

MSCI ESG Ratings Methodology: Toxic Emissions & Waste Key Issue

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Contents

Introduction..... 3

Risks associated with this Key Issue..... 4

Toxic Emissions & Waste Key Issue Score 4

Toxic Emissions & Waste Management Score 5

 Management Score category: Governance and Strategy Score 5

 Management Score category: Targets Score 6

 Management Score category: Performance Score..... 7

Controversies..... 7

Toxic Emissions & Waste Exposure Score 7

 Business Exposure Score..... 8

 Business Segment Exposure Scores..... 9

Data Sources..... 10

Introduction

This document provides essential information on the components of the Toxic Emissions & Waste Key Issue to enable users of ESG Ratings to understand how our outputs are determined. Toxic Emissions & Waste is a Key Issue in the Environmental Pillar of the MSCI ESG Ratings model. Companies are evaluated on the potential environmental contamination and toxic or carcinogenic emissions arising from their operations and the strength of their environmental management systems.

For additional details on the MSCI ESG Ratings Model, refer to Section 2, Data, ratings and scores, of “ESG Ratings Methodology.”

Exhibit 1: MSCI ESG Key Issue hierarchy

3 Pillars	10 Themes	33 ESG Key Issues
Environmental	Climate Change	Carbon Emissions
		Climate Change Vulnerability
		Financing Environmental Impact
		Product Carbon Footprint
	Natural Capital	Biodiversity & Land Use
		Raw Material Sourcing
		Water Stress
	Pollution & Waste	Electronic Waste
		Packaging Material & Waste
		Toxic Emissions & Waste
	Environmental Opportunities	Opportunities in Clean Tech
		Opportunities in Green Building
		Opportunities in Renewable Energy
Social	Human Capital	Health & Safety
		Human Capital Development
		Labor Management
		Supply Chain Labor Standards
	Product Liability	Chemical Safety
		Consumer Financial Protection
		Privacy & Data Security
		Product Safety & Quality
		Responsible Investment
	Stakeholder Opposition	Community Relations
		Controversial Sourcing
	Social Opportunities	Access to Finance
		Access to Health Care
		Opportunities in Nutrition & Health

3 Pillars	10 Themes	33 ESG Key Issues
Governance	Corporate Governance	Board
		Pay
		Ownership & Control
		Accounting
	Corporate Behavior	Business Ethics
		Tax Transparency

Risks associated with this Key Issue

- Increased costs from liabilities associated with damaging health, property.
- Loss of access to markets through community opposition, heightened regulatory hurdles.
- Increased costs to meet compliance standards and install equipment and systems to contain pollution.

Toxic Emissions & Waste Key Issue Score

The Toxic Emissions & Waste Key Issue Score evaluates the company's level of exposure to, and management of, risks on this Key Issue. The Key Issue Score is based on the Exposure Score and the Management Score using the formula below. The Exposure Score and the 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.

$$KI_i = 7 - (\max(EXP_i, 2) - MGMT_i)$$

Where:

- KI_i is the Key Issue Score for company i .
- EXP_i is the Exposure Score for company i .
- $MGMT_i$ is the Management Score for company i .

Toxic Emissions & Waste Management Score

The Toxic Emissions & Waste Management Score evaluates the company's ability to manage its exposure to risks on this Key Issue. It is based on an average of the scores associated with each of the Management Score categories listed below, modified by Controversies. These scores are derived from data points that are scored on a 0-10 scale, with 10 corresponding to best practice and 0 corresponding to lack of management. Refer to Section 3.3, Analyzing risk management, of "ESG Ratings Methodology" for additional details. Sources are company disclosures except where otherwise indicated. The following formula is used to calculate the Toxic Emissions & Waste Management Score - Excluding Controversies:

$$MGMT_{BIO,i} = \frac{GOVS_{BIO,i} + TARG_{BIO,i} + PERF_{BIO,i}}{3}$$

Where:

- $MGMT_{BIO,i}$ is the Toxic Emissions & Waste Management Score - Excluding Controversies for company i .
- $GOVS_{BIO,i}$ is the Governance and Strategy Score for company i .
- $TARG_{BIO,i}$ is the Targets Score for company i .
- $PERF_{BIO,i}$ is the Performance Score for company i .

The following data points, without constituting an exhaustive list, are representative of the inputs to the Management Score and are used in the Management Score calculation:

Management Score category: Governance and Strategy Score

- **Evidence of annual environmental impact audits.**
Definition: Indicates whether there is evidence that the company carries out annual environmental impact audits.
- **Evidence of audits across all locations of operations.**
Definition: Indicates whether there is evidence of environmental audits across all locations of operations.
- **Evidence of environmental impact audits.**

Definition: Indicates whether there is evidence that the company conducts regular environmental impact audits. Companies with an EMS certified to the ISO 14001 standard or equivalent are assumed to conduct regular audits.

- **Existence of environmental management system.**

Definition: Indicates whether the company has an environmental management system (EMS), how robust that EMS is, or in the case of nondisclosure, whether the company operates in markets with strong or weak environmental regulations.

- **Extent of programs to reduce toxic emissions of supply chain.**

Definition: The company's strategy to reduce the toxic emissions associated with its supply chain. Best practice is for suppliers to be subject to screening or audits.

- **Percentage of sites with an environmental management system certified to ISO 14001 or similar.**

Definition: The percentage of sites with hazardous waste guidance that follow ISO 14001 or a similar certification for waste management.

Management Score category: Targets Score

- **Aggressiveness of toxic emissions and waste reduction target.**

Definition: Assesses the aggressiveness of the company's toxic emissions and waste reduction targets. Expressed as a 0-10 score, where 10 indicates a very aggressive improvement target that is applicable to the majority of relevant operations. Targets are differentiated based on the average annual improvement, the comprehensiveness of the target's application, and the number of pollutants or effluents addressed.

- **Track record of achieving toxic emissions targets.**

Definition: Indicates whether the company has a demonstrated track record of achieving its toxic emissions targets.

Management Score category: Performance Score

Assesses the company's performance on toxic emissions and waste metrics (including NO_x emissions, SO_x emissions, particulate matter emissions, hazardous and non-hazardous waste, and other relevant pollutants) relative to its peers. Expressed as a 0-10 score, where 10 indicates the highest level of performance.

Representative performance metrics:

- Trend on toxic releases.
- Performance on toxic releases vs. peers:
 - Year.
 - Volume.
 - Intensity.
 - Trend.

Source: Environmental Protection Agency's (EPA's) Resource Conservation and Recovery Act Biennial Reporting.

Controversies

A controversy deduction ranging from 0 to 5 points is subtracted from the overall Management Score, based on the severity and type of controversies facing the company on this Key Issue. The following categories of controversies are used in the assessment:

- Toxic emissions and spills controversies.

For more details on how controversies are included in the MSCI ESG Ratings model, refer to Section 3.3.2, Controversies cases, of "ESG Ratings Methodology."

Toxic Emissions & Waste Exposure Score

The Toxic Emissions & Waste Exposure Score evaluates the company's exposure to risks on this Key Issue. It is based on the Business Exposure Score only. The

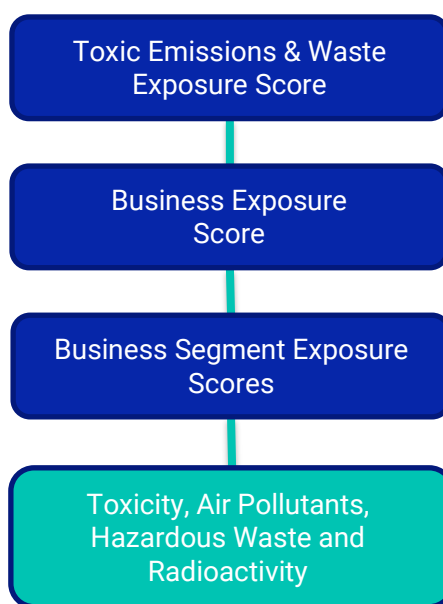
Business Exposure Score is scored on a 0-10 scale, with 10 corresponding to the highest risk and 0 corresponding to the lowest risk. Refer to Section 3.2, Analyzing risk exposure, of “ESG Ratings Methodology” for additional details. The following formula is used in the Exposure Score calculation:

$$EXP_{TEW,i} = BUS_{TEW,i}$$

Where:

- $EXP_{TEW,i}$ is the Toxic Emissions & Waste Exposure Score of company i .
- $BUS_{TEW,i}$ is the Toxic Emissions & Waste Business Exposure Score of company i .

Exhibit 2: Exposure Score components



Business Exposure Score

The Business Exposure Score is a weighted average of the Toxic Emissions & Waste Business Segment Exposure Scores of a company’s business segments. Scores are

weighted by the proportion of a company's total assets in each business segment,¹ using the following formula to calculate the Business Exposure Score:

$$BUS_{TEW,i} = \sum_{j=1}^{n_i} w_{Asset,i,j} BSE_{TEW,j}$$

Where:

- $BSE_{TEW,j}$ is the Toxic Emissions & Waste Business Segment Exposure Score for business segment j .
- $w_{Asset,i,j}$ is the weight of business segment j for company i based on the contribution to total company assets.
- n_i is the number of business segments of company i .

Business Segment Exposure Scores

The Toxic Emissions & Waste Business Segment Exposure Score of a business segment is based on a mapping of the business segment as disclosed by the company to a corresponding business activity. MSCI ESG Research uses the Standard Industrial Classification (SIC) system along with industry-specific adjustments to define business activities. The score associated with a business activity is used to calculate a Business Segment Exposure Score. Each business activity score is determined by a simple average of the Toxicity Score, Air Pollutant Score, Hazardous Waste Score and Radioactivity Score of the business activity:

$$BSE_{TEW,j} = \frac{TS_j + APS_j + HWS_j + RS_j}{4}$$

Where:

- TS_j is the Toxicity Score for business activity j .
- APS_j is the Air Pollutant Score for business activity j .
- HWS_j is the Hazardous Waste Score for business activity j .
- RS_j is the Radioactivity Score for business activity j .

¹ The percentage of assets is typically calculated as the company-reported asset value of the segment divided by the total asset value. In certain cases, industry-specific metrics are used to calculate the percentage of assets, such as power generation, production volume or reserve value. In cases where neither segment assets nor a relevant industry-specific proxy is available, the percentage is calculated based on segment revenue.

The Toxicity Score of a business activity is assessed by examining the toxicity and carcinogenicity (oral and inhalation) risk associated with toxic emissions.

The Air Pollutant Score of a business activity is assessed by taking a simple average of emissions of carbon monoxide (CO), volatile organic compounds (VOCs), nitrogen oxides (NOx), sulphur oxides (SOx) and particulate matter of 10 micrometer diameter (PM10).

The Hazardous Waste Score of a business activity is assessed by examining tons of hazardous waste produced per facility.

The Radioactivity Score of a business activity is assessed through a qualitative assessment of the mining industry. Mining activities related to highly radioactive ores receive a score of 10.

Data Sources

The following sources are used to determine the Toxic Emissions & Waste Exposure Score:

The EPA's Toxics Release Inventory, National Emissions Inventory, and Risk-Screening Environmental Indicators; U.S. Economic Census; Refinitiv; MSCI ESG Research; company disclosures.

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