MSCI SFDR Adverse Impact Metrics Methodology

MSCI ESG Research

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Contents

Introduction[1]

The Sustainable Finance Disclosure Regulation (SFDR) is one of the legislative streams of the European Union (EU) Sustainable Finance Package.[2] Through the SFDR, the EU requires financial market participants (FMPs) and advisers with more than 500 employees to **consider and disclose adverse impacts** of investment decisions on sustainability factors **at entity level**. All other FMPs will need 'clear reasons' for not considering (and disclosing) adverse impacts including, where relevant, information as to whether and when they intend to consider such adverse impacts.[3] Further disclosure obligations relate to products with environmental or social characteristics (SFDR Article 8) and products with sustainable investment objectives (SFDR Article 9).

In April 2022, the European Commission released a Delegated Regulation with regard to regulatory technical standards (SFDR RTS), providing details of the content, methodologies and presentation of disclosures under SFDR, including detailed reporting templates in the Annexes.[4] The SFDR RTS includes **64 adverse impact indicators**, comprising 18 principal adverse impact (PAI) indicators (Table 1 of the SFDR RTS's Annex 1) and 46 additional environmental and social indicators (Tables 2 and 3 of the SFDR RTS's Annex 1).[5]

FMPs considering adverse impacts need to make disclosures **at entity level** of all the 18 PAI indicators, at least two from the additional set of adverse impact indicators (one environmental and one social) and any other indicators the FMP uses to assess sustainability impacts. Furthermore, they need to describe actions taken, planned or targets set to avoid or reduce the PAIs identified (Article 6 SFDR RTS).[6]

For products with a sustainable investment objective (Article 9), including those products seeking a minimum share of taxonomy aligned investments, the use of PAI and any other relevant adverse impact indicators is mandatory to demonstrate that the product does not do significant harm (DNSH) – as outlined in SFDR Article 2(17).[7] However, the reporting format is not further specified.

Adverse impact indicators are specific to **three asset classes**: corporate, sovereign/supranationals and real estate. A summary of these indicators is provided in Exhibit 1 with disclosure rates provided in Exhibits 2 to 3. For the full list of indicators and underlying data points, as well as methodology notes, please consult the separate SFDR Adverse Impact Metrics Guidance.

In response to Article 32 and Article 45 of the SFDR RTS, notably disclosing on their website the data sources used for Article 8 or 9 products, measures taken to ensure data quality, data processing and proportion of data estimated, MSCI ESG Research has added a dedicated section to this

[1] This methodology information is provided "as is" and does not constitute legal advice or any binding interpretation. Any approach to comply with legal, regulatory or policy initiatives should be discussed with your own legal counsel and/or the relevant competent authority, as needed.
[2] Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector.
[3] Regulation (EU) 2019/2088, article 4.1(b).
[4] Commission Delegated Regulation (EU) 2022/1288 of 6 April 2022 supplementing Regulation (EU) 2019/2088 of the European Parliament and of the Council with regard to regulatory technical standards specifying the details of the content and presentation of the information in relation to the principle of 'do no significant harm', specifying the content, methodologies and presentation of information in relation to sustainability indicators and adverse sustainability impacts, and the content and presentation of the information in relation to the promotion of environmental or social characteristics and sustainable investment objectives in pre-contractual documents, on websites and in periodic reports.
[5] Annex I of the SFDR Delegated Regulation (cf footnote 4).
[6] Article 6 of the SFDR Delegated Regulation (cf footnote 4).
[7] The European Supervisory Authorities have clarified that this does not require any PAI consideration at entity level. Hence, FMPs that do not consider adverse sustainability impacts can still issue article 9 products. JC 2022 23 of June 2022.

methodology document (see Ongoing Monitoring and Update Cycle – Data Sources, Data Quality and Data Processing).

Since the adoption of the SFDR RTS, the European Supervisory Authorities (ESAs) have issued two **further clarifications** to help with the technical implementation of the legislation.[8] Some of the clarifications address the calculation formulas for PAI indicators aggregation, others provide further details on the metrics themselves. The ESAs launched a consultation on the SFDR RTS in April 2023, with a final report amending the SFDR RTS released on December 4, 2023. If adopted by the European Commission, this would lead to changes in disclosure requirements including specific PAIs.[9]

Exhibit 1. SFDR Principal Adverse Sustainability Impact Indicators

Principal Adverse Impact Indicators (18)	
ENVIRONMENTAL	**SOCIAL**
Indicators Applicable to Corporate Issuers[10] (14)	
1. Greenhouse gas (GHG) emissions 2. Carbon footprint 3. GHG intensity of investee companies 4. Exposure to companies active in the fossil fuel sector 5. Share of non-renewable energy consumption and production 6. Energy consumption intensity per high impact climate sector 7. Activities negatively affecting biodiversity-sensitive areas 8. Emissions to water 9. Hazardous waste ratio	10. Violations of UN Global Compact principles and Organisation for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises 11. Lack of processes and compliance mechanisms to monitor compliance with UN Global Compact principles and OECD Guidelines for Multinational Enterprises. 12. Unadjusted gender pay gap 13. Board gender diversity 14. Exposure to controversial weapons (anti-personnel mines, cluster munitions, chemical weapons and biological weapons)
Indicators Applicable to Sovereigns and Supranationals (2)	
15. GHG intensity	16. Investee countries subject to social violations
Indicators Applicable to Real Estate Assets (2)	
17. Exposure to fossil fuels through real estate assets 18. Exposure to energy-inefficient real estate assets	

[8] (1) Clarifications on the ESAs' draft RTS under SFDR. JC 2022 23 of June 2, 2022. (2) Questions and answers (Q&A) on the SFDR Delegated Regulation (Commission Delegated Regulation (EU) 2022/1288). JC 2022 62 of November 2022.
[9] Joint Consultation on the Review of the SFDR Delegated Regulation, ESAs, 12 April to 04 July 2023. Final Report amending the draft Regulatory Technical Standards (RTS) to the Delegated Regulation supplementing the Sustainable Finance Disclosure Regulation (SFDR), ESAs, December 4, 2023.
[10] An Issuer is an entity that has issued or contemplates to issue securities. Throughout this methodology document, Issuers typically refers to *corporate*, *sovereign* and *supranational* issuers. MSCI ESG Research also typically refer to corporate issuers as *companies*.

<table>
<tr><th colspan="2">Additional Indicators: Environmental (22) and Social (24)
Choose at least one Environmental and one Social</th></tr>
<tr><th>ENVIRONMENTAL</th><th>SOCIAL</th></tr>
<tr><th colspan="2">Indicators Applicable to Corporate Issuers</th></tr>
<tr><td>1. Emissions of inorganic pollutants
2. Emissions of air pollutants
3. Emissions of ozone depletion substances
4. Investments in companies without carbon reduction initiatives
5. Breakdown of energy consumption by type of non-renewable sources of energy
6. Water usage and recycling
7. Investments in companies without water management policies
8. Exposure to areas of high water stress
9. Investments in companies producing chemicals
10. Land degradation, desertification, soil sealing
11. Investments in companies without sustainable land/agriculture practices
12. Investments in companies without sustainable oceans/seas practices
13. Non-recycled waste ratio
14. Natural species and protected areas
15. Deforestation
16. Share of securities not certified as green under a future EU legal act setting up an EU Green Bond Standard</td><td>1. Investments in companies without workplace accident prevention policies
2. Rate of accidents
3. Number of days lost to injuries, accidents, fatalities or illness
4. Lack of a supplier code of conduct
5. Lack of grievance-/complaints-handling mechanism related to employee matters
6. Insufficient whistleblower protection
7. Incidents of discrimination
8. Excessive CEO pay ratio
9. Lack of a human rights policy
10. Lack of due diligence
11. Lack of processes and measures for preventing trafficking in human beings
12. Operations and suppliers at significant risk of incidents of child labor
13. Operations and suppliers at significant risk of incidents of forced or compulsory labor
14. Number of identified cases of severe human rights issues and incidents
15. Lack of anti-corruption and anti-bribery policies
16. Cases of insufficient action taken to address breaches of standards of anti-corruption and anti-bribery
17. Number of convictions and amount of fines for violation of anti-corruption and anti-bribery laws</td></tr>
<tr><th colspan="2">Indicators Applicable to Sovereigns and Supranationals</th></tr>
<tr><td>17. Share of bonds not certified as green under a future EU legal act setting up an EU Green Bond Standard</td><td>18. Average income inequality score
19. Average freedom-of-expression score
20. Average human rights performance
21. Average corruption score
22. Non-cooperative tax jurisdictions
23. Average political stability score
24. Average rule-of-law score</td></tr>
<tr><th colspan="2">Indicators Applicable to Real Estate Assets</th></tr>
<tr><td>18. GHG emissions
19. Energy consumption intensity
20. Waste production in operations
21. Raw materials consumption for new construction and major renovations
22. Land artificialization</td><td></td></tr>
</table>

Source: MSCI ESG Research, Annex 1 of Commission Delegated Regulation (EU) 2022/1288.

Objectives

The overall objective of the MSCI SFDR Adverse Impact Metrics methodology is to provide issuer-level (reported and estimated) data points and aggregated portfolio/fund-level assessments to align with SFDR disclosure requirements. The approach includes the following key actions:

- Collect readily available data by searching company disclosures for principal adverse sustainability impact information as outlined in Annex 1 of the SFDR RTS.
- Conduct outreach to companies with the findings of MSCI ESG Research's data collection and encourage public disclosure where information is not readily available.
- Fill some disclosure gaps by drawing on MSCI ESG Research datasets and estimates for assessing adverse sustainability impacts. For further information on the estimation approach, please see the respective section in this document (as of page 16).

Coverage

The SFDR Adverse Impact metrics universe is determined by issuers' inclusion in the coverage universes for MSCI ESG Ratings and MSCI ESG Government Ratings.[11] For factors coming from other data sets (e.g. MSCI Climate Change Metrics, MSCI Climate Targets and Commitments, MSCI Implied Temperature Rise, MSCI Business Involvement Screening Research or MSCI ESG Controversies), the coverage may be broader.

Composition of the dataset

MSCI SFDR Adverse Impact Metrics is a set of issuer-level data points on adverse sustainability indicators. As of May 2024, the dataset included collected data relating to the 14 PAIs for corporate issuers, two PAIs for sovereign issuers and 36 of the additional indicators in tables 2 and 3 of Annex 1 to the SFDR RTS. A list of these indicators and availability of data as of May 2024 is included in Exhibits 2 and 3.

Exhibit 2. Mandatory PAIs from Table 1 of Annex 1 of the SFDR RTS supported by MSCI SFDR Adverse Impact Metrics and availability of data[12,13]

Climate and Other Environment-Related Indicators		
Theme	Indicator	Availability of Data
Greenhouse gas emissions	1. GHG emissions Scope 1 GHG emissions Scope 2 GHG emissions Scope 3 GHG emissions	57.5% (Scopes 1+2) Reported and estimated (Scopes 1, 2, and 3): 96.9%

[11] See ESG Ratings and ESG Government Ratings Process documents, available here > https://www.msci.com/esg-and-climate-methodologies

[12] For indicators applicable to corporate issuers, availability of disclosure represents the percentage of MSCI ACWI IMI constituents with available disclosures. For indicators applicable to sovereigns and supranationals, availability of disclosure represents the percentage of sovereign issuers or countries in the MSCI ESG Government Ratings coverage universe with available data. For indicators that address involvement, the availability of disclosures represents the percentage of MSCI ACWI IMI constituents flagged for exposure on this indicator. As of May 6, 2024.

[13] The availability of disclosure reflects MSCI ESG Research's interpretation of the mapping from MSCI ESG Research data points to SFDR indicators.

	Total GHG emissions	
	2. Carbon footprint	
	3. GHG intensity	
	4. Exposure to companies active in the fossil fuel sector	92.2%
	5. Share of non-renewable energy consumption and production	36.5% Availability of estimated data will be added once the data has been released.
	6. Energy consumption intensity per high impact climate sector	51.8% Availability of estimated data will be added once the data has been released.
Biodiversity	7. Activities negatively affecting biodiversity-sensitive areas	1.7% Assessed: 96.4%, based on MSCI Biodiversity Screening Metrics Methodology
Water	8. Emissions to water	0.3%
Waste	9. Hazardous waste ratio	20.1% Availability of estimated data will be added once the data has been released
Indicators for Social and Employee, Respect for Human Rights, Anti-Corruption and Anti-Bribery Matters		
Theme	Indicator	Availability of Data
Social and employee matters	10. Violations of UN Global Compact principles and Organization for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises	0% Assessed: 96.1%, based on MSCI ESG Controversies methodology
	11. Lack of processes and compliance mechanisms to monitor compliance with UN Global Compact principles and OECD Guidelines for Multinational Enterprises	92.5% Assessed based on MSCI SFDR Adverse Impact Metrics Methodology
	12. Unadjusted gender pay gap	6.3% Availability of estimated data will be added once the data has been released
	13. Board gender diversity	95.8%
	14. Exposure to controversial weapons (anti-personnel mines, cluster munitions, chemical weapons and biological weapons)	100% Sourced from MSCI Business Involvement Screening Research methodology based on reported data
Indicators Applicable to Sovereigns and Supranationals		
Theme	Indicator	Availability of Data

Environmental	15. GHG Intensity	95.6% Sourced from EDGAR. Nominal GDP level is sourced from World Development Indicators (WDI)
Social	16. Investee countries subject to social violations	0% Assessed: 98.0%, based on the EU Sanctions list

Source: MSCI ESG Research.

Exhibit 3. Additional PAIs from Tables 2 and 3 of Annex 1 of the SFDR RTS supported by MSCI SFDR Adverse Impact Metrics and availability of data[14, 15]

Table 2: Additional climate and other environment-related indicators		
Theme	Indicator	Availability of Data
Emissions	1. Emissions of inorganic pollutants	0.3%
	2. Emissions of air pollutants	0.4%
	3. Emissions of ozone-depleting substances	0%
	4. Investments in companies without carbon emission reduction initiatives	94.6% Assessed based on MSCI Implied Temperature Rise Methodology
Energy performance	5. Breakdown of energy consumption by type of non-renewable sources of energy	1.4% (Coal) 0.0% (Lignite) 8.7% (Natural gas) 0.2% (Oil & gas) 0% (Nuclear power) 26.9% (Other non-renewable sources)
Water, waste and material emissions	6. Water usage and recycling	Average amount of water consumed: 3.1% Weighted average percentage of water recycled and reused: 31.8%
	7. Investments in companies without water management policies	33.9%
	8. Exposure to areas of high water stress	5.1%
	9. Investments in companies producing chemicals	0% Sourced from vendor: 100%
	10. Land degradation, desertification, soil sealing	2.0%

[14] For indicators applicable to corporate issuers, availability of disclosure represents the percentage of MSCI ACWI IMI constituents with available disclosures. For indicators applicable to sovereigns and supranationals, availability of disclosure represents the percentage of sovereign issuers or countries in the MSCI ESG Government Ratings coverage universe with available data. For indicators that address involvement availability of disclosures represent the percentage of MSCI ACWI IMI constituents flagged for exposure on this indicator. As of May 6, 2024.

[15] The availability of disclosure reflects MSCI ESG Research's interpretation of the mapping from MSCI ESG Research data points to SFDR indicators.

	11. Investments in companies without sustainable land/agriculture practices	24.0%
	12. Investments in companies without sustainable oceans/seas practices	8.7%
	13. Non-recycled waste ratio	17.6%
	14. Natural species and protected areas	Companies whose operations affect threatened species: 6.0% Companies without a biodiversity protection policy covering operational sites owned, leased, managed in, or adjacent to, a protected area or an area of high biodiversity value outside protected areas: 1.7%
	15. Deforestation	3.7%
Table 3: Additional indicators for social and employee, respect for human rights, anti-corruption and anti-bribery matters		
Theme	Indicator	Availability of Data
Social and employee matters	1. Investment in investee companies without workplace accident prevention policies	73.4%
	2. Rate of accidents	17.3%
	3. Number of days lost to injuries, accidents, fatalities or illness	12.8%
	4. Lack of a supplier code of conduct	22.3%
	5. Lack of grievance/complaints handling mechanism related to employee matters	45.5%
	6. Insufficient whistleblower protection	78.8%
	7. Incidents of discrimination	0% Assessed: 96.9%, based on MSCI ESG Controversies methodology
	8. Excessive CEO pay ratio	52.7%
Human rights	9. Lack of a human rights policy	59.0%
	10. Lack of due diligence	37.7%
	11. Lack of processes and measures for preventing trafficking in human beings	37.1%
	12. Operations and suppliers at significant risk of incidents of child labor	5.6%
	13. Operations and suppliers at significant risk of forced or compulsory labor	5.5%
	14. Number of identified cases of severe human rights issues and incidents	0% Assessed: 97.1%, based on MSCI ESG Controversies methodology
	15. Lack of anti-corruption and anti-bribery policies	92.5%

Anti-corruption and anti-bribery	16. Cases of insufficient action taken to address breaches of standards of anti-corruption and anti-bribery	0%
	17. Number of convictions and amount of fines for violation of anti-corruption and anti-bribery laws	0.5% (Number of convictions) 0.4% (Amount of fines)
Indicators applicable to sovereigns and supranationals – Social and Governance	18. Average income inequality score	0% Sourced from US Central Intelligence Agency; World Development Indicators (WDI); World Bank: 84.7%
	19. Average freedom-of-expression score	0% Sourced from Freedom House: 85.7%
	20. Average human rights performance	0% Sourced from World Justice Project (WJP) Rule of Law Index: 70.0%
	21. Average corruption score	0% Sourced from Transparency International: 89.2%
	22. Non-cooperative tax jurisdiction	0% Sourced from EU List on non-cooperative tax jurisdictions: 98.0%
	23. Average political stability score	0% Sourced from Vision of Humanity; Worldwide Governance Indicators (WGI); World Bank: 90.1%
	24. Average rule of law score	0% Sourced from Worldwide Governance Indicators (WGI), World Bank: 100.0%

Source: MSCI ESG Research.

For the **data aggregation** formulas for portfolio- or fund-level SFDR reporting you can consult the separate SFDR Adverse Impact Metrics Guidance.

Gaps in corporate disclosures of specific indicators are apparent and may be driven by many reasons, including companies not subject to disclosure requirements, lack of relevance of certain indicators for some industries (e.g., disclosure of toxic emissions and biodiversity protection policies may not be relevant for health insurance companies, or specialty services), and potentially a lack of clear definitions (SFDR RTS sometimes refer to undefined concepts such as violations of global norms[16]). Article 7.2 of the SFDR RTS asks FMPs for 'best efforts' to obtain data when not reported, either directly from investee companies or through additional research making 'reasonable assumptions'.

[16] In a Q&A released in November 2022, the ESAs refer to the annex of the draft Corporate Sustainability Due Diligence Directive as providing 'helpful examples of typical social violations'. The annex lists several types of violations of global norms but does not further define what precisely constitutes a violation. Questions and Answers on the SFDR Delegated Regulation, ESAs, JC 2022 62, 17 November 2022.

Each value in the dataset is supported by an additional factor to identify whether the value is reported, calculated (based on reported data) or **estimated** by MSCI based on available methodologies.

For **performance metrics with numeric output**, if a company discloses a zero value for a performance indicator, MSCI ESG Research collects and records it for that company. Therefore, zero could be a possible and valid value.

For **qualitative metrics**, where no evidence of a publicly disclosed policy is found, MSCI ESG Research displays “no disclosure”. This indicates the availability of policies, compliance mechanisms, or operations in high-impact locations. For select metrics, e.g., those based on reference lists or indicators estimated based on proprietary MSCI ESG Research methodologies, "No" is a possible value representing no notable controversies, involvement or exposure.

For **numeric output values** within SFDR, a blank value can mean the company does not disclose the data, the company is not in the coverage universe, or the company has not been researched yet – which can be checked using the SFDR_COVERED and SFDR_RESEARCHED indicators. For policy indicators, the lack of a policy is shown as “Not Disclosed”. A blank value for a policy indicator typically means the company is not in the coverage universe or has not been researched yet.

Ongoing monitoring and update cycle

Update cycle

Updates to MSCI SFDR Adverse Impact Metrics are based on **source updates.**

In the case of metrics that are sourced from other MSCI ESG Research proprietary datasets, the standard company review cycle for those datasets applies. These proprietary datasets comprise MSCI Business Involvement Screening Research, MSCI ESG Ratings, MSCI ESG metrics, MSCI Climate Assessments and Climate Data Products, and MSCI ESG Controversies. Datasets that have dynamic source updates outside of annual filings, such as carbon emissions, board of directors’ composition and controversies, are reviewed on a weekly basis and updated when there is a change to the underlying inputs.

For data that is collected specifically for MSCI SFDR Adverse Impact Metrics purposes, MSCI ESG Research follows an **annual update cycle** for the time being, independent of annual filings.

Corporate actions

Our ESG Data Experts and ESG Analytical Personnel review and incorporate certain corporate actions for potential impacts to MSCI SFDR Adverse Impact data. These actions comprise: acquisitions, consolidations, mergers, name changes, public offerings, and spinoffs.

Exclusion from coverage universe: Data for issuers that fall outside of the coverage universe due to index exclusion or corporate actions are no longer updated and excluded from the next scheduled data feed delivery.

Company communication

MSCI ESG Research is committed to transparent communication with all issuers in the coverage universe. This commitment includes:

- Proactively reaching out to companies, as relevant, as part of MSCI ESG Research's data review process.
- A data review process that allows companies to comment on the accuracy of company data for all MSCI ESG Research reports.
- Free access for issuers to published versions of all their MSCI ESG Research company reports. Given the dynamic nature of the research, companies can access, review the data MSCI ESG Research has collected to date, ask questions and provide feedback via a portal, namely MSCI ESG Research's Issuer Communications Portal (ICP), at any time.
- A timely response to company-initiated requests to discuss their MSCI ESG Research reports.

MSCI ESG Research does not issue surveys or questionnaires or conduct general interviews with companies, nor does MSCI ESG Research accept or consider any data provided by issuers that is not publicly available to other stakeholders. MSCI ESG Research evaluates and applies quality checks to issuer-provided data prior to publication.

Data sources

The SFDR RTS calls on financial market participants to source adverse impact data in various ways, including "either directly from companies or by carrying out additional research, cooperating with third party data providers or external experts or making reasonable assumptions" (Article 7.2).

MSCI ESG Research uses the following sources to collect company-reported data:

- Company **direct disclosure**: sustainability reports, annual reports, regulatory filings, and company websites.
- Company **indirect disclosure**: government agency published data, industry and trade associations data and third-party financial data providers.
- **Direct communication** with companies as described above in Company Communication.

Where company disclosure is **unavailable**, investors may choose to use a subset of suggested estimated metrics (where applicable) based on **other MSCI ESG Research datasets**. These datasets are built based on proprietary methodologies and informed by data from companies, market and industry peers, media, NGOs, multilateral and other credible institutions.

These proprietary datasets comprise: MSCI Business Involvement Screening Research, MSCI ESG Ratings, MSCI ESG metrics, MSCI Climate Assessments and Climate Data Products, and MSCI ESG Controversies.

Data quality

MSCI ESG Research looks at a broad range of dimensions when defining quality, including data completeness, exhaustivity, timeliness, accuracy as well as traceability back to source (evidence).

The automated and manual quality checks conducted by MSCI ESG Research address the key aspects of **data consistency and data accuracy**. The approach is built on query extracts from internal databases and flag the pre-specified conditions that trigger score changes, or any suspect values. The data that does not meet the quality standards is subject to further review and correction.

The measures that MSCI ESG Research applies to the data feeding into MSCI's SFDR module include, for example:

- Dual vendor validation quality assurance to validate data against alternate sources using Natural Language Processing (NLP) or Artificial Intelligence (AI)-driven extraction.
- Keyword scan for disclosure detection/coverage; change-based (outlier)/range-based quality assurance on all quantitative data to check large variations and anomalies.
- Negative disclosure checks for qualitative data points.
- Data validation and constraints implemented on data input to ensure data consistency and completeness.
- Validation for consistency on units of measurement.

Data processing

MSCI ESG Research data processing is additive and involves multiple layers of validation designed to detect anomalies.

Data procurement is a combination of automated data extraction and manual data collection. Raw data inputs are collected from approximately 300 public sources representing up to 2 million articles and 1 million company documents per year. To manage this scale, MSCI ESG Research uses AI-driven tools to detect if relevant data is disclosed in specific company documents and provides a classification of news sources and press releases detected to contain relevant data.

The **quality assurance process** for input data involves issuer/security-specific raw data validation including sentiment, association, streaming, and dual vendor validation. Wherever possible, MSCI ESG Research employs a dual vendor validation method, where the same data is collected independently by different ESG data experts from the same or comparable sources.

For **derived data** that are sourced from MSCI ESG Research proprietary datasets, the process may involve simple transformations.

To provide **oversight** over data updates, various governance committees provide an additional layer of review in cases of significant changes to data or models. These governance committees are composed of senior ESG data experts and ESG analytical personnel from across MSCI ESG Research.

Estimating quantitative indicators with limited data availability

For certain adverse impact indicators with limited data availability, MSCI ESG Research provides estimated values. For all factors where an estimation is present, the resulting values are identified as 'reported' or 'estimated' through corresponding KEY factors. The estimates for GHG emissions (PAIs 1-3) are derived using the MSCI ESG Research Carbon Emissions Estimation methodology. The approach used for the estimates for PAI 5, 6, 9 and 12 are described below .

Intensity-based models (PAI 5, 6, 9)

The estimation methodology for PAI 5, 6 and 9 follow the same logic: When a company has reported data on a relevant indicator, for example on hazardous waste for PAI 9, at least once within the past five years, a Company-Specific Intensity model is applied. If the company has not reported relevant data in the last five years, an Industry-Specific model is used.

The Company-Specific Intensity (CSI) model

For companies that have reported data on an indicator at least once in the past five years, MSCI ESG Research calculates a company specific intensity based on their historical data using the following steps:

1. Calculate the "indicator intensity" by using the company's historical data for relevant indicators (e.g. hazardous waste) and dividing it by the company's revenue. The **company-specific intensity** metric is determined by taking the harmonic mean of all reported "indicator intensities" over the last five years. The harmonic mean is preferred because it minimizes the impact of extreme outliers compared to the arithmetic mean.
2. In cases where data for a specific year is missing, estimate the company's relevant indicator (e.g. hazardous waste) by multiplying the company's revenue with the **company-specific intensity** calculated in the first step.

The use of previously reported data means these estimates reflect the specifics of the sectors and geographies in which the company operates as well as its own production processes.[17]

The Industry Specific Intensity (ISI) model

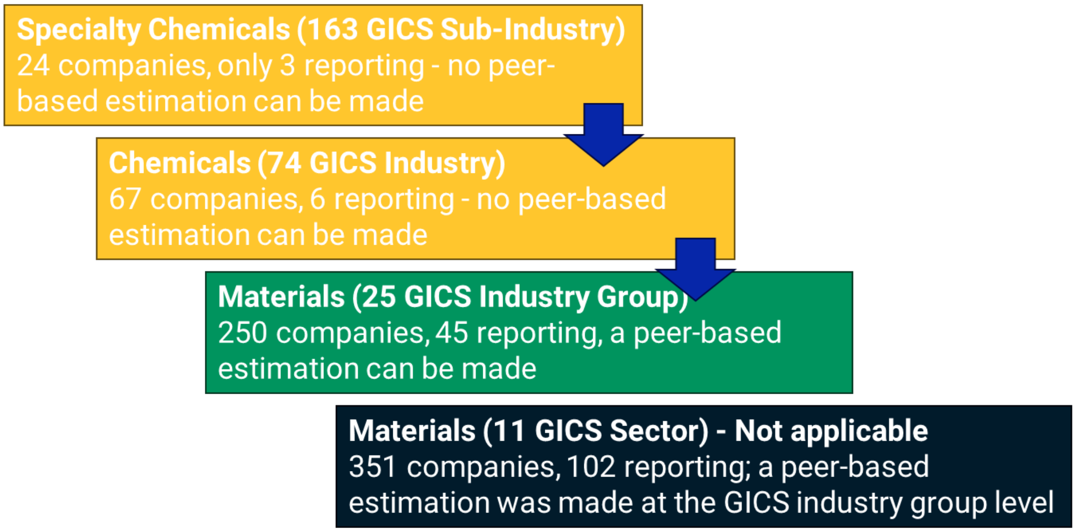
For companies with no reported data on a relevant indicator in the past five years, estimates are calculated using an Industry Specific Intensity (ISI) model:

- The ISI model uses a linear regression analysis comparing sales data with PAI data (e.g. hazardous waste) across the company's peer group.
- The peer group used is the Global Industry Classification Standard (GICS®)[18] framework. To calculate an estimate, it is necessary to have data from at least five companies, and a minimum of 10% of the peer group should have reported their data. If this condition is not satisfied, a higher GICS level is used, moving from sub-industry (most granular) to sector level (least granular). See illustration in Exhibit 4.
- If a peer group does not meet the data thresholds, no estimate is made for that company.
- When a peer group meets the data thresholds, the estimated value is calculated by using the ISI model regression approach with the company's sales data for the respective year.

[17] This model is not used for companies that have undergone corporate actions.

[18] GICS is the global industry classification standard jointly developed by MSCI and S&P Global Market Intelligence.

Exhibit 4. Illustration of the peer set determination for companies in the Specialty Chemicals GICS sub-industry using the Industry Specific Intensity model



Source: MSCI ESG Research.

Materiality-based estimates

For companies without historic reported data, MSCI ESG Research assesses for which GICS sub-industry a certain PAI can be considered non-material. For example, for the Research & Consulting services GICS sub-industry, emissions to water (PAI 8) are assessed as non-material. For GICS sub-industries where a PAI is considered non-material, all non-reported values are set to 0, and marked as 'estimated' in the corresponding KEY factor. No reported data is overridden at any stage during the estimation calculations.

Additional notes for PAI 5 and PAI 6

For PAI 5, the share of non-renewable energy consumption and production, two data points can be estimated based on the approach outlined above: (i) total energy consumption and (ii) share of non-renewable energy consumption.

PAI 5 is calculated using four production and consumption data points (estimated or reported). PAI 5 is only identified as 'reported' if all four underlying data points are reported, (i) total consumption, (ii) total production, (iii) non-renewable energy consumption and (iv) non-renewable energy production.

PAI 6 estimates are calculated using data points estimated for PAI 5 (total energy consumption) and the company's revenues. PAI 6 is then defined as 'estimated' or 'reported' based on whether the total energy consumption value used for its calculation is estimated or reported.

Geographical exposure-based model (for PAI 12)

For PAI 12, MSCI ESG Research uses a country-specific estimation for companies that do not report unadjusted gender pay gap. A company's global footprint is evaluated using MSCI ESG Research asset geographical exposure data. Third-party gender pay gap data at the country level is applied from sources such as the European Union (EU), the International Labor Organization (ILO), and the Organization for Economic Cooperation and Development (OECD).[19]

An estimate is calculated for companies that do not report gender pay gap data. The following steps are used:

- The estimated value is calculated as a weighted average of a company's assets in each country combined with third party local gender pay gap data, delivering a global gender pay gap estimate for this company.
- Operations are excluded from this calculation for which either (i) third-party gender pay gap data for a given country or (ii) a company's geographical assets at the country level cannot be identified. The global estimate is then adjusted by using a rescaling method. See illustration in Exhibit 5.

For companies reporting gender pay gap for local operations only – e.g. as a result of jurisdictional requirements like in the UK, the reported data is provided and labelled as reported in the supporting KEY factor, even though the data may not be representative of the pay gap for global operations. A factor that distinguishes data reported for local operations from data reported for global operations is planned.

Exhibit 5. Example of calculation of gender pay gap estimate for an issuer

<table>
<tr><th>Geographical area</th><th>% of assets</th><th>Country gender pay gap (third party data)</th><th>% of assets adjusted</th><th>Estimated Gender pay gap</th></tr>
<tr><td>United States of America</td><td>13%</td><td>17%</td><td>15%</td><td rowspan="3">(17%*0.15 + 14%*0.85)
= 14%</td></tr>
<tr><td>United Kingdom</td><td>73%</td><td>14%</td><td>85%</td></tr>
<tr><td>Europe</td><td>14%</td><td>Not available</td><td>Excluded from calculation</td></tr>
</table>

Source: MSCI ESG Research.

Update cycle and coverage

The linear regression parameters used in the ISM are updated annually at the beginning of the calendar year. For all companies researched after that date that have not reported any data in the past five years, these parameters are used for the estimation. For example, a company researched in August 2024 for fiscal year 2023 that has not reported relevant data for the past five years would receive an estimate at the beginning of year 2024 using the linear regression method.

All estimates are calculated for the entire SFDR coverage universe for companies that have not reported data.

[19] MSCI ESG Research first sources EU data, where EU data is not available, sources ILO and OECD open-source and most recent data.

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