHODOLOGY OVERVIEW

MSCI ESG Ratings research aims to answer the following questions:

- ***Of the negative externalities that companies in an industry generate, which issues may turn into unanticipated costs for companies in the medium to long term?***
- ***Conversely, which ESG issues affecting an industry may turn into opportunities for companies in the medium to long term?***

More specifically, the MSCI ESG Ratings model seeks to answer four key questions about companies:

- What are the most significant ESG risks and opportunities facing a company and its industry?
- How exposed is the company to those key risks and/or opportunities?
- How well is the company managing key risks and opportunities?
- What is the overall picture for the company and how does it compare to its global industry peers?

MATERIAL INDUSTRY ESG RISKS AND OPPORTUNITIES

Environmental, social, and governance risks and opportunities are posed by large scale trends (e.g. climate change, resource scarcity, demographic shifts) as well as by the nature of the company's operations. Companies in the same industry generally face the same major risks and opportunities, though individual exposure can vary.

A risk is material to an industry when it is likely that companies in a given industry will incur substantial costs in connection with it (for example: regulatory ban on a key chemical input requiring reformulation). An opportunity is material to an industry when it is likely that companies in a given industry could capitalize on it for profit (for example: opportunities in clean technology for the LED lighting industry). The MSCI ESG Ratings model focuses only on issues that are determined as material for each industry.

We identify material risks and opportunities for each industry through a quantitative model that looks at ranges and average values for each industry for externalized impacts such as carbon intensity, water intensity, and injury rates. Companies with unusual business models for their industry may face fewer or additional key risks and opportunities. Company-specific exceptions are allowed for companies with diversified business models, facing controversies, or based on industry rules. Once identified, these **Key Issues** are assigned to each industry and company.

Figure 1 MSCI ESG Key Issue Hierarchy

3 Pillars	10 Themes	37 ESG Key Issues	
Environment	**Climate Change**	Carbon Emissions Product Carbon Footprint	Financing Environmental Impact Climate Change Vulnerability
	Natural Resources	Water Stress Biodiversity & Land Use	Raw Material Sourcing
	Pollution & Waste	Toxic Emissions & Waste Packaging Material & Waste	Electronic Waste
	Environmental Opportunities	Opportunities in Clean Tech Opportunities in Green Building	Opp's in Renewable Energy
Social	**Human Capital**	Labor Management Health & Safety	Human Capital Development Supply Chain Labor Standards
	Product Liability	Product Safety & Quality Chemical Safety Financial Product Safety	Privacy & Data Security Responsible Investment Health & Demographic Risk
	Stakeholder Opposition	Controversial Sourcing	
	Social Opportunities	Access to Communications Access to Finance	Access to Health Care Opp's in Nutrition & Health
Governance	**Corporate Governance***	Board* Pay*	Ownership* Accounting*
	Corporate Behavior	Business Ethics Anti-Competitive Practices Tax Transparency	Corruption & Instability Financial System Instability

** Corporate Governance Theme carries weight in the ESG Rating model for all companies. In 2018, we introduce sub-scores for each of the four underlying issues: Board, Pay, Ownership, and Accounting.*

ESG RATINGS

To arrive at a final letter rating, the weighted averages of the Key Issue Scores are aggregated and companies' scores are normalized by their industries. After any overrides are factored in, each company's Final Industry-Adjusted Score corresponds to a rating between best (AAA) and worst (CCC). These assessments of company performance are not absolute but are explicitly intended to be relative to the standards and performance of a company's industry peers.

SETTING KEY ISSUE WEIGHTS

Once the Key Issues have been selected for a GICS Sub-Industry, we set the weights that determine each Key Issue's contribution to the overall rating. Each Key Issue typically comprises 5-30% of the total ESG Rating. The weightings take into account both the contribution of the industry, relative to all other industries, to the negative or positive impact on the environment or society; and the timeline within which we expect that risk or opportunity for companies in the industry to materialize, as illustrated conceptually below.

Figure 2 Framework for Setting Key Issue Weights

		Expected Time frame for Risk/Opportunity to Materialize: Short-Term (<2 years)	Long-Term (5+ years)
Level of Contribution to Environmental or Social Impact	Industry is **major** contributor to impact	**Highest Weight**	
	Industry is **minor** contributor to impact		**Lowest Weight**

The framework is such that a Key Issue defined as “High Impact” and “Short-Term” would be weighted three times higher than a Key Issue defined as “Low Impact” and “Long-Term”.

- **Level of contribution to social or environmental externality**: Similar to the process outlined above, each GICS Sub-Industry is assigned a “High”, “Medium”, or “Low” impact for each Key Issue based on our analysis of relevant data (e.g. average carbon emissions intensity).
- **Expected time horizon of risk / opportunity:** The time horizon of each Key Issue (Short-Term, Medium-Term, Long-Term) is classified based on the type of risk or opportunity that each Key Issue presents to companies.

KEY ISSUE ASSESSMENT

Risks

To understand whether a company is adequately managing a key ESG risk, it is essential to understand both what management strategies it has employed and how exposed it is to the risk. The MSCI ESG Ratings model measures both of these: **risk exposure** and **risk management**. To score well on a Key Issue, management needs to be commensurate with the level of exposure: a company with high exposure must also have very strong management, whereas a company with limited exposure can have a more modest approach.

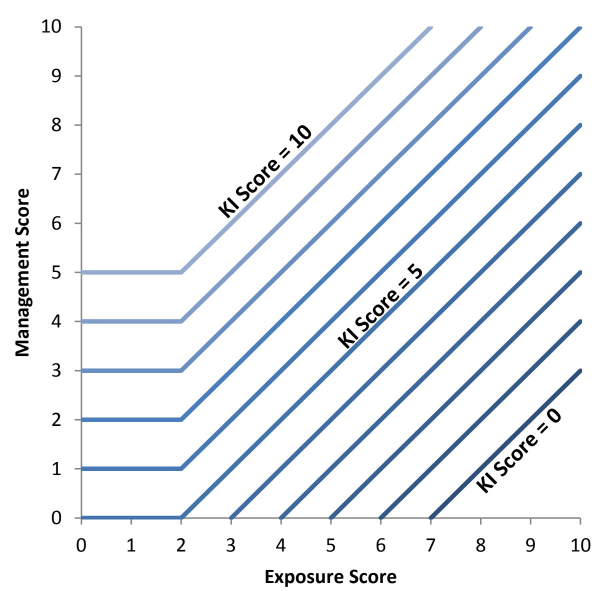
Conversely, a highly exposed company with poor management will score worse than a company with the same management practices but lower exposure to the risk.

> ***Example:*** Electric Utilities are typically highly water-dependent, but each company may be more or less exposed to water related risks depending on where its plants are – desert locations present much higher risks than those where water supplies are plentiful. Companies operating in water-scarce regions must take more extensive measures to mitigate these risks than those with abundant access to water.

While Key Issues are identified by looking quantitatively at each industry as a whole, individual companies' exposure to each issue will vary. MSCI ESG Ratings calculate each company's exposure to key ESG risks based on a granular breakdown of its business: its core product or business segments, the locations of its operations, and other relevant measures such as outsourced production or reliance on government contracts. Risk exposure is scored on a 0-10 scale, with 0 representing no exposure and 10 representing very high exposure.

The analysis then takes into account the extent to which a company has developed strategies and demonstrated a strong track record of performance in managing its specific level of risks or opportunities. Controversies occurring within the last three years lead to a deduction from the overall management score on each issue. Management is scored on a 0-10 scale, where 0 represents no evidence of management efforts and 10 represents indications of very strong management.

Figure 3 Combining Exposure and Management – 'Risk' Key Issues



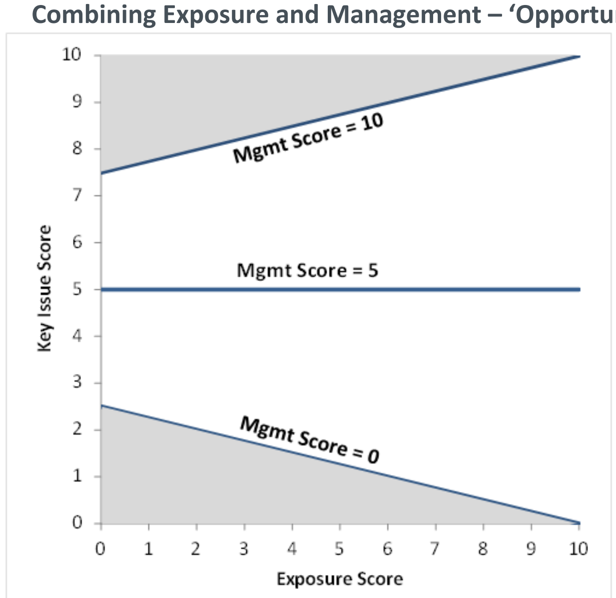
The Risk Exposure Score and Risk Management Score are combined such that a higher level of exposure requires a higher level of demonstrated management capability in order to achieve the same overall Key Issue Score. Key Issue scores are also on a 0-10 scale, where 0 is very poor and 10 is very good. For instance, a utility focused on conventional power generation is required to have stronger measures for mitigating its carbon and toxic emissions compared to a utility which is largely focused on electricity transmission and distribution which is less polluting compared to conventional generation.

> ***Example:*** Utility Company A focuses on conventional power generation, which typically results in large carbon and toxic emissions. It has high risk exposure in these areas. To score well on these issues, it must have strong risk mitigation programs in place. Utility Company B is largely focused on electricity transmission and distribution, which are less polluting activities. Although they are in the same industry, Company A and Company B have different levels of exposure to these risks. Company B can score as well as Company A with more modest risk mitigation efforts. Alternatively, if Company B has risk mitigation efforts similar to company A, it will score higher overall because its risk management is stronger relative to its risk exposure.

Opportunities

Assessment of opportunities works similarly to risks, but the model for combining exposure and management differs. Exposure indicates the relevance of the opportunity to a given company based on its current business and geographic segments. Management indicates the company's capacity to take advantage of the opportunity. Where exposure is limited, the key issue score is constrained toward the middle of the 0-10 range, while high exposure allows for both higher and lower scores.

Figure 4 Combining Exposure and Management – 'Opportunities' Key Issues



Controversies

MSCI ESG Ratings reviews controversies, which may indicates structural problems with a company's risk management capabilities. In the ESG Rating model, a controversies case that is deemed by an analyst to indicate structural problems that could pose future material risks for the company triggers a larger deduction from the Key Issue score than a controversies case that is deemed to be an important indicator of recent performance but not a clear signal of future material risk.

A controversy case is defined as an instance or ongoing situation in which company operations and/or products allegedly have a negative environmental, social, and/or governance impact. A case is typically a single event such as a spill, accident, regulatory action, or a set of closely linked events or allegations such as health and safety fines at the same facility, multiple allegations of anti-competitive behavior related to the same product line, multiple community protests at the same company location, or multiple individual lawsuits alleging the same type of discrimination.

Each controversy case is assessed for the severity of its impact on society or the environment and consequently rated Very Severe (reserved for 'worst of the worst' cases), Severe, Moderate, or Minor.

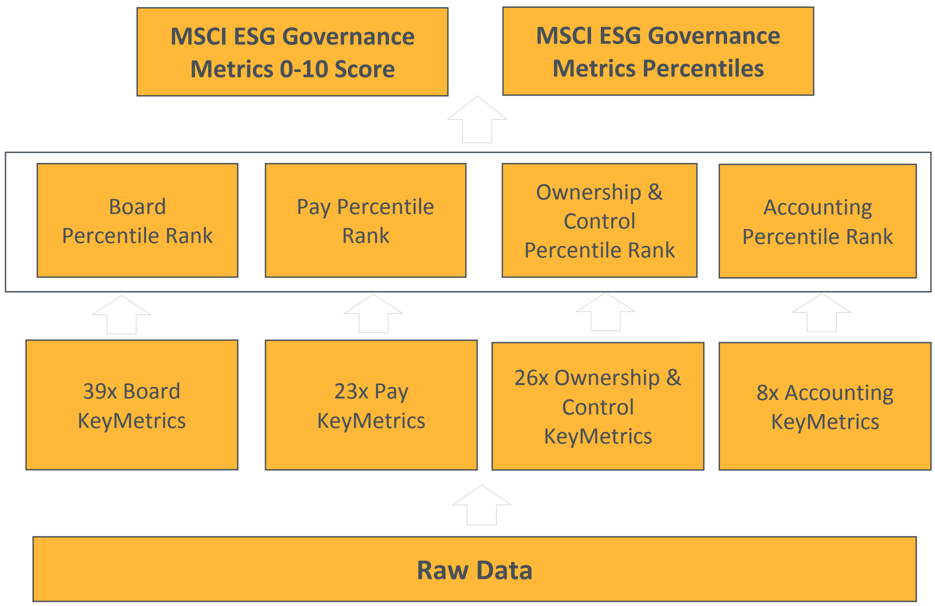
Figure 5 Assessment of Controversial Cases

	Nature of Impact			
Scale of Impact	**Egregious**	**Serious**	**Medium**	**Minimal**
Extremely Widespread	**Very Severe**	**Very Severe**	Severe	Moderate
Extensive	**Very Severe**	Severe	Moderate	Moderate
Limited	Severe	Moderate	Minor	Minor
Low	Moderate	Moderate	Minor	Minor

DETERMINING KEY ISSUE SCORES – CORPORATE GOVERNANCE

The Corporate Governance Score is an absolute assessment of a company's governance that utilizes a universally applied 0-10 scale. Each company starts with a "perfect 10" score and scoring deductions are applied based on the assessment of KeyMetrics. The Corporate Governance Score is derived from the raw score which is calculated as the sum of points associated with the KeyMetrics.

Figure 6 Corporate Governance Component Structure



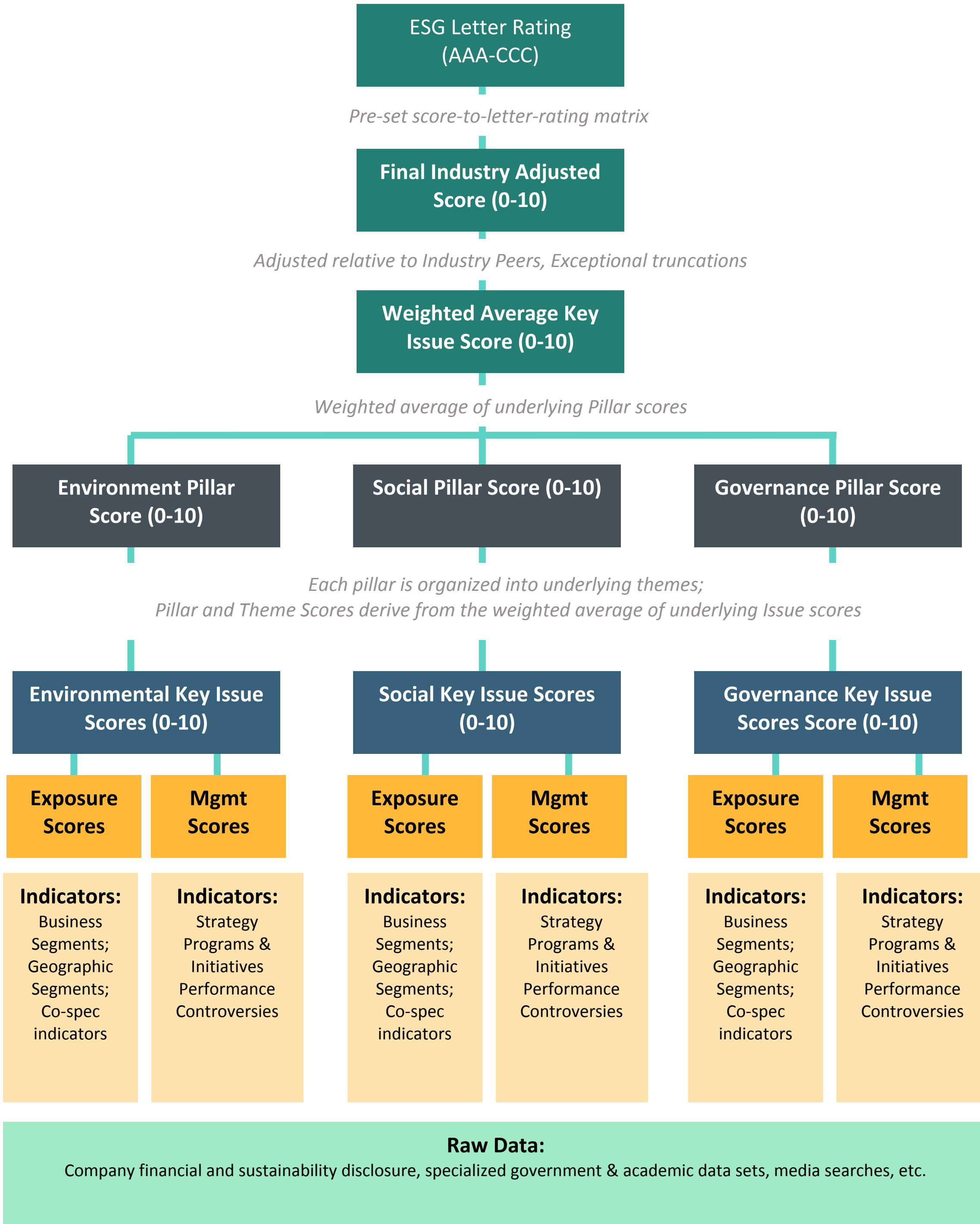
CONSTRUCTING THE RATING

The ESG Ratings model is industry relative and uses a weighted average approach.

Key Issue weights are set at the GICS Sub-Industry level (8-digit) based on each industry's relative external impact and the time horizon associated with each risk. Key Issues and weights undergo a formal review and feedback process at the end of each calendar year. Corporate Governance is always material and therefore always weighted and analyzed for all companies. Where there are company-specific exceptions, weights depart from the industry standard weights but remain in proportion.

For each company a Weighted Average Key Issue Score is calculated based on the underlying Key Issue scores and weights.

Figure 7 Hierarchy of ESG Scores



To arrive at a final letter rating, the Weighted Average Key Issue Score is normalized by industry. The range of scores for each industry is established annually by taking a rolling three-year average of the top and bottom scores among the MSCI ACWI Index constituents; the values are set at the 97.5th and 2.5th percentile. Using these ranges, the Weighted Average Key Issue Score is converted to an Industry Adjusted Score from 0-10, where zero is worst and 10 is best. The Industry Adjusted Score corresponds to a rating between best (AAA) and worst (CCC). These assessments of company performance are not absolute but are explicitly intended to be relative to the standards and performance of a company's industry peers.

Figure 8 The Final Industry Adjusted Company Score is mapped to a Letter Rating as follow.

Letter Rating	Final Industry-Adjusted Company Score
AAA	8.6* - 10.0
AA	7.1 – 8.6
A	5.7 – 7.1
BBB	4.3 – 5.7
BB	2.9 – 4.3
B	1.4 – 2.9
CCC	0.0 – 1.4

**Appearance of overlap in the score ranges is due to rounding error. The 0 to 10 scale is divided into 7 equal parts, each corresponding to a letter rating.*

1.2 ESG RATING PROCESS OVERVIEW

DATA SOURCES

To assess companies' exposure to and management of ESG risks and opportunities, we collect data from the following sources:

- Macro data at segment or geographic level from academic, government, NGO datasets (e.g. Transparency International, US EPA, World Bank)
- Company disclosure (10-K, sustainability report, proxy report, AGM results, etc.)

- Government databases, 1600+ media, NGO, other stakeholder sources regarding specific companies

ISSUER COMMUNICATIONS

Companies are invited to participate in a formal data verification process prior to publication of their ESG Ratings report. At that time, companies have the opportunity to review and comment on the facts contained in their existing MSCI ESG Ratings report, as well as to provide MSCI ESG Research any additional ESG information if they wish. This process is also in accordance with the objective of frequently updating company reports with the latest available information as provided by companies. Issuers may request to see their reports and/or to provide updates or corrections at any time.

MONITORING AND UPDATES

Companies are monitored on a systematic and ongoing basis, including daily monitoring of controversies and governance events. New information is reflected in reports on a weekly basis and significant score changes trigger analyst review and re-rating. Companies receive an in-depth review at least annually.

QUALITY REVIEW

Formal in-depth quality review processes take place at each stage of analysis, including automated and quality checks of data and rating publication; industry and market lead oversight of ratings and reports; Methodology Committee approval of any exceptions, truncations, or major (2+) rating changes; and a ESG Methodology Committee to review contentious cases.

ANNUAL CONSULTATION

In November of each year, MSCI ESG Research reviews the Key Issues assigned to each industry as well as their weights. This process also identifies emerging issues and those that have become less significant. As part of this process, MSCI ESG Research consults with clients about proposed changes to Key Issue selections for each industry as well as any proposed new Key Issues.

1.3 PRODUCT FEATURES

MSCI ESG Ratings clients receive access to a database of company reports and industry reports. Each company report includes an easy to read summary tear sheet as well as detailed relevant ESG performance data as well as an analysis of possible ESG risks and opportunities facing the company. Industry reports provide updates on the ESG landscape of each industry, and allow for benchmarking of how global players are positioned to anticipate challenges and to tap into opportunities relative to peers.

MSCI ESG Ratings clients also receive scores for each company that include the final company rating and overall industry-adjusted score; weights and scores for each of the E, S, and G pillars; weights and scores for each of the Issues that contribute to the overall rating; and weights and scores for additional ESG issues that clients may incorporate into their own analysis (Carbon Emissions, Water Stress, Toxic Emissions & Waste; Labor Management; Health & Safety; Corporate Governance; Business Ethics; Anticompetitive Practices).

MSCI ESG Ratings scores and/or reports are currently available on MSCI ESG Research's proprietary platform, MSCI ESG Manager, as well as through FactSet, StyleResearch, and MSCI's BarraOne and Barra Portfolio Manager platforms.

When used in conjunction with conventional financial analysis and valuation methods, MSCI ESG Ratings are designed to help clients:

- Integrate ESG factors into their investment approaches;
- Screen portfolios and trades for emerging and overlooked ESG risks;
- Generate investment ideas using positive and negative outliers on specific ESG issues;
- Generate investment ideas based on ESG developments impacting key industry drivers;
- Conduct due diligence for transactions;
- Determine opportunities for engagement with company management;
- Support implementation of the **UN Principles for Responsible Investment (PRI)**:
  - Smoothly integrate ESG considerations into the investment processes by focusing on the most significant issues – **Principle 1***
  - Support efforts to engage companies on ESG issues – **Principle 2***
  - Support efforts to encourage companies to make ESG-related disclosure by providing benchmarking against peers on key ESG metrics – **Principle 3***
  - Help asset owners to monitor their implementation of ESG principles – **Principle 4***
  - Help asset managers to report on ESG mandates – **Principle 6***

**Source: http://www.unpri.org/about-pri/the-six-principles/*

1.4 COVERAGE

MSCI ESG Ratings covers over **13,000*** equity and fixed income issuers linked to over 590,000* equity and fixed income securities.

MSCI ESG Ratings are available for over **6,800** companies included in the following MSCI indexes:

MSCI World Index
MSCI Emerging Markets Index
MSCI US Investible Market Index (IMI)
MSCI Canada IMI+
MSCI Europe IMI+
MSCI UK IMI+
MSCI Nordic IMI+
MSCI Swiss IMI
MSCI Australia IMI+
MSCI South Africa IMI
MSCI EFM Africa
MSCI Japan IMI ~Top 750 constituents by market cap
MSCI World IMI Small Cap and Emerging Markets IMI Small Cap ~250 constituents
MSCI ESG Ratings covers over 8,700* issuers linked to over 500,000* fixed income securities

MSCI ESG Ratings covers over 85% of market value of a widely used global fixed income benchmark, including:
Approximately 96% of the corporate investment grade (listed and non-listed)
Approximately 95% of the covered bonds
Approximately 99% of the treasuries/Sovereign**
Approximately 92% of the government related (ex-Sovereign)**
Approximately 85% of global high yield

Notes:

+ Includes coverage of regional benchmarks outside of the MSCI regional index

* Includes coverage through subsidiary mapping

**The overall ESG rating for government-related bond issuers will be either in the MSCI ESG Ratings or MSCI Government ESG Rating framework

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ABOUT MSCI

MSCI ESG Research LLC is the world's largest provider of ESG research and data[1]. We research over 13,000 equity and fixed income issuers linked to over 590,000 equity and fixed income securities, including all companies in the MSCI ACWI IMI. Our research and ratings are used by over 1,000 institutional investors, including 46 of the top 50 asset managers worldwide according to the most recent P&I ranking, helping them understand how ESG factors can impact the long-term risk and return profile of their investments.

MSCI Inc. is the world's largest provider of ESG indexes[2] with over 700 ESG Equity and Fixed Income Indexes designed to help institutional investors more effectively benchmark ESG investment performance, issue index-based investment products, as well as manage, measure and report on ESG mandates. Several global asset owners have selected MSCI ESG Indexes, with over $170billion allocated in recent years[3].

For more information visit our ESG webpage, contact us or join our mailing list.

1 By number of clients based on public information produced by Sustainalytics, Vigeo/EIRIS and Oekom as of April 2017.
2 By number of indexes and by assets tracking the indexes compared with publically available information produced by FTSE and S&P Dow Jones as of April 2017
3 Based on publically available information in press releases published from 2014 to date.

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