

MSCI SFDR Adverse Impact Metrics Methodology

MSCI ESG Research

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Introduction¹

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; the full list of indicators and underlying data points is shown in Exhibits 4 to 7. Appendix 1 provides methodology notes for mandatory and certain additional indicators. Appendix 2 outlines data aggregation formulas for portfolio- or fund-level SFDR reporting.

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

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.

proportion of data estimated, we have added a dedicated section to this 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. If adopted by the European Commission, this would lead to changes in disclosure requirements including specific PAIs.⁹

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.

Exhibit 1. SFDR Principal Adverse Sustainability Impact Indicators

Principal Adverse Impact Indicators (18)	
ENVIRONMENTAL	SOCIAL
Indicators Applicable to Corporate Issuers ¹⁰ (14)	
<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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)	
<ol style="list-style-type: none"> 15. GHG intensity 	<ol style="list-style-type: none"> 16. Investee countries subject to social violations
Indicators Applicable to Real Estate Assets (2)	
<ol style="list-style-type: none"> 17. Exposure to fossil fuels through real estate assets 18. Exposure to energy-inefficient real estate assets 	

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. We also typically refer to corporate issuers as *companies*.

Additional Indicators: Environmental (22) and Social (24) Choose at least one Environmental and one Social	
ENVIRONMENTAL	SOCIAL
Indicators Applicable to Corporate Issuers	
<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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
Indicators Applicable to Sovereigns and Supranationals	
<ol style="list-style-type: none"> 17. Share of bonds not certified as green under a future EU legal act setting up an EU Green Bond Standard 	<ol style="list-style-type: none"> 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
Indicators Applicable to Real Estate Assets	
<ol style="list-style-type: none"> 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 	

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 efforts 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.

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, 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 November 2023, 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 disclosures as of November 2023 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 disclosure^{12,13}

Climate and Other Environment-Related Indicators		
Theme	Indicator	Availability of Disclosure
Greenhouse gas emissions	1. GHG emissions	
	Scope 1 GHG emissions	54.4% (Scopes 1+2)
	Scope 2 GHG emissions	Reported and estimated (Scopes 1, 2, and 3): 93.9%
	Scope 3 GHG emissions	
	Total GHG emissions	

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 supnationals, 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 represent the percentage of MSCI ACWI IMI constituents flagged for exposure on this indicator. As of November 10, 2023.

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

	2. Carbon footprint	
	3. GHG intensity	
	4. Exposure to companies active in the fossil fuel sector	96.5%
	5. Share of non-renewable energy consumption and production	36.5%
	6. Energy consumption intensity per high impact climate sector	44.1%
Biodiversity	7. Activities negatively affecting biodiversity-sensitive areas	0.1% Estimated: 97.0%, based on MSCI ESG Controversies methodology
Water	8. Emissions to water	0.3%
Waste	9. Hazardous waste ratio	17.9%
Indicators for Social and Employee, Respect for Human Rights, Anti-Corruption and Anti-Bribery Matters		
Theme	Indicator	Availability of Disclosure
Social and employee matters	10. Violations of UN Global Compact principles and Organization for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises	0% Estimated: 96.6%, 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	17.3% Estimated based on UN Global Compact list of signatories
	12. Unadjusted gender pay gap	6.7%
	13. Board gender diversity	97.7%
	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 Disclosure
Environmental	15. GHG Intensity	95.7% Sourced from EDGAR. Nominal GDP level is sourced from World Development Indicators (WDI)
Social	16. Investee countries subject to social violations	0% Estimated: 98.1%, 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 disclosure^{14, 15}

Table 2: Additional climate and other environment-related indicators		
Theme	Indicator	Availability of Disclosure
Emissions	1. Emissions of inorganic pollutants	0.8%
	2. Emissions of air pollutants	0.7%
	3. Emissions of ozone-depleting substances	0.0%
	4. Investments in companies without carbon emission reduction initiatives	44.0%
Energy performance	5. Breakdown of energy consumption by type of non-renewable sources of energy	1.4% (Coal) 0.1% (Lignite) 8.4% (Natural gas) 0.4% (Oil & gas) 0.1% (Nuclear power) 28.9% (Other non-renewable sources)
Water, waste and material emissions	6. Water usage and recycling	3.1%
	7. Investments in companies without water management policies	38.4%
	8. Exposure to areas of high water stress	3.5%
	9. Investments in companies producing chemicals	0% Sourced from vendor: 100%
	10. Land degradation, desertification, soil sealing	2.2%
	11. Investments in companies without sustainable land/agriculture practices	22.6%
	12. Investments in companies without sustainable oceans/seas practices	8.0%
	13. Non-recycled waste ratio	12.2%
	14. Natural species and protected areas	5.2%
	15. Deforestation	3.0%
Table 3: Additional indicators for social and employee, respect for human rights, anti-corruption and anti-bribery matters		
Theme	Indicator	Availability of Disclosure
	1. Investment in investee companies without workplace accident prevention policies	71.9%

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 November 10, 2023.

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

Social and employee matters	2. Rate of accidents	19.0%
	3. Number of days lost to injuries, accidents, fatalities or illness	11.6%
	4. Lack of a supplier code of conduct	23.0%
	5. Lack of grievance/complaints handling mechanism related to employee matters	40.5%
	6. Insufficient whistleblower protection	81.4%
	7. Incidents of discrimination	0% Estimated: 98.0%, based on MSCI ESG Controversies methodology
	8. Excessive CEO pay ratio	55.0%
Human rights	9. Lack of a human rights policy	63.8%
	10. Lack of due diligence	35.7%
	11. Lack of processes and measures for preventing trafficking in human beings	35.6%
	12. Operations and suppliers at significant risk of incidents of child labor	6.4%
	13. Operations and suppliers at significant risk of forced or compulsory labor	6.1%
	14. Number of identified cases of severe human rights issues and incidents	0% Estimated: 98.0%, based on MSCI ESG Controversies methodology
Anti-corruption and anti-bribery	15. Lack of anti-corruption and anti-bribery policies	79.2%
	16. Cases of insufficient action taken to address breaches of standards of anti-corruption and anti-bribery	0.3%
	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: 84.3%
	19. Average freedom-of-expression score	0% Sourced from Freedom House: 86.2%
	20. Average human rights performance	0% Sourced from World Justice Project (WJP) Rule of Law Index: 69.5%
	21. Average corruption score	0% Sourced from Transparency International: 89.0%
	22. Non-cooperative tax jurisdiction	0%

		Sourced from EU List on non-cooperative tax jurisdictions: 98.1%
	23. Average political stability score	0% Sourced from Vision of Humanity; Worldwide Governance Indicators (WGI); World Bank: 100.0%
	24. Average rule of law score	0% Sourced from Worldwide Governance Indicators (WGI), World Bank: 98.1%

Source: MSCI ESG Research.

Exhibit 17 outlines **data aggregation** formulas for portfolio- or fund-level SFDR reporting using MSCI SFDR Adverse Impact Metrics.

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 norms¹⁶). 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’.

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.

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.

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 Solutions 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 our research findings. 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 robust and transparent communication with all issuers in the coverage universe. This commitment includes:

- Proactively reaching out to companies as part of MSCI ESG Research's standardized and systematic 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 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 Solutions, 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 sources/analysts from the same or comparable sources.

For **derived data** that are sourced from MSCI ESG Research proprietary datasets, the process involves context-specific validation including individual factors, simple transformations, and forecast models.

For **output data**, including ratings and analytics, the process involves validation at the issuer- and security-level.

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 research and content experts across MSCI ESG Research.

MSCI SFDR Adverse Impact Metrics

Based on MSCI ESG Research’s interpretation of the description of the adverse sustainability impact indicators in SFDR RTS, the following issuer-level data points are provided. **Highlighted in bold** are those data points that correspond to the PAI required by the regulation. The MSCI SFDR Adverse Impact Metrics dataset and mapping to relevant PAIs are described in detail below. Some metrics are sourced from existing MSCI ESG datasets. The MSCI SFDR Adverse Impact Metrics Indicator Mapping Excel file supports this methodology by illustrating how MSCI ESG & Climate data points may identify indicators associated with SFDR’s Principle Adverse Impact Indicators (PAIs).

Mandatory adverse impact indicators

Exhibit 4. Mandatory environmental and social principal adverse impact indicators

Environmental				
Relevant SFDR Adverse Impact Indicator	Short Name (bold = PAI)	Factor Name	Output	Factor Description
Greenhouse gas emissions: 1. GHG emissions 2. Carbon footprint 3. GHG intensity of investee companies	CARBON_EMISSIONS_SCOPE_1	Carbon Emissions – Scope 1 (metric tons)	Numeric value (tCO2e)	This figure represents the company’s most recently reported or estimated Scope 1 greenhouse gas emissions (if available). Scope 1 emissions are those from sources owned or controlled by the company, typically direct combustion of fuel as in a furnace or vehicle.
	CARBON_EMISSIONS_SCOPE_1_KEY	Carbon Emissions - Scope 1 KEY	Reported, Estimated	This field indicates whether the Scope 1 emissions figure was reported by the company or estimated. See the Carbon Estimation Methodology for details.
	CARBON_EMISSIONS_SCOPE_2	Carbon Emissions - Scope 2 (metric tons)	Numeric value (tCO2e)	This figure represents the company’s most recently reported or estimated Scope 2 greenhouse gas emissions (if available). Scope 2 emissions are those caused by the generation of electricity purchased by the company.
	CARBON_EMISSIONS_SCOPE_2_KEY	Carbon Emissions - Scope 2 KEY	Reported, Estimated	This field indicates whether the Scope 2 emissions figure was reported by the company or estimated. See the Carbon Estimation Methodology for details.
	CARBON_EMISSIONS_SCOPE_3_TOTAL	Scope 3 - Total Emissions Estimated	Numeric value (tCO2e)	Estimated Scope 3 emissions (total) as defined by the Greenhouse Gas Protocol [tCO2e/yr].

	CARBON_EMISSIONS_SCOPE123	Total GHG Emissions (Scopes 1, 2 and 3)	Numeric value (tCO2e)	This factor indicates the most recent aggregate GHG emissions of the company based on reported or estimated Scopes 1 and 2, and estimated Scope 3 emissions.
	CARBON_EMISSIONS_EVIC_EUR_SCOPE123_INTEN	Total GHG Emissions Intensity per EUR million EVIC (t/EUR million EVIC)	Numeric value (tCO2e/ EUR million EVIC)	This factor indicates the most recent aggregate GHG emissions of the company (Scopes 1 and 2, and estimated Scope 3 emissions) relative to its most recent Enterprise Value, including cash (EVIC) in million Euro.
	CARBON_EMISSIONS_SALES_EUR_SCOPE123_INTEN	Total GHG Emissions Intensity per EUR million Sales (t/EUR million sales)	Numeric value (tCO2e/ EUR million sales)	This factor indicates the most recent aggregate GHG emissions of the company (Scopes 1 and 2, and estimated Scope 3 emissions) relative to its most recent Sales in million Euro.
4. Exposure to companies active in the fossil fuel sector	ACTIVE_FF_SECTOR_EXPOSURE	Active Fossil Fuel Sector Exposure	Yes, Not Disclosed	Company's exposure to fossil fuel-related activities, including exploration, extraction, mining, storage, distribution and trading of oil and gas, production and distribution of thermal coal, and production, distribution, storage, and reserves of metallurgical coal.
5. Share of non-renewable energy consumption and production	PCT_NONRENEW_CONSUMP_PROD	Percentage of non-renewable energy consumption and production	Numeric value (ratio %)	The company's energy consumption and/or production from non-renewable sources as a percentage of total energy use and/or generation.
	PCT_TOTL_ERGY_CONSUMP_NONRENEW	Percentage of Total Energy Consumption from Non-renewable Sources	Numeric value (ratio %)	The company's energy consumption from non-renewable sources as a percentage of total energy use and/or generation.
	PCT_TOTL_ERGY_PRODUCTION_NONRENEW	Percentage of Total Energy Production from Non-renewable Sources	Numeric value (ratio %)	The company's energy production from non-renewable sources as a percentage of total energy use and/or generation.
	TOTL_ERGY_CONSUMPTION_GWH	Total energy consumption (GWh)	Numeric value (GWh)	Total energy consumption (GWh)
	TOTL_ERGY_CONSUMPTION_NONRENEW_GWH	Total energy consumption from non-renewable Sources (GWh)	Numeric value (GWh)	Total energy consumption from non-renewable sources (GWh)
	TOTL_ERGY_CONSUMPTION_RENEWABLE_GWH	Total energy consumption from renewable sources (GWh)	Numeric value (GWh)	Total energy consumption from renewable sources (GWh)
6. Energy consumption in GWh per million EUR of revenue of investee companies, per high-impact climate sector	NACE_SECTION_CODE	NACE Section Code for the activity with highest revenues	Letter code	This indicates the Nomenclature of Economic Activities (NACE) Section Code for the activity with the highest reported or estimated revenue for the latest available year. The NACE Section Code refers to a Level 1 economic activity code identified by alphabetical letters A to U established by the European Union.

	NACE_SECTION_DESCRIPTION	NACE Section Description of activity with highest revenues	Text	This indicates the Nomenclature of Economic Activities (NACE) Section Description of the activity with the highest reported or estimated revenue for the latest available year. The NACE Section Description refers to the description of the Level 1 economic activity description identified by alphabetical letters A to U, established by the European Union.
	ENERGY_CONSUMPTION_INTENSITY_EUR	Energy consumption intensity (GWh / EUR million sales)	Numeric value (GWh/EUR million)	Energy consumption (GWh) per million EUR revenue
	ENERGY_CONSUMPTION_INTENSITY_USD	Energy consumption intensity (GWh / USD million sales)	Numeric value (GWh/USD million)	Energy consumption (GWh) per million USD revenue
7. Activities negatively affecting biodiversity-sensitive areas	OPS_PROT_BIODIVERSITY_CONTROVERSIES	Company has operations located in biodiversity-sensitive areas and is involved in controversies with severe impact on the environment	Yes, Not Disclosed	Company reports having operations in or near to biodiversity-sensitive areas and has been implicated in controversies with severe or very severe adverse impact on the environment.
	OPS_PROT_BIODIVERSITY_AREAS	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	Yes, Not Disclosed	Company has operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas.
	ENVIRONMENT_LAND_FLAG	Environment – Land Use and Biodiversity Flag	Flag: Green, Yellow, Orange, Red	This indicator measures the severity of controversies related to a firm's use or management of natural resources. Factors affecting this evaluation include, but are not limited to, a history of involvement in natural resource-related legal cases, involvement in environmental impact-related legal cases, widespread or egregious impacts due to the firm's use of natural resources, impacts due to direct or indirect use of the firm's products or services, resistance to improved practices, and criticism by NGOs and/or other third-party observers.
8. Emissions to water	WATER_EMISSION_EFFECT_METRIC_TONS	Water Emissions (metric tons)	Numeric value (metric tons)	Company's direct emissions (in metric tons) of priority substances and pollutants discharged into bodies of water as a result of the company's operations.
9. Hazardous waste ratio	HAZARD_WASTE_METRIC_TON	Hazardous Waste (metric tons)	Numeric value (metric tons)	Total hazardous waste (metric tons).

Note: Carbon Emissions Scopes 1 and 2 indicators include both company-reported values and estimates, where company-reported data is not available. The estimation keys indicate which values were company-reported or estimated based on the MSCI Climate Change Metrics methodology. Carbon-related metrics are available through the MSCI Climate Change Metrics dataset.

SOCIAL				
Relevant SFDR Adverse Impact Indicator	Short Name (bold = PAI)	Factor Name	Output	Factor Description
10. Violations of UN Global Compact principles and Organisation for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises	OECD_ALIGNMENT	OECD Alignment	Fail, Watch List, or Pass	This factor indicates an assessment on whether the company is aligned with the Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises based on MSCI ESG Research methodology. The possible values are Fail, Watch List, or Pass. See the MSCI ESG Controversies and Global Norms methodology document for detailed explanations.
	LABOR_COMPLIAN CE_BROAD	Labor Compliance - Broad	Fail, Watch List, or Pass	This factor indicates an assessment on whether the company is aligned with the International Labour Organization's (ILO) broader set of labor standards based on MSCI ESG Research methodology. The possible values are Fail, Watch List, or Pass. See the MSCI ESG Controversies and Global Norms methodology document for detailed explanations.
	OVERALL_FLAG	Company Summary - Overall Flag	Flag: Green, Yellow, Orange, Red	The overall company assessment signals whether a company has a notable controversy related to a company's operations and/or products, and the severity of the social or environmental impact of the controversy.
11. Lack of processes and compliance mechanisms to monitor compliance with UN Global Compact principles and OECD Guidelines for Multinational Enterprises	LABOR_DDIL_POL_I LO	Labor Due Diligence Policy (ILO)**	Yes, Not Disclosed	Company has a due diligence policy on labor issues addressed by the fundamental International Labor Organisation (ILO) Conventions 1 to 8.
	MECH_UN_GLOBAL _COMPACT	Mechanism to monitor compliance with UN Global Compact	Yes, No Evidence	The company is a signatory to the UN Global Compact and is required to monitor and report compliance with the UN Global Compact principles.
12. Unadjusted gender pay gap	GENDER_PAY_GAP_ RATIO	Gender pay gap ratio	Numeric value (ratio %)	The difference between the average gross hourly earnings of male and female employees as a percentage of male gross earnings. Note that reporting on this metric is inconsistent: some companies report on the absolute or uncontrolled pay gap while others control for compensable factors such as role or location.
13. Board gender diversity	FM_BOARD_RATIO	Board gender diversity – female to male ratio (%) – INACTIVE FACTOR ***	Numeric value (ratio %)	Ratio of female to male board members
	FEMALE_DIRECTOR S_PCT	Female Directors Percentage	Numeric value (ratio %)	The percentage of board members who are female. For companies with a two-tier board, the calculation is based on members of the Supervisory Board only.

14. Exposure to controversial weapons (anti-personnel mines, cluster munitions, chemical weapons and biological weapons)	CONTRO_WEAP_CB LMBW_ANYTIE	Exposure to controversial weapons (landmines, cluster munitions, chemical weapons and biological weapons)	Yes, No	Company has a tie to landmines, cluster munitions, chemical weapons or biological weapons. Note: industry tie includes ownership, manufacture or investment. Landmines do not include related safety products.
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* "Company Summary – Overall Flag" is available through the MSCI ESG Controversies dataset.

** Earlier iterations of the SFDR RTS referenced ILO principles for this metric. The final SFDR RTS expanded the reference beyond labor conventions to the UN Global Compact and OECD Guidelines. We have retained the "Labor Due Diligence Policy (ILO)" indicator for transitional use but we may discontinue this factor in the future.

***Earlier iterations of the SFDR RTS included a requirement to report a ratio of female directors to male directors. On April 6, 2022, the European Commission implemented the SFDR Delegated Regulation integrating the RTS developed by the European Supervisory Authorities that included a change in reporting requirements for the Board Diversity metric, replacing a ratio of female directors to male directors with a percentage of female directors of total directorship positions. We have retained the "Board gender diversity – female-to-male ratio (%)" indicator for transitional use. However, the factor is set to inactive and no longer updated. We may discontinue this indicator in the future.

Indicators Applicable to Sovereigns and Supranationals				
15. GHG Intensity	CTRY_GHG_INTEN_GDP_EUR	Country GHG intensity	Numeric value (t/EUR million)	Tons of CO2e emissions per EUR million GDP of the country. National territorial emissions are sourced from EDGAR. Nominal GDP level is sourced from WDI. Currency conversion of Nominal GDP to euros uses the average annual nominal exchange rate level.
16. Investee countries subject to social violations	GOVERNMENT_EU_SANCTIONS	European Union (EU) Sanctions	Yes, No	Countries alleged to be involved in human rights violations and abuses can be subject to EU sanctions. Restrictive measures imposed by the EU may target governments of third countries, or non-state entities and individuals. Sanctions may consist of asset freezes, travel bans, economic and financial measures or arms embargoes, among other measures. Data source: European External Action Service

Source: MSCI ESG Research.

Additional adverse impact indicators – environmental

Exhibit 5. Additional climate and other environment-related adverse impact indicators

Relevant SFDR Adverse Impact Indicator	Short Name (bold = PAI)	Factor Name	Output	Factor Description
1. Emissions of inorganic pollutants	EMISSIONS_INORGANIC_POLUTANTS_VALUE	Emissions of Inorganic Pollutants	Numeric value (metric tons)	Aggregate amount of discharged inorganic pollutants (metric tons) as reported by the company.
2. Emissions of air pollutants	EMISSIONS_AIR_POLUTANTS_VALUE	Emissions of Air Pollutants	Numeric value (metric tons)	Aggregate amount of air pollutants (metric tons) as reported by the company.
3. Emissions of ozone-depleting substances	EMISSIONS_OZONE_DEPLETION_SUBS_VALUE	Emissions of Ozone Depletion Substances	Numeric value (metric tons)	Aggregate amount of discharged ozone depletion substances (metric tons) as reported by the company.
4. Investments in companies without carbon-emissions-reduction initiatives	CARBON_REDUCTION_INITIATIVES_PA	Company's carbon emission reduction initiatives aimed at aligning with the Paris Agreement (Yes, No)	Yes, No	This factor indicates whether the company's Implied Temperature Rise (in the year 2100 or later) is estimated to be at or below 2 degrees, if the whole economy had the same over-/undershoot level of greenhouse gas emissions to the company analyzed. The Implied Temperature Rise is based on the company's Scopes 1, 2 and 3 projected emissions.
	CARBON_EMISSIONS_REDUCTION_INITIATIVES	Carbon Emissions Reduction Initiatives	Yes, Not Disclosed	Company has a carbon emissions reduction target.
5. Breakdown of energy consumption by type of non-renewable sources of energy	COAL_CON_GWH	Energy consumption from coal (GWh)	Numeric value (GWh)	Energy consumption from coal (GWh)
	LIGNITE_CON_GWH	Energy consumption from lignite (GWh)	Numeric value (GWh)	Energy consumption from lignite (GWh)
	NGAS_CON_GWH	Energy consumption from natural gas (GWh)	Numeric value (GWh)	Energy consumption from natural gas (GWh)
	OG_CONSUMP_GWH	Energy consumption from oil & gas (GWh)	Numeric value (GWh)	Energy consumption from oil & gas (GWh)
	NUCLEAR_CON_GWH	Energy consumption from nuclear power (GWh)	Numeric value (GWh)	Energy consumption from nuclear power (GWh)
	FFUEL_CON_GWH	Energy consumption from fossil fuels (GWh)	Numeric value (GWh)	Energy consumption from fossil fuel (GWh)
	OTHER_NRENEW_CON_GWH	Energy consumption from other non-renewable sources (GWh)	Numeric value (GWh)	Energy consumption from other non-renewable sources (GWh)
6. Water usage and recycling	TOTL_WATER_CONSUMPTION_VALUE	Total Consumption of Water (m³)	Numeric value (m³)	Company-disclosed total amount of water consumed, including reclaimed, water in cubic meters (m³).

	WATER_CONSUMP_INTEN_EUR	Water Consumption Intensity (m ³ /EUR million sales)	Numeric value (m ³ /EUR million)	The water consumption intensity normalized by revenue (cubic meters/EUR million sales).
	RECLM_WATER_VALUE	Reclaimed Water (m ³)	Numeric value (m ³)	Company-reported amount of reclaimed (reused) water in cubic meters (m ³).
	RECLM_WATER_INTENS_VALUE	Reclaimed Water Intensity (m ³ /EUR million sales) – INACTIVE FACTOR*	Numeric value (m ³ /EUR million)	Company-reported amount of reclaimed (reused) water in cubic meters (m ³) relative to sales (in EUR million).
	PCT_RECLM_WATER_TO_TAL_CONSUMP	Percentage of Reclaimed Water Relative to Total Water Consumed	Numeric value (ratio %)	Percentage of water reclaimed relative to total water consumption as reported by the company.
7. Investments in companies without water management policies	WATER_MGT_POL_VALUE	Water Management Policies and Practices	Yes, Not Disclosed	Evidence of water management policies and practice as reported by the company.
8. Exposure to areas of high water stress	HIGH_EXTREME_WTR_STRESS	Exposure to areas of high or extremely high water stress	Yes, Not Disclosed	Company's operations are exposed to areas where the percentage of total water withdrawn is high or extremely high based on the World Resources Institute's (WRI) – Aqueduct Water Risk Framework tool.
	EXPOSURE_WATER_STRESS_NO_POL_VALUE	Exposure to Areas of High Water Stress and Lack of Water Management Policy	Yes, No, Not Disclosed	Company discloses operations in areas of high water stress but lacks water management policies.
9. Investments in companies producing chemicals	NACE_GROUP_CODE	NACE Group Code for the activity with highest revenues	Numeric value (code)	This indicates the Nomenclature of Economic Activities (NACE) Group Code of the activity with the highest reported or estimated revenue for the latest available year. The NACE Group Code refers to the Level 3 economic activity identified by three-digit numerical codes established by the European Union.
	NACE_GROUP_DESCRIPTION	NACE Group Description of activities with highest revenues	Text	This indicates the Nomenclature of Economic Activities (NACE) Group Description of the activity with the highest reported or estimated revenue for the latest available year. The NACE Group Description refers to the description of Level 3 economic activity identified by three-digit numerical codes established by the European Union.
10. Land degradation, desertification, soil sealing	LAND_DEGRADE_ACTIV_REPRT_VALUE	Reported Involvement in Activities Which Cause Land Degradation, Desertification, or Soil Sealing	Yes, No Not Disclosed	Company discloses involvement in activities, which cause land degradation, desertification, or soil sealing.
11. Investments in companies without	SUST_AGRI_POL_PRACT_VALUE	Company Reports Having Sustainable Land Management Policies and Practices	Yes, Not Disclosed	Company discloses information related to its policies or practices towards sustainable agriculture or management of land.

sustainable land/agriculture practices				
12. Investments in companies without sustainable oceans/seas practices	SUST_SEAS_POL_PRACT_VALUE	Company Reports Having Sustainable Ocean Policies and Practices	Yes, Not Disclosed	Company discloses information related to its policies or practices towards sustainable management of ocean resources.
13. Non-recycled waste ratio	NONRECYL_WASTE	Non-Recycled Waste (metric tons)	Numeric value (metric tons)	Total non-recycled waste (metric tons)
14. Natural species and protected areas	OPS_IUCN_NSPECIES	Operations affect IUCN Red List species and/or national conservation list species	Yes, Not Disclosed	Company's operations affect IUCN Red List species and/or national conservation list species.
	SUST_BIODIV_PROTECT_POL_VALUE	Company Reports Having Biodiversity Protection Policy	Yes, Not Disclosed	Company discloses having a biodiversity protection policy.
	OPS_PROT_BIODIV_AREAS_POL_VALUE	Company Operates Near Protected Areas and has no Biodiversity Protection Policy	Yes, No, Not Disclosed	Company operates near protected areas and does not have 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.
15. Deforestation	DEFOREST_POL	Deforestation Policy	Yes, Not Disclosed	Company has a deforestation policy.
<i>*Earlier iterations of the SFDR RTS included a requirement to report "water consumed and reclaimed" but the final SFDR RTS only included "water consumed." We have retained the "Reclaimed Water Intensity" indicator for transitional use. However, the factor is set to inactive and no longer updated. We may discontinue this indicator in the future.</i>				

Source: MSCI ESG Research.

Additional adverse impact indicators - social

Exhibit 6. Social and employee, human rights, and anti-corruption & anti-bribery adverse impact indicators

Relevant SFDR Adverse Impact Indicator	Short Name (bold = PAI)	Factor Name	Output	Factor Description
1. Investments in companies without workplace accident prevention policies	WORKPLACE_ACC_PR EV_POL	Workplace accident prevention policy	Yes, Not Disclosed	Company has a health & safety/workplace accident prevention policy that applies to all direct operations, including subsidiaries.
2. Rate of accidents	TRIR	Total Recordable Incident Rate	Numeric value (rate per million hours)	Total recordable incident rate (TRIR) per million hours worked. The TRIR includes fatalities, lost time injuries, restricted work injuries and medical treatment injuries.
3. Number of days lost to injuries, accidents, fatalities or illness	TOT_WRKDAY_LOST_ VALUE	Workdays Lost Due to Workplace Accidents or Illness	Numeric value (days)	Total number of lost workdays due to injuries, accidents, fatalities or illness.
4. Lack of a supplier code of conduct	SUPPLIER_CODE_KEY _PROVISIONS_VALUE	Supplier Code Covers Key Labor Provisions	Yes, Not Disclosed	Company's supplier code of conduct includes commitments to eradicate unsafe working conditions, precarious work, child labor and forced labor.
5. Lack of grievance/complaints handling mechanism related to employee matters	GRIEV_COMPLAIN_PR OCEDURE_VALUE	Grievances or Complaints-handling Mechanisms Related to Employee Matters	Yes, Not Disclosed	Company discloses information indicating availability of grievance and complaint-handling procedures.
6. Insufficient whistleblower protection	WHISTLEBLOWER_PR OTECT_POLICY	Whistleblower protection policy	Yes, Not Disclosed	Company has a whistleblower protection policy.
7. Incidents of discrimination	CONTR_DISCRIMINAT ION_DIV_N_SEVERE	Number of Severe and Very Severe Discrimination and Diversity Controversies*	Numeric value (count)	Number of Severe and Very Severe Controversy cases in the last three years related to: Employee discrimination and workforce diversity issues.
8. Excessive CEO pay ratio	CEO_EMP_PAY_RATI O_RECENT	CEO-to-employee pay ratio	Numeric value (ratio)	Provides the ratio of CEO pay to average employee pay.
Human rights: 9. Lack of human rights policy	HUMAN_RGTS_POL	Human rights policy	Yes, Not Disclosed	Company has a human rights policy.

10. Lack of due diligence	HUMAN_RGTS_DD	Human rights due diligence	Yes, Not Disclosed	Company has defined processes, set targets or reports achievements for monitoring the effectiveness of its human rights policy.
11. Lack of processes and measures for preventing trafficking in human beings	HUM_TRAFK_POL	Policy against trafficking in human beings	Yes, Not Disclosed	Company has a policy against trafficking in human beings.
12. Operations and suppliers at significant risk of incidents of child labor	OPS_SRISK_CHILD_LABOR	Operations at significant risk of child labor	Yes, Not Disclosed	Company's operations and suppliers are at significant risk of child labor incidents involving hazardous work based on geographic location or type of operation.
13. Operations and suppliers at significant risk of incidents of forced or compulsory labor	OPS_SRISK_FORCED_LABOR	Operations at significant risk of forced or compulsory labor	Yes, Not Disclosed	Company's operations and suppliers are at significant risk of forced or compulsory labor incidents based on geographic location or type of operation.
14. Number of identified cases of severe human rights issues and incidents	CONTR_HUMAN_RIGHTS_N_SEVERE	Number of Severe and Very Severe Human Rights Concerns Controversies*	Numeric value (count)	Number of Severe and Very Severe Controversy cases in the last three years related to: Human rights violations issues.
Anti-corruption and anti-bribery: 15. Lack of anti-corruption and anti-bribery policies	CORR_BRIB_POLICY_UN	Policy on anti-corruption and anti-bribery (UN Convention against Corruption)	Yes, Not Disclosed	Company has an anti-corruption and anti-bribery policy consistent with the United Nations Convention against Corruption.
16. Cases of insufficient action taken to address breaches of procedures and standards of anti-corruption and anti-bribery	BREACHES_CORRBRI B	Breaches in procedures and standards of anti-corruption and anti-bribery	Yes, Not Disclosed	Company has disclosed evidence of insufficient actions taken to address anti-corruption and/or anti-bribery policy or procedure violations.
17. Number of convictions and amount of fines for violation of anti-corruption and anti-bribery laws	CORR_BRIB_CONVICT IONS	Total number of convictions for violations of anti-corruption and anti-bribery laws	Numeric value (count)	Total number of convictions against company for violation of anti-corruption and anti-bribery laws
	CORR_BRIB_FINES	Total amount of fines for violation of anti-corruption and anti-bribery laws	Numeric value (USD)	Sum of fines company for convictions relating to violation of anti-corruption and anti-bribery laws.

*"Number of Severe and Very Severe Discrimination and Diversity Controversies" and "Number of Severe and Very Severe Human Rights Concerns Controversies" metrics are available through the MSCI ESG Controversies dataset.

Source: MSCI ESG Research.

Additional adverse impact indicators - applicable to sovereigns and supranationals

Exhibit 7. Social and governance adverse impact indicators for sovereigns and supranationals

Relevant SFDR Adverse Impact Indicator	Short Name (bold = PAI)	Factor Name	Output	Factor Description
18. Average income inequality score	GOVERNMENT_RAW_GINI	GINI Index	Numeric value (score)	Measures the equality of income distribution within the population. Ranges from 0 (perfect equality) to 100 (perfect inequality). (Source: CIA, WDI)
19. Average freedom-of-expression score	GOVERNMENT_RAW_PRESS_FREED	World Press Freedom Index score	Numeric value (score)	Press freedom is defined as the ability of journalists as individuals and collectives to select, produce, and disseminate news in the public interest independent of political, economic, legal, and social interference and in the absence of threats to their physical and mental safety. The World Press Freedom Index compares the level of press freedom in 180 countries and territories and those countries with higher scores have higher levels of press freedom. Data source: Reporters Without Borders
20. Average human rights score	GOVERNMENT_FUNDAMENTAL_RIGHTS	WJP Rule of Law Index, Fundamental Rights Sub-score	Numeric value (score)	This indicator is the “Fundamental Rights” sub-score from the World Justice Project (WJP) Rule of Law Index. The sub-score measures a country’s performance on human rights issues, as per Factor 4 of the WJP Rule of Law Index. Scores can range from 0-1.0, and higher values denote stronger national performance across a broad range of human rights issues. Countries not covered will not have a value populated for this indicator. Values are updated annually via the World Justice Project with no analytical inputs from MSCI ESG Research. Data source: World Justice Project (WJP) Rule of Law Index®.
21. Average corruption score	GOVERNMENT_RAW_CORR_PERC_INDEX	Corruption perception index	Numeric value (score)	It measures the degree to which public sector corruption is perceived to exist in different countries around the world. Data source: Transparency International. Countries with lower score are perceived to be more corrupt.

22. Non-cooperative tax jurisdiction	NON_COOP_TAX_JURIS	Non-cooperative tax jurisdiction	Yes, No	Indicates that the jurisdiction is on the EU list of non-cooperative jurisdictions for tax purposes.
23. Average political stability score	GOVERNMENT_STABILITY_PEACE_SCORE	Stability & Peace Score	Numeric value (score)	Assesses the level of stability and peace in a region. This sub-factor is assessed using two data points: (1) political stability and absence of violence/ terrorism, which captures the perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism; and 2) global peace index, which measures the relative position of nations' and regions' peacefulness by gauging ongoing domestic and international conflict, safety and security in society, and militarization in different regions. Regions with high political instability and violence and conflict score poorly. (Score: 0-10).
24. Average rule-of-law score	GOVERNMENT_RAW_RULE_OF_LAW	Rule of law	Numeric value (score)	Capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Data source: Worldwide Governance Indicators (WGI). Countries with higher score demonstrate better rule of law.

Source: MSCI ESG Research.

Supplemental metadata – years and sources of the data used in SFDR adverse impact metrics

In addition to the MSCI SFDR Adverse Impact Metrics, MSCI ESG Research provides a sub-set of supplemental metadata indicating sources and dates of the input data for relevant SFDR Metric where such metadata is not part of the existing dataset.

Exhibit 8. Supplemental metadata for adverse impact indicators – sources and dates

Relevant SFDR Adverse Impact Indicator	Short Name	Factor Name	Output	Factor Description
Greenhouse gas emissions: 1. GHG emissions 2. Carbon footprint 3. GHG intensity of investee companies	CARBON_EMISSIONS_YEAR	Carbon Emissions - Year	Year	This field indicates the most recent fiscal year available for estimated or reported Scope 1, Scope 2, Scope 1+2 and reported Scope 3.
	CARBON_EMISSIONS_SOURCE	Carbon Emissions - Source	Text	Source of carbon emission data when reported.
	CARBON_EMISSIONS_SCOPE_3_ESTIMATES_YEAR	Carbon Emissions – Scope 3 Year	Year	This is the fiscal year for the revenue used in the Scope 3 emissions estimates. The Scope 3 estimate computation uses the most recent inputs available to MSCI ESG Research. Due to data availability constraints, not all input data are aligned to the same fiscal year.
4. Exposure to companies active in the fossil fuel sector	ACTIVE_FF_SECTOR_EXPOSURE_SOURCE	Active Fossil Fuel Sector Exposure - Source	Text	Source of data used in the metric "Active Fossil Fuel Sector Exposure."
	ACTIVE_FF_SECTOR_EXPOSURE_YEAR	Active Fossil Fuel Sector Exposure - Year	Year	Most recent fiscal year for data used in the metric "Active Fossil Fuel Sector Exposure"
	TOTL_ERGY_CONSUMP_NONRENEW_GWH_SOURCE	Total energy consumption from non-renewable sources (GWh) - Source	Text	Source of data used in the metric "Total energy consumption from non-renewable sources (GWh)"
	TOTL_ERGY_CONSUMP_GWH_SOURCE	Total energy consumption (GWh) - Source	Text	Source of data used in the metric "Total energy consumption (GWh)"
6. Energy consumption in GWh per million EUR of revenue of investee companies, per high-impact climate sector	ENERGY_CONSUMP_INTEN_YEAR	Energy consumption intensity (GWh / EUR million sales) - Year	Year	This figure represents the most recent fiscal year for the data used in the metric "Energy consumption intensity (GWh/EUR million sales)."
8. Emissions to water	WATER_EM_EFF_METRIC_TONS_YEAR	Water Emissions (metric tons) - Year	Year	This figure represents the most recent fiscal year for the data used in the metric "Water Emissions (metric tons)."
9. Hazardous waste ratio	HAZARD_WASTE_METRIC_TON_YEAR	Hazardous Waste (metric tons) - Year	Year	This figure represents the most recent fiscal year for the data used in the metric "Hazardous Waste (metric tons)."

12. Unadjusted gender pay gap	GENDER_PAY_GAP_YEAR	Gender pay gap ratio - Year	Year	This figure represents the most recent fiscal year for data used in the metric "Gender pay gap ratio."
	GENDER_PAY_GAP_RATIO_SOURCE	Gender pay gap ratio - Source	Text	Source of data used in the metric "Gender pay gap ratio."
13. Board gender diversity	FM_BOARD_RATIO_YEAR	Board gender diversity – female-to-male ratio (%) - Year	Year	This figure represents the most recent fiscal year for the data used in the metric "Board gender diversity."
	FM_BOARD_RATIO_SOURCE	Board gender diversity - female to male ratio (%) - Source	Text	Source of data used in the metric "Board gender diversity."
14. Exposure to controversial weapons (anti-personnel mines, cluster munitions, chemical weapons and biological weapons)	CONTRO_WEAP_CBLMBW_ANYTIE_SOURCE	Exposure to controversial weapons (landmines, cluster munitions, chemical weapons and biological weapons) - Source	Text	Source of data used in the metric "Exposure to controversial weapons (landmines, cluster munitions, chemical weapons and biological weapons)."

Source: MSCI ESG Research.

Exhibit 9. Supplemental metadata for additional adverse impact indicators – sources and dates

ENVIRONMENTAL Relevant SFDR Adverse Impact Indicator	Short Name	Factor Name	Output	Factor Description
1. Emissions of inorganic pollutants	EMISSIONS_INORGANIC_POLUTANTS_SOURCE	Emissions of Inorganic Pollutants - Source	Text	Source of data used in the metric "Emissions of Inorganic Pollutants."
	EMISSIONS_INORGANIC_POLUTANTS_YEAR	Emissions of Inorganic Pollutants - Year	Year	Fiscal year for the data used in the metric "Emissions of Inorganic Pollutants."
2. Emissions of air pollutants	EMISSIONS_AIR_POLLUTANTS_SOURCE	Emissions of Air Pollutants - Source	Text	Source of data used in the metric "Emissions of Air Pollutants."
	EMISSIONS_AIR_POLLUTANTS_YEAR	Emissions of Air Pollutants - Year	Year	Fiscal year for the data used in the metric "Emissions of Air Pollutants."
3. Emissions of ozone-depleting substances	EMISSIONS_OZONE_DEPLETION_SUBS_SOURCE	Emissions of Ozone Depletion Substances - Source	Text	Source of data used in the metric "Emissions of Ozone Depletion Substances."
	EMISSIONS_OZONE_DEPLETION_SUBS_YEAR	Emissions of Ozone Depletion Substances - Year	Year	Fiscal year for the data used in the metric "Emissions of Ozone Depletion Substances."
4. Investments in companies without carbon-emissions-reduction initiatives	CARBON_EMISSIONS_REDUCTION_INITIATIVES_SOURCE	Carbon Emissions Reduction Initiatives - Source	Text	Source of data used in the metric "Carbon Emissions Reduction Initiatives."
6. Water usage and recycling	TOTAL_WATER_CONSUMPTION_YEAR	Total Water Consumption (m³) - Year	Year	Fiscal year for the data used in the metric "Total Consumption of Water (m³)."
	TOTAL_WATER_CONSUMPTION_SOURCE	Total Water Consumption – Source	Text	Source of data used in the metric "Total Consumption of Water (m³)."
	RECLAIMED_WATER_INTENSITY_SOURCE	Reclaimed Water Intensity (m³/EUR million sales) – Source – INACTIVE FACTOR*	Text	Source of data used in the metric "Reclaimed Water Intensity (m³/EUR million sales)."
7. Investments in companies without water management policies	WATER_MGT_POL_YEAR	Water Management Policies and Practices - Year	Year	Fiscal year for the data used in the metric "Water Management Policies and Practices."
	WATER_MGT_POL_SOURCE	Water Management Policies and Practices - Source	Text	Source of data used in the metric "Water Management Policies and Practices."
8. Exposure to areas of high water stress	HIGH_EXTREME_WATER_STRESS_SOURCE	Exposure to areas of high or extremely high water stress - Source	Text	Source of data used in the metric "Exposure to areas of high or extremely high water stress."
	EXPOSURE_WATER_STRESS_YEAR	Exposure to areas of high or extremely high water stress - Year	Year	Fiscal year for the data used in the metric "Exposure to areas of high or extremely high water stress."

	EXPOSURE_WATER_STRESS_NO_POL_SOURCE	Exposure to Areas of High Water Stress and Lack of Water Management Policy - Source	Text	Source of data used in the metric "Exposure to Areas of High Water Stress and Lack of Water Management Policy."
10. Land degradation, desertification, soil sealing	LAND_DEGRADE_ACTIV_R EPRT_SOURCE	Reported Involvement in Activities Which Cause Land Degradation, Desertification, or Soil Sealing - Source	Text	Source of data used in the metric "Reported Involvement in Activities Which Cause Land Degradation, Desertification, or Soil Sealing."
	LAND_DEGRADE_ACTIV_R EPRT_YEAR	Reported Involvement in Activities Which Cause Land Degradation, Desertification, or Soil Sealing - Year	Year	Fiscal year for the data used in the metric "Reported Involvement in Activities Which Cause Land Degradation, Desertification, or Soil Sealing."
11. Investments in companies without sustainable land/agriculture practices	SUST_AGRI_POL_PRACT_SOURCE	Company Reports Having Sustainable Land Management Policies and Practices - Source	Text	Source of data used in the metric "Company Reports Having Sustainable Land Management Policies and Practices."
	SUST_AGRI_POL_PRACT_YEAR	Company Reports Having Sustainable Land Management Policies and Practices - Year	Year	Fiscal year for the data used in the metric "Company Reports Having Sustainable Land Management Policies and Practices."
12. Investments in companies without sustainable oceans/seas practices	SUST_SEAS_POL_PRACT_SOURCE	Company Reports Having Sustainable Ocean Policies and Practices - Source	Text	Source of data used in the metric "Company Reports Having Sustainable Ocean Policies and Practices."
	SUST_SEAS_POL_PRACT_YEAR	Company Reports Having Sustainable Ocean Policies and Practices - Year	Year	Fiscal year for the data used in the metric "Company Reports Having Sustainable Ocean Policies and Practices."
13. Non-recycled waste ratio	NONRECYL_WASTE_YEAR	Non-Recycled Waste (metric tons) - Year	Year	This figure represents the most recent fiscal year for the data used in the metric "Non-Recycled Waste (metric tons)."
	NONRECYL_WASTE_SOURCE	Non-Recycled Waste (metric tons) - Source	Text	Source of data used in the metric "Non-Recycled Waste (metric tons)."
14. Natural species and protected areas	OPS_IUCN_NSPECIES_SOURCE	Operations affect IUCN Red List species and/or national conservation list species - Source	Text	Source of data used in the metric "Operations affect IUCN Red List species and/or national conservation list species."
	SUST_BIODIV_PROTECT_POL_YEAR	Company Reports Having Biodiversity Protection Policy - Year	Year	Fiscal year for the data used in the metric "Company Reports Having Biodiversity Protection Policy."
	SUST_BIODIV_PROTECT_POL_SOURCE	Company Reports Having Biodiversity Protection Policy - Source	Text	Source of data used in the metric "Company Reports Having Biodiversity Protection Policy."

	OPS_PROT_BIODIV_AREAS_POL_SOURCE	Company Operates Near Protected Areas and has no Biodiversity Protection Policy - Source	Text	Source of data used in the metric "Company Operates Near Protected Areas and has no Biodiversity Protection Policy."
15. Deforestation	DEFOREST_POL_SOURCE	Deforestation Policy - Source	Text	Source of data used in the metric "Deforestation Policy."
SOCIAL				
Relevant SFDR Adverse Impact Indicator	Short Name	Factor Name	Output	Factor Description
1. Investments in companies without workplace accident prevention policies	WORKPLACE_ACC_PREV_POL_SOURCE	Workplace accident prevention policy - Source	Text	Source of data used in the metric "Workplace accident prevention policy."
2. Rate of accidents	TRIR_SOURCE	Total Recordable Incident Rate - Source	Text	Source of data used in the metric "Total Recordable Incident Rate."
	TRIR_YEAR	Total Recordable Incident Rate - Year	Year	This figure represents the most recent fiscal year for the data used in the metric "Total Recordable Incident Rate."
3. Number of days lost to injuries, accidents, fatalities or illness	TOT_WRKDAY_LOST_YEAR	Workdays Lost Due to Workplace Accidents or Illness - Year	Year	Fiscal year for the data used in the metric "Workdays Lost Due to Workplace Accidents or Illness."
	TOT_WRKDAY_LOST_SOURCE	Workdays Lost Due to Workplace Accidents or Illness - Source	Text	Source of data used in the metric "Workdays Lost Due to Workplace Accidents or Illness."
4. Lack of a supplier code of conduct	SUPPLIER_CODE_KEY_PROVISIONS_SOURCE	Supplier Code Covers Key Labor Provisions - Source	Text	Source of data used in the metric "Supplier Code Covers Key Labor Provisions"
	SUPPLIER_CODE_KEY_PROVISIONS_YEAR	Supplier Code Covers Key Labor Provisions - Year	Year	Fiscal year for the data used in the metric "Supplier Code Covers Key Labor Provisions"
5. Lack of grievance/complaints handling mechanism related to employee matters	GRIEV_COMPLAIN_PROCEDURE_SOURCE	Grievances or Complaints-handling Mechanisms Related to Employee Matters - Source	Text	Source of data used in the metric "Grievances or Complaints-handling Mechanisms Related to Employee Matters."
	GRIEV_COMPLAIN_PROCEDURE_YEAR	Grievances or Complaints-handling Mechanisms Related to Employee Matters - Year	Year	Fiscal year for the data used in the metric "Grievances or Complaints-handling Mechanisms Related to Employee Matters."
9. Lack of human rights policy	HUMAN_RGTS_POL_SOURCE	Human rights policy - Source	Text	Source of data used in the metric "Human rights policy."

10. Lack of due diligence	HUMAN_RGTS_DD_SOURCE	Human rights due diligence - Source	Text	Source of data used in the metric "Human rights due diligence."
11. Lack of processes and measures for preventing trafficking in human beings	HUM_TRAFK_POL_SOURCE	Policy against trafficking in human beings - Source	Text	Source of data used in the metric "Policy against trafficking in human beings."
12. Operations and suppliers at significant risk of incidents of child labor	OPS_SRISK_CHILD_LABOR_SOURCE	Operations at significant risk of child labor - Source	Text	Source of data used in the metric "Operations at significant risk of child labor."
13. Operations and suppliers at significant risk of incidents of forced or compulsory labor	OPS_SRISK_FORCED_LABOR_SOURCE	Operations at significant risk of forced or compulsory labor - Source	Text	Source of data used in the metric "Operations at significant risk of forced or compulsory labor."
15. Lack of anti-corruption and anti-bribery policies	CORR_BRIB_POLICY_UN_SOURCE	Policy on anti-corruption and anti-bribery (UN Convention against Corruption) - Source	Text	Source of data used in the metric "Policy on anti-corruption and anti-bribery (UN Convention against Corruption)."
16. Cases of insufficient action taken to address breaches of procedures and standards of anti-corruption and anti-bribery	BREACHES_CORRBRIB_SOURCE	Breaches in procedures and standards of anti-corruption and anti-bribery - Source	Text	Source of data used in the metric "Breaches in procedures and standards of anti-corruption and anti-bribery."
17. Number of convictions and amount of fines for violation of anti-corruption and anti-bribery laws	CORR_BRIB_FINES_SOURCE	Total amount of fines for violation of anti-corruption and anti-bribery laws – Source	Text	Source of data used in the metric "Total amount of fines for violation of anti-corruption and anti-bribery laws."
<i>*Earlier iterations of the SFDR RTS included a requirement to report 'water consumed and reclaimed' but the final SFDR RTS only included 'water consumed'. We have retained the "Reclaimed Water Intensity" indicator and associated metadata "Reclaimed Water Intensity- Source" for transitional use. However, the factors are set on inactive and no longer updated. We may discontinue this indicator in the future.</i>				

Source: MSCI ESG Research.

History of adjustments to issuer factors

The following is a history of revisions made to the methodologies underlying the issuer factors of MSCI SFDR Adverse Impact Metrics.

May 26, 2023

- For Table 1, Indicator 16 (Investee countries subject to social violations), MSCI ESG Research switched from calculating based on unique issuers to calculating based on unique countries.
- Some issuers were displaying outputs for the factor EXPOSURE_WATER_STRESS_NO_POL_VALUE that were not intended to be reflected by this metric. With the aim to best align with regulatory requirements, these values were updated.
- For both derived factors EXPOSURE_WATER_STRESS_NO_POL_VALUE and OPS_PROT_BIODIV_AREAS_POL_VALUE, MSCI ESG Research also identified, in some cases, that fiscal years for the input metrics were misaligned, resulting in several output discrepancies. To avoid such discrepancies, MSCI ESG Research will ensure alignment of all fiscal years for derived factors.
- With a view to standardize SFDR adverse impact factor output values, the possible outputs for OPS_PROT_BIODIV_AREAS_POL_VALUE are "Yes," "No," or "Not Disclosed."

December 11, 2023

- To better align with the SFDR RTS, companies with revenue from equipment and services for fossil fuel-related activities are no longer flagged for exposure under Table 1, indicator 4 – Exposure to companies active in the fossil fuel sector (ACTIVE_FF_SECTOR_EXPOSURE). Additionally, MSCI ESG Research updated the indicator's logic so it is only calculated when common fiscal years of the underlying data points match.
- Following the release of the OECD Alignment factor (OECD_ALIGNMENT), MSCI ESG Research changed the metric for Table 1, indicator 10 – Violations of UN Global Compact principles and Organisation for Economic Cooperation and Development (OECD) Table 3, Indicator 14 – Number of identified cases of severe human rights issues and incidents.

February 12, 2024

- For Table 2, Indicator 6.1 (Average amount of water consumed by the investee companies [in cubic meters] per million EUR of revenue of investee companies), MSCI ESG Research changed the factor from reclaimed water intensity (m³/EUR million sales) (RECLM_WATER_INTENS_VALUE) to water consumption intensity (m³/EUR million sales) (WATER_CONSUMP_INTEN_EUR) to better align with the SFDR RTS.

Methodology for portfolio- or fund-level SFDR metrics aggregation using MSCI SFDR Adverse Impact Metrics dataset¹⁷

Based on the SFDR RTS, financial market participants serving EU investors may be required, depending on their structure, to make disclosures at the entity level of all 18 principal adverse impact indicators (PAIs), at least two from the set of additional adverse impact indicators (one environmental and one social) and any other indicators used to identify and assess additional principal adverse impacts on a sustainability factor.

For the purpose of the annual entity-level statement, the regulation requires impacted market participants to:¹⁸

1. Calculate the indicator at position level;
2. Aggregate the position level indicators to portfolio level indicators;
3. Calculate the yearly indicators to be disclosed.

This section describes how all these steps can be taken using the MSCI SFDR Adverse Impact Metrics dataset.

Calculation of position-level indicators using current value of investment

Some indicators are binary flags, where the position level indicator is simply the indicator for the relevant issuer (for example, if an issuer has “exposure to fossil fuels related activities”, all equity or debt positions related to this issuer will include this flag).

For some numeric indicators, however, the issuer level total PAI should be allocated to the position held by the reporting financial market participant using the size of the position and the EVIC of the company. For example, if the total GHG emission of an issuer is 15 million tCO_{2e} and the value of the investment in the portfolio is 0.1% of the EVIC of the investee company, then the GHG emissions allocated to this holding will be 15,000 tCO_{2e}.

According to the regulator, the calculation of the size of the position and the EVIC of the investee company should use the same fiscal year-end when determining position-level indicators.¹⁹ The ESAs introduce the concept of current value of investments (CVI) which is defined as:

- the size of the position (# of shares) times the share price at fiscal year-end of the investee company for equity investments
- the notional value for fixed income (debt) securities.

¹⁷ 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.

¹⁸ This is a simplification of the regulatory guidance set out in more detail in ESAs’ Q&A on the SFDR Delegated Regulation (JC 2022 62) of 17 November 2022, see p.9-11.

¹⁹ ESAs’ Q&A on the SFDR Delegated Regulation (JC 2022 62) of 17 November 2022, p.11.

The aim of this approach appears to be to filter out the effects of market volatility from the PAI calculation. Without using CVI, the total GHG emissions of an equity position could change as the share price moves, which is undesirable. The CVI is not used in MSCI ESG Fund Ratings because fund values are calculated daily, but security CVI values cannot be calculated until the end of a given company's fiscal year.

To enable reporting entities to convert the market value of any equity position to the CVI, a CVI Adjustment Factor is provided. The CVI Adjustment Factor and complementary factors listed below are available for the coverage universe and for every month end.

Short Name	Factor Name	Output	Factor Description
CVI_FACTOR	CVI Adjustment Factor	Numeric value	The Current Value of Investment (CVI) Adjustment Factor allows adjustment of the present value of holding positions to calculate the CVI needed for entity-level adverse sustainability impact disclosures as defined in the SFDR Delegated Regulation (EU) 2022/1288. It is calculated at the issuer level and reflects the ratio of the adjusted close price of the issuer's equity at the factor date and the corresponding fiscal year end for the issuer.
CVI_FACTOR_AS_OF_DATE	As of date for the CVI Adjustment Factor	Date	The Current Value of Investment (CVI) Adjustment Factor is calculated at the issuer level and reflects the ratio of the adjusted close price of the issuer's equity at the as of date for the CVI Adjustment Factor and the corresponding fiscal year end for the issuer. This factor reflects the as of date used in calculating the CVI Adjustment Factor.
CVI_FACTOR_FISCAL_YEAR_END	Fiscal year end date for the CVI Adjustment Factor	Date	The Current Value of Investment (CVI) Adjustment Factor is calculated at the issuer level and reflects the ratio of the adjusted close price of the issuer's equity at the as of date for the CVI Adjustment Factor and the corresponding fiscal year end for the issuer. This factor reflects the fiscal year end date of the issuer used in calculating the CVI Adjustment Factor.
CVI_FACTOR_TS	CVI Adjustment Factor – Time Series	List of numeric values	The Current Value of Investment (CVI) Adjustment Factor allows adjustment of the present value of holding positions to calculate the Current Value of Investment (CVI) needed for entity-level adverse sustainability impact disclosures as defined in the SFDR Delegated Regulation (EU) 2022/1288. It is calculated at the issuer level and reflects the ratio of the adjusted close price of the issuer's equity at the factor date and the corresponding fiscal year end for the issuer. This factor is provided in the time series format on a monthly basis.
CVI_FACTOR_AS_OF_DATE_TS	As of date for the CVI Adjustment Factor – Time Series	List of dates	The Current Value of Investment (CVI) Adjustment Factor is calculated at the issuer level and reflects the ratio of the adjusted close price of the issuer's equity at the as of date for the CVI Adjustment Factor and the corresponding fiscal year end for the issuer. This factor reflects the time series of all as of dates used in calculating the "CVI Adjustment Factor – Time Series".
CVI_FACTOR_FY_END_TS	Fiscal year end data for the CVI Adjustment Factor - Time Series	List of dates	The Current Value of Investment (CVI) Adjustment Factor is calculated at the issuer level and reflects the ratio of the adjusted close price of the issuer's equity at the as of date for the CVI Adjustment Factor and the corresponding fiscal year end for the issuer. This factor reflects the fiscal year end date of the issuer used in calculating the CVI Adjustment Factor. This factor is provided in the time series format on a monthly basis.

Source: MSCI ESG Research.

Example: Application of the CVI Adjustment Factor

To illustrate how the CVI Adjustment Factor is applied, take the following example: assume that a portfolio holds 1,000 shares of company X with a present value of 100,000 EUR on March 31 (so the share price as of March 31 is 100 EUR/share). Issuer X has a fiscal year end on June 30 and the share price as of June 30 is 110 EUR/share. In this case, the CVI as of March 31 is defined as 1,000 shares x 110 EUR/share = 110,000 EUR, which is not the same as the true value of this position at that date. To calculate this CVI, use the CVI Adjustment Factor for issuer X as of March 31 (1.1) and calculate the CVI (110,000 EUR) as the present value (100,000 EUR) times the CVI Adjustment Factor (1.1). All relevant PAIs should use the CVI instead of present value.

The CVI Adjustment Factor is calculated at the issuer level and is the ratio of the adjusted closing share price²⁰ of the issuer's equity at the factor date to the adjusted closing share price at the fiscal year end. If an issuer has multiple share classes, each potentially listed on multiple exchanges, the CVI Adjustment Factor is first calculated for the primary listing of all share classes and then the issuer level CVI Adjustment Factor is defined as the volume weighted average of the share class factors as of the CVI month-end date.

The CVI Adjustment Factor is calculated using the share price as of the fiscal year end of the investee company, which might become known as late as Dec 31 in the calendar year. This means that the CVI Adjustment Factor can only be calculated after the issuer's fiscal year end. MSCI ESG Research calculates the CVI Adjustment Factor on a monthly frequency as of the last business day of the month, for all issuers where the fiscal year end data is available.

For example, on Apr 30, 2023, issuer A's 2022 fiscal year end Dec 31, 2022 data becomes available. At the same time, issuer B's fiscal year end March 31, 2023 fiscal year end data also becomes available. In this case, the CVI Adjustment Factor for issuer A will be calculated for the 12 months of 2022 and for issuer B for the 4 months of 2023. In May, issuer B will have the May month end calculated incrementally. The 2023 CVI Adjustment Factor for A will only be calculated once the fiscal year end date for 2023 becomes available.

Adjusting for circumstances when EVIC data is not available for the portfolio year

The CVI Adjustment Factor calculation is always based on the fiscal year-end date which is in the same calendar year as the portfolio date. For example, the CVI Adjustment Factor as of June 30, 2022, will use the fiscal year end that falls in the 2022 calendar year, while the CVI Adjustment Factor as of January 31, 2023 will use the fiscal year end that falls in the 2023 calendar year.

In some cases, the most recent EVIC data may not be available for a given calendar year. For example, it is possible that the most recent EVIC available for an issuer is from 2021, while the portfolio date is in 2022 and thus the CVI Adjustment Factor is based on the equity price at the fiscal year end in 2022, not in 2021.

In such situations, the CVI Adjustment Factor is used based on the fiscal year-end share price available for the reporting year (2022 in the example), effectively filtering out any market movement within the calendar year of reporting. This option aligns with the example presented in the Q&A released by the ESAs in November 2022. While this approach lets the effect of changes in EVIC

²⁰ The share price is adjusted to reflect the effect of company events like dividend payments and share splits.

from the previous year influence the PAIs, it also ensures that market value changes within the reporting calendar year are filtered out.

Portfolio-level aggregation

Portfolio- and fund-level SFDR metrics are calculated according to one of seven methodologies described below. Due to differences in functionality and data availability, in certain cases, the aggregation used in the portfolio Principal Adverse Sustainability Impacts (PASI) Statement varies slightly from the aggregation used in MSCI ESG Fund Ratings. These cases are noted in the relevant sections.

In all cases, the results reflect the adverse impact of the sub-portfolio made up of holdings for which the indicator is applicable. For example, indicators applicable to investments in investee companies are based on the sub-portfolio of corporate holdings.

Our entity classification methodology²¹ is applied when determining whether an issuer should be evaluated as a corporate, sovereign, or supranational. Generally, the proceeds are followed in making this determination. Entities that are classed as sovereign include national political entities (e.g., countries), sub-national political entities (e.g., Provinces, municipalities), and government agencies. Corporate SPVs raising money on behalf of a sovereign (e.g., Sukuk bonds) are also assessed as sovereigns. Supranational entities classed as supranational administrative bodies are evaluated using the ESG assessments of their member sovereigns, however supranational entities classed as international financial institutions (e.g. development banks) are evaluated under the corporate model alongside single nation sponsored financial institutions due to the nature of their operations.

Additionally, although MSCI ESG Research plans to provide both reported and estimated issuer-level values for PAIs 5, 6, 9 and 12 of Table 1, only the reported values are included in the portfolio- and fund-level results for those PAIs. Using only reported values ensures greater comparability between year-over-year portfolio- and fund-level results.

Method 1: percentage sum

Some portfolio indicators are aggregated as the sum of portfolio weights associated with positions flagged for a given criteria. Metrics calculated using the percentage sum method show the percentage of the portfolio that meets the criteria for the metric being measured. The percentage represents a minimum value, as there may be uncovered securities that also meet the criteria for a given metric. For instance, a value of 10% for PAI 7 (Activities negatively affecting biodiversity-sensitive areas) means that 10% of the weight of the portfolio comes from issuers flagged for having activities negatively affecting biodiversity-sensitive areas. The actual percentage may be higher if the portfolio also has securities from issuers that are outside of the SFDR coverage universe and have activities negatively affecting biodiversity-sensitive areas. The security weights used in percentage sum calculations are set by excluding short positions and not applicable positions, and rebasing the remaining positions to 100%.

²¹ MSCI ESG & Climate Entity Selection and Data Mapping Methodologies details the methodology employed to determine and maintain the entities subject to MSCI ESG Research ESG Evaluations.

The example below shows the calculation for PAI 7 (Activities negatively affecting biodiversity-sensitive areas).

1. Start with holding weights disclosed by the portfolio (w_d).
2. Recalculate holding weights after removing all short positions (w_s).
3. Recalculate holding weights based only on corporate positions (w_{sp}).
4. Sum the weights of holdings flagged for activities negatively affecting biodiversity-sensitive areas.

Exhibit 10: Example showing calculation of percentage sum

Holding	Company Has Operations Located in Biodiversity-Sensitive Areas and Is Involved in Controversies with Severe Impact on the Environment (OPS_PROT_BIODIV_CONTROVS)	Weight (w_d)	Weight Excluding Short Positions (w_s)	Sub-Portfolio Weight Excluding Short Positions (w_{sp})	Contribution to Activities Negatively Affecting Biodiversity-Sensitive Areas
Corporate 1	Yes	36.4%	26.7%	40.0%	40.0%
Corporate 2	Yes	-36.4%			
Corporate 3	Not disclosed	36.4%	26.7%	40.0%	
Sovereign	Not covered	36.4%	26.7%		
Corporate 4	Not covered	18.2%	13.3%	20.0%	
Cash	Not covered	9.1%	6.7%		
Activities Negatively Affecting Biodiversity-Sensitive Areas:					40.0%

Source: MSCI ESG Research.

Method 2: weighted average (normalized)

Some portfolio indicators are calculated using the weighted average of a given metric. The security weights used in weighted average calculations are set by excluding short positions, not applicable positions and uncovered positions, and rebasing the remaining positions to 100%.

The example below shows the calculation for PAI 3 (GHG Intensity of investee companies).

1. Start with holding weights disclosed by the portfolio (w_d).
2. Recalculate holding weights after removing all short positions (w_s).

3. Recalculate holding weights based only on corporate positions (w_{sp}).
4. Remove all securities that do not have Total GHG Emissions Intensity coverage (w_c).
5. Rebase the remaining weights to add up to 100% (w_r).
6. Sum the contributions to GHG Intensity of investee companies.

Exhibit 11: Example showing calculation of weighted average (normalized)

Holding	Weight (w_d)	Total GHG Emissions Intensity per EUR Million Sales (t/EUR Million Sales) (CARBON_EMISSIONS_SALES_EUR_SCOPE1_23_INTEN)	Weight Excluding Short Positions (w_s)	Sub-Portfolio Weight Excluding Short Positions (w_{sp})	Sub-Portfolio Weight Excluding Uncovered Holdings (w_c)	Sub-Portfolio Weight Rebased to 100% (w_r)	Contribution to GHG Intensity of Investee Companies
Corporate 1	20.00%	350	16.7%	22.2%	22.2%	50.0%	175.0
Corporate 2	-20.00%	100					
Corporate 3	20.00%	75	16.7%	22.2%	22.2%	50.0%	37.5
Sovereign	20.00%	Not covered	16.7%				
Corporate 4	50.00%	Not covered	41.7%	55.6%			
Cash	10.00%	Not covered	8.3%				
GHG Intensity of Investee Companies:							212.5

Source: MSCI ESG Research.

Method 3: weighted average per category (normalized)

The portfolio aggregation method for PAI 6 (Energy consumption intensity per high-impact climate sector), is the same as the weighted average (normalized) method, except that the calculation is run on the sub-portfolio made up of issuers classified by a given NACE section code. The security weights used in weighted average calculations are set by excluding short positions, not applicable positions and uncovered positions, and rebasing the remaining positions to 100%.

The example below shows the calculation for PAI 6 (Energy consumption intensity per high-impact climate sector), for the sub-portfolio comprised of holdings categorized as NACE section code A.

1. Start with holding weights disclosed by the portfolio (w_d).

2. Recalculate holding weights after removing all short positions (w_s).
3. Recalculate holding weights based only positions classified as NACE section code A (w_{sp}).
4. Remove all securities that do not have Energy Consumption Intensity coverage (w_c).
5. Rebase the remaining weights to add up to 100% (w_r).
6. Sum the contributions to Energy consumption intensity for NACE Code A.

Exhibit 12: Example showing calculation of weighted average per category (normalized)

Holding	Weight (w_d)	NACE Section Code (NACE_SECTION_CODE)	Energy Consumption Intensity (GWh/EUR million sales) (ENERGY_CONSUMPTION_INTEN_EUR)	Weight Excluding Short Positions (w_s)	NACE Code A Sub-Portfolio Weight Excluding Short Positions (w_{sp})	Sub-Portfolio Weight Excluding Uncovered Holdings (w_c)	Sub-Portfolio Weight Rebased to 100% (w_r)	Contribution to Energy consumption intensity for NACE Code A
Corporate 1	20.00%	A	3.80	16.67%	28.57%	28.57%	100%	3.80
Corporate 2	-20.00%	A	0.25					
Corporate 3	20.00%	G	1.09	16.67%				
Sovereign	20.00%		Not covered	16.67%				
Corporate 4	50.00%	A	Not covered	41.67%	71.43%			
Cash	10.00%		Not covered	8.33%				
Energy Consumption Intensity for NACE Code A:								3.80

Source: MSCI ESG Research.

Method 4: investor allocation

The purpose of some indicators is to measure the volume of a given metric for which a portfolio's investor is responsible. The aggregated portfolio figures in a PASI Statement represent the volume the investor is responsible for, based on the value of the portfolio invested in the relevant asset class (i.e., corporates). The holding values used in investor allocation calculations are set by excluding short positions, not applicable positions and uncovered positions, and reallocating the value of the uncovered positions into the covered holdings.

For fund-level calculations, all indicators using the investor allocation method are normalized to represent the impact per EUR 1 million invested in the relevant class of the fund. The EUR 1 million value is used because the value of fund assets under management is not comprehensively available.

The example below shows a PASI Statement calculation for PAI 1.4 (Total GHG emissions). See Method 5: investor allocation per EUR 1 million invested for a fund example. In a PASI Statement, for indicators using the investor allocation method, the Value column reflects the CVI adjustment.

1. Start with position values disclosed by the portfolio (w_d). For the PASI Statement, position values are based on CVI. For MSCI ESG Fund Ratings, position values are based on market value.
2. Remove all short positions and non-corporate positions (w_{sp}).
3. Reallocate the value of corporate positions that do not have both Total GHG Emissions and Enterprise Value Including Cash (EVIC) coverage into the covered portion of the portfolio (w_a).
4. Divide position values by EVIC to calculate the attribution factor.
5. Multiply the attribution factor by Total GHG Emissions.
6. Sum the contributions to Total GHG Emissions.

Exhibit 13: Example showing calculation of investor allocation

Holding	Value (w_d)	Total GHG Emissions (CARBON_EMISSIONS_SCOPE123)	Enterprise Value Including Cash (EUR million) (EVIC_EUR)	Value Excluding Short Positions and Non-Corporates (w_{sp})	Reallocated Value of Corporates (w_a)	Attribution Factor	Contribution to Total GHG Emissions
Corporate 1	10,000,000	15,000,000	20,000	10,000,000	15,000,000	0.075%	11,250
Corporate 2	-10,000,000	2,000,000	8,000				
Corporate 3	10,000,000	7,500,000	5,000	10,000,000	15,000,000	0.300%	22,500
Sovereign	10,000,000		Not covered				
Corporate 4	10,000,000		Not covered	10,000,000			
Cash	10,000,000		Not covered				
Total GHG Emissions:							33,750

Source: MSCI ESG Research.

Method 5: investor allocation per EUR 1 million invested

Some indicators are intended to represent the volume of a metric for which a portfolio's investors are responsible, per EUR million. Investor allocation per EUR 1 million invested is a normalized measure that facilitates comparisons regardless of portfolio size. The holding values used in investor allocation calculations are set by excluding short positions, not applicable positions and uncovered positions, and reallocating the value of the uncovered positions into the covered holdings. The results are identical to the investor allocation method, except that the impact is adjusted to reflect a portfolio value of EUR 1 million.

The example below shows a calculation for PAI 1.4 (Total GHG emissions). In a PASI Statement, for indicators using the investor allocation per EUR million invested method, the Value column reflects the CVI adjustment.

1. Start with position values disclosed by the portfolio (w_d). For the PASI Statement, position values are based on CVI. For MSCI ESG Fund Ratings, position values are based on market value.
2. Remove all short positions and non-corporate positions (w_{sp}).
3. Reallocate the value of corporate positions that do not have both Total GHG Emissions and Enterprise Value Including Cash (EVIC) coverage into the covered portion of the portfolio (w_a).
4. Rebase to a total value of one EUR 1 million (w_r).
5. Divide rebased position values by EVIC to calculate attribution factor.
6. Multiply the attribution factor by Total GHG Emissions.
7. Sum the contributions to Total GHG Emissions.

Exhibit 14: Example showing calculation of investor allocation per EUR million invested

Holding	Value (w_d)	Total GHG Emissions (CARBON_EMISSIONS_SCOPE123)	Enterprise Value Including Cash (EUR million) (EVIC_EUR)	Value Excluding Short Positions and Non-Corporates (w_{sp})	Reallocated Value of Corporates (w_a)	Rebased to a Value of EUR 1 million (w_r)	Attribution Factor	Contribution to Total GHG Emissions
Corporate 1	10,000,000	15,000,000	20,000	10,000,000	15,000,000	500,000	0.0025%	375
Corporate 2	-10,000,000	2,000,000	8,000					
Corporate 3	10,000,000	7,500,000	5,000	10,000,000	15,000,000	500,000	0.0100%	750
Sovereign	10,000,000		Not covered					
Corporate 4	10,000,000		Not covered	10,000,000				
Cash	10,000,000		Not covered					
Total GHG Emissions:								1,125

Source: MSCI ESG Research.

Method 6: count

PAI 16 (Investee countries subject to social violations) is calculated as the count of unique issuers in a portfolio that meet a given criterion. The count is calculated after removing short positions.

The example below shows a calculation for PAI 16 (Investee countries subject to social violations).

1. Start with holdings disclosed by the portfolio (w_d).
2. Remove all short positions (w_s).
3. Count the number of unique issuers flagged for the criterion.

Exhibit 15: Example showing calculation of count

Holding (w_d).	Long/Short	Holding Excluding Short Positions (w_s)	European Union Sanctions (GOVERNMENT_EU_SANCTIONS)	Contribution to Investee Countries Subject to Social violations
Sovereign 1 – Bond A	Long	Sovereign 1 – Bond A	Yes	1
Sovereign 1 – Bond B	Long	Sovereign 1 – Bond B	Yes	
Sovereign 2	Short		Yes	
Sovereign 3	Long	Sovereign 3	No	
Corporate	Long	Corporate	Not covered	
Sovereign 4	Long	Sovereign 4	Yes	1
Cash	N/A	Cash	Not covered	
Investee Countries Subject to Social Violations:				2

Source: MSCI ESG Research.

Method 7: sum

PAI 17 (Number of convictions and amount of fines for violation of anti-corruption and anti-bribery laws) is calculated as the sum of values for the metric being measured from unique issuers in a portfolio. The sum is calculated after removing short positions.

The example below shows a calculation for PAI 17 (Number of convictions and amount of fines for violation of anti-corruption and anti-bribery laws).

1. Start with holdings disclosed by the portfolio (w_d).

2. Remove all short positions (w_s).
3. Sum the values of the metric being measured from unique issuers.

Exhibit 16: Example showing calculation of sum

Holding (w_d)	Long/ Short	Holding Excluding Short Positions (w_s)	Total number of convictions for violations of anti-corruption and anti-bribery laws (CORR_BRIB_CONVICTIO NS)	Contribution to Number of Convictions for Violation of Anti- Corruption and Anti- Bribery Laws	Contribution to Amount of Fines for Violation of Anti-Corruption and Anti-Bribery Laws
Corporate 1 – Equity A	Long	Corporate 1 – Equity A	1	1	7,250,000
Corporate 1 – Equity B	Long	Corporate 1 – Equity B	1		
Corporate 2	Short				
Corporate 3	Long	Corporate 3			
Sovereign	Long	Sovereign			
Corporate 4	Long	Corporate 4	3	3	25,500,000
Cash	N/A	Cash			
Total Number of Convictions:				4	
Total Amount of Fines:					32,750,000

Source: MSCI ESG Research.

Calculation of yearly reported indicators

Financial market participants in scope of SFDR's entity reporting requirements are required to disclose relevant indicators for every calendar year. The indicator level of the calendar year is defined as the simple, non-weighted average of the indicator calculated at the portfolio level at least four times a year (in practice, most market participants will likely choose to do these calculations at the end of each quarter).

For example, if the portfolio's total GHG Emission indicator is respectively 8, 25, 30 and 25 million tCO₂e at the end of each quarter, the yearly indicator to be disclosed is the average of these numbers, i.e. 22 million tCO₂e.

Exhibit 17. Mandatory adverse impact indicators and reporting metrics

Environmental			
SFDR Adverse Impact Indicators and Reporting Metrics		MSCI ESG Research's Portfolio Aggregation	Aggregation Method
1. GHG Emissions	Scope 1 GHG emissions	Sum of portfolio companies' Carbon Emissions - Scope 1 (tCO2e) (CARBON_EMISSIONS_SCOPE_1) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR).	–Investor Allocation for portfolios –Investor Allocation (per EUR million) for funds
	Scope 2 GHG emissions	Sum of portfolio companies' Carbon Emissions - Scope 2 (tCO2e) (CARBON_EMISSIONS_SCOPE_2) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR).	–Investor Allocation for portfolios –Investor Allocation (per EUR million) for funds
	Scope 3 GHG emissions	Sum of portfolio companies' Scope 3 - Total Emission Estimated (tCO2e) (CARBON_EMISSIONS_SCOPE_3_TOTAL) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR).	–Investor Allocation for portfolios –Investor Allocation (per EUR million) for funds
	Total GHG emissions	Sum of portfolio companies' Total GHG Emissions (Scopes 1, 2 and 3) (CARBON_EMISSIONS_SCOPE123) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR).	–Investor Allocation for portfolios –Investor Allocation (per EUR million) for funds
2. Carbon Footprint	Carbon footprint	Sum of portfolio companies' Total GHG Emissions (Scopes 1, 2 and 3) (CARBON_EMISSIONS_SCOPE123) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR), adjusted to show the emissions associated with 1 million EUR invested in the portfolio.	Investor Allocation (per EUR million)
3. GHG Intensity of investee companies	GHG intensity of investee companies	Portfolio weighted average of companies' Total GHG Emissions Intensity per EUR million Sales (t/EUR million sales) (CARBON_EMISSIONS_SALES_EUR_SCOPE123_INTEN). Portfolio weights are normalized when corresponding data coverage is less than 100%.	Weighted Average (Normalized)
4. Exposure to companies active in the fossil fuel sector	Share of investments in companies active in the fossil fuel sector	Sum of companies' weight in portfolio that have Active Fossil Fuel Sector Exposure (ACTIVE_FF_SECTOR_EXPOSURE) equals Yes.	Percentage Sum

5. Share of non-renewable energy consumption and production	Share of non-renewable energy consumption and non-renewable energy production of investee companies from non-renewable energy sources compared to renewable energy sources, expressed as a percentage of total energy sources	Portfolio weighted average of company Percentage of non-renewable energy consumption and production (PCT_NONRENEW_CONSUMP_PROD). Portfolio weights are normalized when Percentage of non-renewable energy consumption and production coverage is less than 100%.	Weighted Average (Normalized)
6. Energy consumption intensity per high-impact climate sector	Energy consumption in GWh per million EUR of revenue of investee companies, per high-impact climate sector	Portfolio weighted average of company Energy consumption intensity (GWh / EUR million sales) (ENERGY_CONSUMP_INTEN_EUR) per high impact climate sector (NACE section code (NACE_SECTION_CODE) A, B, C, D, E, F, G, H, and L). Portfolio weights are normalized when Energy consumption intensity coverage is less than 100%.	Weighted Average (Normalized per category)
7. Activities negatively affecting biodiversity-sensitive areas	Share of investments in investee companies with sites/operations located in or near to biodiversity-sensitive areas where activities of those investee companies negatively affect those areas	Sum of companies' weight in portfolio that have Company has operations located in biodiversity sensitive areas and is involved in controversies with severe impact on the environment (OPS_PROT_BIODIV_CONTROVS) equals Yes.	Percentage Sum
8. Emissions to water	Metric tons of emissions to water generated by investee companies per million EUR invested, expressed as a weighted average	Sum of portfolio companies' Water Emissions (metric tons) (WATER_EM_EFF_METRIC_TONS) weighted by the current value of investment in a company divided by the company's most recently available enterprise value including cash (EVIC_EUR), adjusted to show the water emissions associated with 1 million EUR invested in the portfolio.	Investor Allocation (per EUR million)
9. Hazardous waste and radioactive waste ratio	Metric tons of hazardous waste and radioactive waste generated by investee companies per million EUR invested, expressed as a weighted average	Sum of portfolio companies' Hazardous Waste (metric tons) (HAZARD_WASTE_METRIC_TON) weighted by the current value of investment in a company divided by the company's most recently available enterprise value including cash (EVIC_EUR), adjusted to show the hazardous waste associated with 1 million EUR invested in the portfolio.	Investor Allocation (per EUR million)
Social			
SFDR Adverse Impact Indicators and Reporting Metrics		MSCI ESG Research's Portfolio Aggregation	Aggregation Method
10. Violations of UN Global Compact principles and Organisation for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises	Share of Investments in investee companies that have been involved in violations of the UNGC principles for OECD Guidelines for Multinational Enterprises	Sum of companies' weight in portfolio that have OECD Alignment (OECD_ALIGNMENT) equals Fail.	Percentage Sum

11. Lack of processes and compliance mechanisms to monitor compliance with UN Global Compact principles and OECD Guidelines for Multinational Enterprises	Share of investments in investee companies without policies to monitor compliance with the UNGC principles or OECD Guidelines for Multinational Enterprises or grievance /complaints handling mechanisms to address violations of the UNGC principles or OECD Guidelines for Multinational Enterprises	Sum of companies' weight in portfolio that have no evidence of mechanism to monitor compliance with the UN Global Compact ((MECH_UN_GLOBAL_COMPACT) equals No evidence).	Percentage Sum
12. Unadjusted gender pay gap	Average unadjusted gender pay gap of investee companies	Portfolio weighted average of company Gender Pay Gap ratio (GENDER_PAY_GAP_RATIO). Portfolio weights are normalized when Gender pay gap ratio coverage is less than 100%.	Weighted Average (Normalized)
13. Board gender diversity	Average ratio of female to male board members in investee companies, expressed as a percentage of all board members	Portfolio weighted average of company Female Directors Percentage (FEMALE_DIRECTORS_PCT). Portfolio weights are normalized when Board gender diversity coverage is less than 100%.	Weighted Average (Normalized)
14. Exposure to controversial weapons (anti-personnel mines, cluster munitions, chemical weapons and biological weapons)	Share of investments in investee companies involved in the manufacture or selling of controversial weapons	Sum of companies' weight in portfolio that have exposure to controversial weapons (landmines, cluster munitions, chemical weapons and biological weapons) ((CONTRO_WEAP_CBLMBW_ANYTIE) equals Yes).	Percentage Sum
Sovereign			
SFDR Adverse Impact Indicators and Reporting Metrics		MSCI ESG Research's Portfolio Aggregation	
15. GHG intensity	GHG intensity of investee countries	Portfolio weighted average of sovereign issuers' Country GHG intensity (CTRY_GHG_INTEN_GDP_EUR). Portfolio weights are normalized when Country GHG intensity coverage is less than 100%.	Weighted Average (Normalized)
16. Investee countries subject to social violations	Number of investee countries subject to social violations (absolute number and relative number divided by all investee countries), as referred to in international treaties and conventions, United Nations principles and, where applicable, national law	Number, and percentage, of unique countries represented by issuers with European Union sanctions (GOVERNMENT_EU_SANCTIONS).	Count (unique)
Real Estate			
SFDR Adverse Impact Indicators and Reporting Metrics		MSCI ESG Research 's Portfolio Aggregation	

17. Exposure to fossil fuels through real estate assets	Share of investments in real estate assets involved in the extraction, storage, transport or manufacture of fossil fuels	Not currently provided	N/A
18. Exposure to energy-inefficient real estate assets	Share of investments in energy-inefficient real estate assets	Not currently provided	N/A

Source: MSCI ESG Research.

Exhibit 18. Additional adverse impact indicators and reporting metrics

SFDR Table 2 – Environmental Indicators			
EU SFDR Adverse Impact Indicators and Reporting Metrics		MSCI ESG Research's Portfolio Aggregation	Aggregation Method
1. Emissions of inorganic pollutants	Metric tons of inorganic pollutants equivalent per million EUR invested, expressed as a weighted average	Sum of portfolio companies' Emissions of Inorganic Pollutants (metric tons) - Most Recent (EMISSIONS_INORGANIC_POLLUTANTS_VALUE) weighted by the current value of investment in a company divided by the company's most recently available enterprise value including cash (EVIC_EUR), associated with 1 million EUR invested in the portfolio.	Investor Allocation (per EUR million)
2. Emissions of air pollutants	Metric tons of air pollutants equivalent per million EUR invested, expressed as a weighted average	Sum of portfolio companies' Emissions of Air Pollutants (metric tons) - Most Recent (EMISSIONS_AIR_POLLUTANTS_VALUE) weighted by the current value of investment in a company divided by the company's most recently available enterprise value including cash (EVIC_EUR), with 1 million EUR invested in the portfolio.	Investor Allocation (per EUR million)
3. Emissions of ozone-depleting substances	Metric tons of ozone-depleting substances equivalent per million EUR invested, expressed as a weighted average	Sum of portfolio companies' Emissions of Ozone-Depleting Substances (metric tons) - Most Recent (EMISSIONS_OZONE_DEPL_SUBS_VALUE) weighted by the current value of investment in a company divided by the company's most recently available enterprise value including cash (EVIC_EUR), associated with 1 million EUR invested in the portfolio.	Investor Allocation (per EUR million)
4. Investments in companies without carbon emissions-reduction initiatives	Share of investments in investee companies without carbon emissions-reduction initiatives aimed at aligning with the Paris Agreement	Sum of companies' weight in portfolio that qualify for Company's carbon emissions-reduction initiatives aimed at aligning with the Paris Agreement (Yes, No) (CARBON_REDUCT_INITIATIVES_PA) equals No.	Percentage Sum
5. Breakdown of energy consumption by type of non-renewable sources of energy	Share of energy from non-renewable sources used by investee companies broken down by each non-renewable energy source	The percent of energy consumption (GWh) coal is calculated as the sum of portfolio companies' energy consumption from Energy consumption from coal (GWh) (COAL_CON_GWH) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR), divided by portfolio energy consumption from all sources.	Investor Allocation (per category)

	<p>The percent of energy consumption (GWh) from lignite is calculated as the sum of portfolio companies' Energy consumption from lignite (GWh) (LIGNITE_CON_GWH) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR), divided by portfolio energy consumption from all sources.</p>	Investor Allocation (per category)
	<p>The percent of energy consumption (GWh) from natural gas is calculated as the sum of portfolio companies' Energy consumption from natural gas (GWh) (NGAS_CON_GWH) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR), divided by portfolio energy consumption from all sources.</p>	Investor Allocation (per category)
	<p>The percent of energy consumption (GWh) from oil & gas is calculated as the sum of portfolio companies' Energy consumption from oil & gas (GWh) (OG_CONSUMP_GWH) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR), divided by portfolio energy consumption from all sources.</p>	Investor Allocation (per category)
	<p>The percent of energy consumption (GWh) from nuclear power is calculated as the sum of portfolio companies' Energy consumption from nuclear power (GWh) (NUCLEAR_CON_GWH) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR), divided by portfolio energy consumption from all sources.</p>	Investor Allocation (per category)
	<p>The percent of energy consumption (GWh) fossil fuels is calculated as the sum of portfolio companies' Energy consumption fossil fuels (GWh) (FFUEL_CON_GWH) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR), divided by portfolio energy consumption from all sources.</p>	Investor Allocation (per category)
	<p>The percent of energy consumption (GWh) other non-renewables is calculated as the sum of portfolio companies' Energy consumption from other non-renewables (GWh) (OTHER_NRENEW_CON_GWH) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR), divided by portfolio energy consumption from all sources.</p>	Investor Allocation (per category)

6. Water usage and recycling	1. Average amount of water consumed by the investee companies (in cubic meters) per million EUR of revenue of investee companies.	1. Sum of portfolio companies' Water Consumption Intensity (m ³ /EUR million sales) (WATER_CONSUMP_INTEN_EUR) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR).	–Investor Allocation for portfolios –Investor Allocation (per EUR million) for funds
	2. Weighted average percentage of water recycled and reused by investee companies	2. Sum of portfolio companies' Percentage of Reclaimed Water Relative to Total Water Consumed (PCT_RECLM_WATER_TOTAL_CONSUMP) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR).	–Investor Allocation for portfolios –Investor Allocation (per EUR million) for funds
7. Investments in companies without water management policies	Share of investments in investee companies without water management policies	Sum of companies' weight in portfolio that have Water Management Policies and Practices (WATER_MGT_POL_VALUE) equals Not disclosed.	Percentage Sum
8. Exposure to areas of high water stress	Share of investments in investee companies with sites located in areas of high water stress without a water management policy	Sum of companies' weight in portfolio that have Exposure to Areas of High Water Stress and Lack of Water Management Policy (EXPOSURE_WATER_STRESS_NO_POL_VALUE) equals Yes.	Percentage Sum
9. Investments in companies producing chemicals	Share of investments in investee companies the activities of which fall under Division 20.2 of Annex I to Regulation (EC) No 1893/2006	Sum of companies' weight in portfolio with a NACE group code (NACE_GROUP_CODE) OF 20.2.	Percentage Sum
10. Land degradation, desertification, soil sealing	Share of investments in investee companies the activities of which cause land degradation, desertification or soil sealing	Sum of companies' weight in portfolio that have Reported Involvement in Activities Which Cause Land Degradation, Desertification, or Soil Sealing (LAND_DEGRADE_ACTIV_REPRT_VALUE) equals Yes.	Percentage Sum
11. Investments in companies without sustainable land/agriculture practices	Share of investments in investee companies without sustainable land/agriculture practices or policies	Sum of companies' weight in portfolio that have Company Reports Having Sustainable Land Management Policies and Practices (SUST_AGR_PRACT_VALUE) equals Not disclosed.	Percentage Sum
12. Investments in companies without sustainable oceans/seas practices	Share of investments in investee companies without sustainable oceans/seas practices or policies	Sum of companies' weight in portfolio that have Company Reports Having Sustainable Ocean Policies and Practices (SUST_SEAS_POL_PRACT_VALUE) equals Not disclosed.	Percentage Sum

13. Non-recycled waste ratio	Metric tons of non-recycled waste generated by investee companies per million EUR invested, expressed as weighted average	Sum of portfolio companies' Non-Recycled Waste (metric tons) (NONRECYL_WASTE) weighted by the value of investment in a company divided by the company's most recently available enterprise value including cash (EVIC_EUR), adjusted to show the non-recycled waste associated with 1 million EUR invested in the portfolio.	Investor Allocation (per EUR million)
14. Natural species and protected areas	1. Share of investments in investee companies whose operations affect threatened species	Sum of companies' weight in portfolio that have operations that affect IUCN Red List species and/or national conservation list species ((OPS_IUCN_NSPECIES) equals Yes).	Percentage Sum
	2. Share of investments in investee 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	Sum of companies' weight in portfolio that have Company Operates Near Protected Areas and has no Biodiversity Protection Policy (OPS_PROT_BIODIV_AREAS_POL_VALUE) equals Yes.	Percentage Sum
15. Deforestation	Share of investments in companies without a policy to address deforestation	Sum of companies' weight in portfolio that have no disclosed deforestation policy ((DEFOREST_POL) equals Not disclosed).	Percentage Sum
16. Share of securities not issued under Union legislation on environmentally sustainable bonds	Share of securities not issued under Union legislation on environmentally sustainable bonds	Not currently provided	N/A
17. Share of bonds not issued under Union legislation on environmentally sustainable bonds	Share of bonds not issued under Union legislation on environmentally sustainable bonds	Not currently provided	N/A
18. GHG emissions	Scope 1 GHG emissions generated by real estate assets	Not currently provided	N/A
	Scope 2 GHG emissions generated by real estate assets	Not currently provided	N/A
	Scope 3 GHG emissions generated by real estate assets	Not currently provided	N/A
	Total GHG emissions generated by real estate assets	Not currently provided	N/A
19. Energy consumption intensity	Energy consumption in GWh of owned real estate assets per square meter	Not currently provided	N/A

20. Waste production in operations	Share of real estate assets not equipped with facilities for waste sorting and not covered by a waste recovery or recycling contract	Not currently provided	N/A
21. Raw materials consumption for new construction and major renovations	Share of raw building materials (excluding recovered, recycled and biosourced) compared with the total weight of building materials used in new construction and major renovations	Not currently provided	N/A
22. Land artificialization	Share of non-vegetated surface area (surfaces that have not been vegetated in ground, as well as on roofs, terraces and walls) compared with the total surface area of the plots of all assets	Not currently provided	N/A

SFDR Table 3 – Social

SFDR Adverse Impact Indicators and Reporting Metrics		MSCI's Portfolio Aggregation	Aggregation Method
1. Investments in companies without workplace accident prevention policies	Share of investments in investee companies without a workplace accident prevention policy	Sum of companies' weight in portfolio that have no disclosed workplace accident prevention policy ((WORKPLACE_ACC_PREV_POL) equals Not disclosed).	Percentage Sum
2. Rate of accidents	Rate of accidents in investee companies expressed as a weighted average	Sum of portfolio companies' Total Recordable Incident Rate (TRIR) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR).	–Investor Allocation for portfolios –Investor Allocation (per EUR million) for funds
3. Number of days lost to injuries, accidents, fatalities or illness	Number of workdays lost to injuries, accidents, fatalities or illness of investee companies expressed as a weighted average	Sum of portfolio companies' Total number of lost workdays due to injuries, accidents, fatalities or illness (TOT_WRKDAY_LOST_VALUE) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR), associated with 1 million EUR invested in the portfolio.	Investor Allocation (per EUR million)
4. Lack of supplier code of conduct	Share of investments in investee companies without any supplier code of conduct (against unsafe working conditions, precarious work, child labor and forced labor)	Sum of companies' weight in portfolio that have Supplier Code Covers Key Labour Provisions (SUPPLIER_CODE_KEY_PROVISIONS_VALUE) equals Not disclosed.	Percentage Sum
5. Lack of grievance-/complaints-handling mechanism	Share of investments in investee companies without any grievance-/complaints-handling	Sum of companies' weight in portfolio that have Grievances or Complaints-handling Mechanisms Related to Employee Matters (GRIEV_COMPLAIN_PROCEDURE_VALUE) equals Not disclosed.	Percentage Sum

related to employee matters	mechanism related to employee matters		
6. Insufficient whistleblower protection	Share of investments in entities without policies on the protection of whistleblowers	Sum of companies' weight in portfolio that have no disclosed whistleblower protection policy ((WHISTLEBLOWER_PROTECT_POLICY) equals Not disclosed).	Percentage Sum
7. Incidents of discrimination	1. Number of incidents of discrimination reported in investee companies expressed as a weighted average	Sum of portfolio companies' Severe and Very Severe Discrimination and Diversity Controversies (CONTR_DISCRIMINATION_DIV_N_SEVERE) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR), associated with 1 million EUR invested in the portfolio.	Investor Allocation (per EUR million)
	2. Number of incidents of discrimination leading to sanctions in investee companies expressed as a weighted average	Not currently provided	N/A
8. Excessive CEO pay ratio	Average ratio within investee companies of the annual total compensation for the highest-compensated individual to the median annual total compensation for all employees (excluding the highest-compensated individual)	Portfolio weighted average of companies CEO-to-employee pay ratio (CEO_EMP_PAY_RATIO_RECENT). Portfolio weights are normalized when CEO-to-employee pay ratio coverage is less than 100%.	Weighted Average (Normalized)
9. Lack of human rights policy	Share of investments in entities without human rights policy	Sum of companies' weight in portfolio that have no disclosed company Human rights policy ((HUMAN_RGTS_POL) equals Not disclosed).	Percentage Sum
10. Lack of due diligence	Share of investments in entities without a due diligence process to identify, prevent, mitigate and address adverse human rights impacts	Sum of companies' weight in portfolio that have no disclosed company human rights due diligence process ((HUMAN_RGTS_DD) equals Not disclosed).	Percentage Sum
11. Lack of processes and measures for preventing trafficking in human beings	Share of investments in investee companies without policies against trafficking in human beings	Sum of companies' weight in portfolio that have no disclosed company policy against trafficking in human beings ((HUM_TRAFK_POL) equals Not disclosed).	Percentage Sum
12. Operations and suppliers at significant risk of incidents of child labor	Share of investments in investee companies exposed to operations and suppliers at significant risk of incidents of child labor in terms of geographic areas or type of operation	Sum of companies' weight in portfolio that have company operations at significant risk of child labor ((OPS_SRISK_CHILD_LABOR) equals Yes).	Percentage Sum

13. Operations and suppliers at significant risk of incidents of forced or compulsory labor	Share of the investments in investee companies exposed to operations and suppliers at significant risk of incidents of forced or compulsory labor in terms of geographic areas and/or the type of operation	Sum of companies' weight in portfolio that have company operations at significant risk of forced or compulsory labor ((OPS_SRISK_FORCED_LABOR) equals Yes).	Percentage Sum
14. Number of identified cases of severe human rights issues and incidents	Number of cases of severe human rights issues and incidents connected to investee companies on a weighted average basis	Sum of portfolio companies' Number of Severe and Very Severe Human Rights Concerns Controversies (CONTR_HUMAN_RIGHTS_N_SEVERE) weighted by the portfolio's current value of investment in a company and by the company's most recently available enterprise value including cash (EVIC_EUR), associated with 1 million EUR invested in the portfolio.	Investor Allocation (per EUR million)
15. Lack of anti-corruption and anti-bribery policies	Share of investments in entities without policies on anti-corruption and anti-bribery consistent with the United Nations Convention against Corruption	Sum of companies' weight in portfolio that have no disclosed company policy on anti-corruption and anti-bribery (UN Convention against Corruption) ((CORR_BRIB_POLICY_UN) equals Not disclosed).	Percentage Sum
16. Cases of insufficient action taken to address breaches of standards of anti-corruption and anti-bribery	Share of investments in investee companies with identified insufficiencies in actions taken to address breaches in procedures and standards of anti-corruption and anti-bribery	Sum of companies' weight in portfolio that have company breaches in procedures and standards of anti-corruption and anti-bribery ((BREACHES_CORRBRIB) equals Yes).	Percentage Sum
17. Number of convictions and amount of fines for violations of anti-corruption and anti-bribery laws	Number of convictions and amount of fines for violations of anti-corruption and anti-bribery laws by investee companies	Sum of the total number of company convictions for violations of anti-corruption and anti-bribery laws (CORR_BRIB_CONVICTIONS).	Sum (unique)
		Sum of the total amount of fines for company violations of anti-corruption and anti-bribery laws (CORR_BRIB_FINES).	Sum (unique)
18. Average income inequality score	The distribution of income and economic inequality among the participants in a particular economy, including quantitative indicator explained in the explanation column	Portfolio weighted average of sovereign issuers' GINI Index coefficient (GOVERNMENT_RAW_GINI). Portfolio weights are normalized when GINI Index coverage is less than 100%.	Weighted Average (Normalized)
19. Average freedom of expression score	Measuring the extent to which political and civil society organizations can operate freely, including a quantitative indicator explained in the explanation column	Portfolio weighted average of sovereign issuers' press freedom rank (GOVERNMENT_RAW_PRESS_FREED). Portfolio weights are normalized when Press freedom coverage is less than 100%.	Weighted Average (Normalized)
20. Average human rights performance	Measure of the average human rights performance of investee countries using a quantitative	Portfolio weighted average of sovereign issuers' WJP Rule of Law Index, Fundamental Rights Sub-score (GOVERNMENT_FUNDAMENTAL_RIGHTS). Portfolio weights are	Weighted Average (Normalized)

	indicator explained in the explanation column	normalized when WJP Rule of Law Index, Fundamental Rights Sub-score coverage is less than 100%.	
21. Average corruption score	Measure of the perceived level of public-sector corruption using a quantitative indicator explained in the explanation column	Portfolio weighted average of sovereign issuers' Corruption Perception Index rank (GOVERNMENT_RAW_CORR_PERC_INDEX). Portfolio weights are normalized when Corruption Perception Index coverage is less than 100%.	Weighted Average (Normalized)
22. Non-cooperative tax jurisdictions	Investments in jurisdictions on the EU list of non-cooperative jurisdictions for tax purposes	Sum of sovereign issuers' weight in portfolio that have Non-cooperative tax jurisdiction (NON_COOP_TAX_JURIS) equals Yes.	Percentage Sum
23. Average political stability score	Measure of the likelihood that the current regime will be overthrown by use of force using a quantitative indicator explained in the explanation column	Portfolio weighted average of sovereign issuers' Stability & Peace Score (GOVERNMENT_STABILITY_PEACE_SCORE). Portfolio weights are normalized when Stability & Peace Score coverage is less than 100%.	Weighted Average (Normalized)
24. Average rule of law score	Measure of the level of corruption, lack of fundamental rights and the deficiencies in civil and criminal justice using a quantitative indicator explained in the explanation column	Portfolio weighted average of sovereign issuers' Rule of law (GOVERNMENT_RAW_RULE_OF_LAW). Portfolio weights are normalized when Rule of law coverage is less than 100%.	Weighted Average (Normalized)

Source: MSCI ESG Research.

History of adjustments to aggregation

The following is a history of revisions made to the aggregation methodologies of MSCI SFDR Adverse Impact Metrics.

October 21, 2022

- Following an update from the European Commission, the methodology for the list of indicators below was changed from Weighted Average to Investor Allocation aggregation.
 - Table 3, Indicator 2 - Rate of accidents
 - Table 3, Indicator 7.1 - Incidents of discrimination
 - Table 3, Indicator 14 - Number of identified cases of severe human rights issues and incidents
- Following a consultation with financial market participants, the Investor Aggregation methodology was revised to aggregate factors based on the actual market value of each holding and no longer reallocate the full market value of a portfolio across the sub-portfolio of holdings that are within coverage. This impacted the indicators listed below.
 - Table 1, Indicator 1 - GHG emissions
 - Table 1, Indicator 2 - Carbon Footprint
 - Table 1, Indicator 8 - Emissions to water
 - Table 1, Indicator 9 - Hazardous waste ratio
 - Table 2, Indicator 5 - Breakdown of energy consumption by type of non-renewable sources of energy
 - Table 2, Indicator 13 - Non-recycled waste ratio
 - Table 3, Indicator 2 - Rate of accidents
 - Table 3, Indicator 7.1 - Incidents of discrimination
 - Table 3, Indicator 14 - Number of identified cases of severe human rights issues and incidents

April 24, 2023 / June 6, 2023

- MSCI ESG Research replaced the “full portfolio” approach with the “sub-portfolio” approach, aggregating for each category of indicators separately (corporates vs. sovereigns and supranationals). For example, an indicator relevant to corporates is calculated based on the sub-portfolio of corporate positions. This reduces the missing value for out-of-category securities compared to the “full portfolio” approach. PASI Statement revisions were made on April 24, 2023, and MSCI ESG Fund Ratings revisions were made on June 6, 2023. This impacted the indicators listed below.

Table 1, Indicator 2- Carbon Footprint	Table 2, Indicator 15- Deforestation
Table 1, Indicator 4- Exposure to companies active in the fossil fuel sector	Table 3, Indicator 1- Investments in companies without workplace accident prevention policies
Table 1, Indicator 7- Activities negatively affecting biodiversity-sensitive areas	Table 3, Indicator 2- Rate of accidents

Table 1, Indicator 8- Emissions to water	Table 3, Indicator 3- Number of days lost to injuries, accidents, fatalities or illness
Table 1, Indicator 9- Hazardous waste ratio	Table 3, Indicator 4- Lack of supplier code of conduct
Table 1, Indicator 10- Violations of UN Global Compact principles and Organisation for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises	Table 3, Indicator 5- Lack of grievance/complaints handling mechanism related to employee matters
Table 1, Indicator 11- Lack of processes and compliance mechanisms to monitor compliance with UN Global Compact principles and OECD Guidelines for Multinational Enterprises	Table 3, Indicator 6- Insufficient whistleblower protection
Table 1, Indicator 14- Exposure to controversial weapons (anti-personnel mines, cluster munitions, chemical weapons and biological weapons)	Table 3, Indicator 7- Incidents of discrimination
Table 2, Indicator 4- Investments in companies without carbon emission reduction initiatives (Fund factor revised on June 27, 2023)	Table 3, Indicator 9- Lack of human rights policy
Table 2, Indicator 6- Water usage and recycling	Table 3, Indicator 10- Lack of due diligence
Table 2, Indicator 7- Investments in companies without water management policies	Table 3, Indicator 11- Lack of processes and measures for preventing trafficking in human beings
Table 2, Indicator 8- Exposure to areas of high water stress	Table 3, Indicator 12- Operations and suppliers at significant risk of incidents of child labour
Table 2, Indicator 9- Investments in companies producing chemicals	Table 3, Indicator 13- Operations and suppliers at significant risk of incidents of forced or compulsory labour
Table 2, Indicator 10- Land degradation, desertification, soil sealing	Table 3, Indicator 14- Number of identifies cases of severe human rights issues and incidents
Table 2, Indicator 11- Investments in companies without sustainable land/agriculture practices	Table 3, Indicator 15- Lack of anti-corruption and anti-bribery policies
Table 2, Indicator 12- Investments in companies without sustainable oceans/seas practices	Table 3, Indicator 16- Cases of insufficient action taken to address breacher of standards of anti-corruption and anti-bribery
Table 2, Indicator 13- Non-recycled waste ratio	Table 3, Indicator 22- Non-cooperative tax jurisdictions
Table 2, Indicator 14- Natural species and protected areas	○

- Following an update from the European Commission, the methodology for the list of indicators below was changed to be reported in units of millions of EUR invested. These changes were only applied to the PASI Statement, as MSCI ESG Fund Ratings calculations always reflected units of millions of EUR invested.
 - Table 3, Indicator 3 - Number of days lost to injuries
 - Table 3, Indicator 7 - Incidents of discrimination
 - Table 3, Indicator 14 - Number of identified cases of severe human rights issues and incidents
- Market participants are generally expected to pursue best efforts to close data gaps (Article 7.2 SFDR RTS). To reflect this, the aggregation of certain SFDR indicators was changed to an approach that reallocates the market value of the sub-portfolio of in-category holdings into the sub-portfolio of holdings within coverage. For example, for indicators applicable to investments in investee companies, the market value of all corporate positions is reallocated into corporate positions

that are within coverage. PASI Statement revisions were made on April 24, 2023, and MSCI ESG Fund Ratings revisions were made on June 6, 2023. This impacted the indicators listed below:

- Table 1, Indicator 1 - GHG emissions
- Table 1, Indicator 2 - Carbon Footprint
- Table 1, Indicator 8 - Emissions to water
- Table 1, Indicator 9 - Hazardous waste ratio
- Table 2, Indicator 5 - Breakdown of energy consumption by type of non-renewable sources of energy (Fund factor revised on June 27, 2023)
- Table 2, Indicator 13 - Non-recycled waste ratio
- Table 3, Indicator 2 - Rate of accidents
- Table 3, Indicator 7.1 - Incidents of discrimination
- Table 3, Indicator 14 - Number of identified cases of severe human rights issues and incidents

May 26, 2023 / June 6, 2023

For Table 1, Indicator 16 (Investee countries subject to social violations), MSCI ESG Research switched from calculating based on unique issuers to calculating based on unique countries. PASI Statement revisions were made on May 26, 2023, and MSCI ESG Fund Ratings revisions were made on June 6, 2023

December 7, 2023

- For Table 1, Indicator 10 (Violations of UN Global Compact principles and Organisation for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises), MSCI ESG Research updated the aggregation from Company Summary – Overall Flag (OVERALL_FLAG) = “Red” to OECD Alignment (OECD_ALIGNMENT) = “Fail”.
- For Table 2, Indicator 14.2 (Natural species and protected areas - Share of investments in investee 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), MSCI ESG Fund Ratings aggregation was updated to account for a May 25, 2023 update to the corresponding issuer data point. The aggregation was revised from Company Operates Near Protected Areas and Has a Biodiversity Protection Policy (OPS_PROT_BIODIV_AREAS_POL_VALUE) equals “No”, to Company Operates Near Protected Areas and has no Biodiversity Protection Policy (OPS_PROT_BIODIV_AREAS_POL_VALUE) equals “Yes”. A comparable update for the PASI Statement was not required.

February 12, 2024

For Table 2, Indicator 6.1 (Average amount of water consumed by the investee companies [in cubic meters] per million EUR of revenue of investee companies.), MSCI ESG Research updated the aggregation from using the issuer factor Reclaimed Water Intensity (m³/EUR million sales) (RECLM_WATER_INTENS_VALUE) to Water Consumption Intensity (m³/EUR million sales) (WATER_CONSUMP_INTEN_EUR).

Appendix 1: Indicator notes

PAI(s) 1, 2, 3: GHG emissions, carbon footprint, GHG intensity of investee companies

Reported and estimated GHG emissions data are provided. Estimated Scopes 1 and 2 emissions are provided in the absence of company disclosure for Scopes 1 and 2 emissions. For consistency, estimated Scope 3 emissions are used in all cases as currently there are vast differences in the ways companies estimate their own Scope 3 emissions. A uniform approach is used to combine both upstream and downstream emissions.²²

Note that where values for any of Scope 1, 2, or 3 data are not disclosed or not estimated, respectively, for a company, the total emissions Scopes 1+2+3 (CARBON_EMISSIONS_SCOPE123) value is not calculated. For more information on estimation of GHG emissions, see MSCI Carbon Emissions Estimation: Methodology and Definitions.

PAI 4: Exposure to companies active in the fossil fuel sector

MSCI ESG Research provides the following metric for a company's exposure to fossil fuel-related activities, including exploration, extraction, mining, storage, distribution, and trading of oil and gas, production and distribution of thermal coal, and production, distribution, storage, and reserves of metallurgical coal: ACTIVE_FF_SECTOR_EXPOSURE. Active exposure to fossil fuels is "Yes" if any of the below criteria are satisfied:

Oil & Gas Distribution – Revenue > 0%

Oil & Gas Extraction & Production – Revenue > 0%

Oil & Gas Petrochemicals – Revenue > 0%

Oil & Gas Pipelines Transportation – Revenue > 0%

Oil & Gas Refining – Revenue > 0%

Oil & Gas Trading Revenue > 0%

Thermal Coal Production Revenue > 0%

Thermal Coal Distribution – Involvement = Yes

²² The methodologies applied for carbon emissions estimations are covered in the following two documents: "Carbon Emissions Estimation: Methodology and Definitions", which outlines MSCI ESG Research's methodology and definitions for estimating Scope 1, Scope 2 and Scope 3 carbon emissions for companies that do not disclose their emissions data; and "Scope 3 Carbon Emissions Methodology" which describes the framework for estimating Scope 3 estimations.

Metallurgical Coal Production Revenue > 0%

Metallurgical Coal Distribution – Involvement = Yes

Metallurgical Coal Storage – Involvement = Yes

Metallurgical Coal Reserves – Involvement = Yes

PAI 5: Share of non-renewable energy consumption and production

For PAI 5, MSCI ESG Research provides the percentage of non-renewable energy consumption and production, which reflects the company's energy consumption and/or production from non-renewable sources as a percentage of total energy use and/or generation. This indicator is required by the regulator as a single factor but for purposes of the European ESG Template (EET) reporting, it is split into two sub-components: the percentage of total energy **consumption** from non-renewable sources and the percentage of total energy **production** from non-renewable sources. These two sub-components are offered in addition to an aggregate factor "Share of non-renewable energy consumption and production."

The following metrics are collected and provided, based on reported data by companies, and mapped to PAI 5: Total Energy Consumption, Total Renewable Energy Consumption, and Total Non-Renewable Energy Consumption as well as the breakdown of Non-Renewable Energy Consumption.

Companies often disclose data in absolute values, but some disclose data that require some calculations. For example, a company may disclose a percentage value or a breakdown of different energy consumption types.

Total Energy Consumption: This metric represents the Total Energy Consumption disclosed by the company, or the aggregate of Total Renewable and Total Non-Renewable Energy Consumption as disclosed by the company. Where a breakdown of various renewable and non-renewable energy sources is provided, inputs are aggregated, and total energy consumption is calculated.

Total Renewable Energy Consumption: This metric represents the Total Renewable Energy Consumption as disclosed by the company, or the aggregate value of energy consumption from renewable sources, given the company has disclosed a complete breakdown. This can also be the difference between Total Energy Consumption and Total Non-Renewable Energy Consumption, given a company discloses the difference is attributable to renewable sources.

Total Non-Renewable Energy Consumption: This metric represents the Total Non-Renewable Energy Consumption as disclosed by the company, or the aggregate value of energy consumption from non-renewable sources, given the company has disclosed a complete breakdown. This can also be the difference between Total Energy Consumption and Total Renewable Energy Consumption, given a company discloses the difference is attributable to non-renewable sources. Note, the value for Total Energy Consumption will equal the value for Total Non-Renewable Energy Consumption where a company discloses that the values are equal or explicitly discloses no energy consumption from renewable sources.

Examples of energy consumption reporting and data collection:

- In percentage:
 - Consider an example of Company A reporting their Total Energy Consumption in absolute value of 1,000 MWh and Total Renewable Energy at 30%. The calculation done to get the value of Total Renewable Energy and Total Non-Renewable Energy will be:
 - Total Renewable Energy: $1,000 \times 30\% = 300$ MWh
 - Total Non-Renewable Energy: $1,000 - 300 = 700$ MWh
- In breakdown:
 - Consider an example of Company B reporting their Total Non-Renewable Energy as 2,500 GJ and Total Renewable Energy as 800 GJ. Both sources will be aggregated to get the Total Energy Consumption as 3,300 GJ.
 - Another example will be for Company C reporting the breakdown of its renewable sources only: Solar, Wind, Hydroelectric, and Geothermal energy sources. The disclosed values will be aggregated to get the Total Renewable Energy consumption.
- Difference in unit of measurement:
 - Consider where Company D is reporting its Total Renewable Energy Consumption in GJ and Total Non-Renewable Energy Consumption in GWh. To calculate the Total Energy Consumption, both source breakdowns should have the same unit of measurement to get the sum value. The value in GJ will be converted to GWh or vice-versa.

Please note that the above examples are the more common scenarios that companies disclose and how the data for energy consumption is being collected. Some companies may disclose energy consumption data as a breakdown of sources. In this case, calculations will be done if disclosures are considered relevant.

PAI 6: Energy consumption intensity per high impact climate sector

The following factors are mapped to PAI 6: Energy consumption intensity (GWh / EUR million sales); Energy consumption intensity (GWh / USD million sales); NACE section code; Total energy consumption (GWh). Refer to PAI 5 above regarding energy consumption data. Also, note that due to lack of available activity-level energy consumption intensity data, MSCI ESG Research provides energy consumption intensity per company.

The definition of “high climate impact sector” builds on EU Regulation 2019/2089 (EU Climate Benchmark Regulation) and refers to the following 9 NACE sections: A. Agriculture, Forestry, and Fishing; B. Mining and Quarrying; C. Manufacturing; D. Electricity, Gas, Steam, and Air Conditioning Supply; E. Water Supply, Sewerage, Waste Management, and Remediation Activities; F.

Construction; G. Wholesale and Retail Trade, Repair of Motor Vehicles and Motorcycles; H. Transportation and Storage; L. Real Estate Activities.

NACE section codes (NACE_SECTION_CODE) may be used to map energy consumption intensity data of companies in the high impact climate sectors.

NACE code factors are set up to be attributed to subsidiary companies. This is consistent with the approach applied to GICS®.²³ Data Mapping²⁴ may be used for NACE section code however while some subsidiaries belong to the same industry as their parents, others do not, and so the value of Data Mapping might be questionable and is not recommended.

PAI 7: Activities negatively affecting biodiversity-sensitive areas

The metric OPS_PROT_BIODIV_CONTROVS is the main indicator mapped to PAI 7. This metric identifies a company that has operations located in biodiversity sensitive areas and is involved in controversies with severe impact on the environment.

Two other metrics are provided: OPS_PROT_BIODIV_AREAS and ENVIRONMENT_LAND_FLAG, which serve as underlying metrics or inputs to the main indicator. Respectively, these metrics identify 1) whether a company has operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas, as reported by the company, and 2) whether a company has been involved in controversies related to a firm's use or management of natural resources, as estimated based on the MSCI ESG Controversies methodology. The most severe ongoing controversies with direct involvement of the company receive a Red Flag. Partially resolved very severe controversies or those implicating the company indirectly, or severe (but not most severe) controversies receive an Orange Flag. For further details, please refer to MSCI ESG Controversies and Global Norms Methodology.

A "Yes" value is returned for this indicator where:

- The value for indicator OPS_PROT_BIODIV_AREAS is "Yes"

AND

- The value for indicator ENVIRONMENT_LAND_FLAG is "Red" or "Orange"

In all other cases, the value on this indicator is "Not Disclosed" or blank, as applicable.

²³ The Global Industry Classification Standard (GICS) was developed by and is the exclusive property of MSCI and Standard & Poor's. "Global Industry Classification Standard (GICS®)" is a service mark of MSCI and Standard & Poor's.

²⁴ Data Mapping is the process whereby ESG Evaluations for an Entity are attributed to related Issuers. ESG Evaluations are mapped based on observed parent-subsidiary relationships, subject to certain Issuer and data point requirements.

PAI 8: Emissions to water

In collecting data for water emissions (metric tons) or emissions to water for metric WATER_EM_EFF_METRIC_TONS, the disclosures looked at are the direct nitrate emissions, direct phosphate emissions, direct pesticide emissions, and direct emissions of priority substances which were discharged to bodies of water. It should be noted that water emissions are different from water discharge and untreated wastewater.

The values included will only be the emissions to water data as reported by companies, pertaining to actual pollutants or effluents and not volume of contaminated water or water quality metrics. If multiple pollutants to water are disclosed, the values are aggregated.

PAI 9: Hazardous waste and radioactive waste ratio²⁵

MSCI ESG Research collects three primary input data points for Hazardous Waste and Non-Recycled Waste: total waste, hazardous waste, and recycled waste. Similar to energy consumption, companies usually disclose data in absolute values, but some companies disclose in a different format that requires additional calculations.

Examples of waste reporting and data collection:

- In percentage:
 - Consider an example of Company X reporting their Total Waste Consumption in 1,000 metric tons and Total Non-Hazardous Waste at 30%. The calculation done to get the value of Total Hazardous Waste will be:
 - Total Non-Hazardous Waste: $1,000 \times 30\% = 300$ metric tons
 - Total Hazardous Waste: $1,000 - 300 = 700$ metric tons
- In breakdown:
 - Consider an example of Company Y reporting their Total Hazardous Waste as 2,500 kilograms and Total Non-Hazardous Waste as 800 kilograms. Both sources will be aggregated to get the Total Waste as 3,300 kilograms.
- Difference in unit of measurement:
 - Consider Company Z is reporting its Total Hazardous Waste in metric tons and Total Non-Hazardous Waste in kilograms. To calculate for the Total Waste, both source breakdown should have the same unit of measurement to get the sum value. Metric tons value will be converted to kilograms or vice-versa.

It has been observed that companies would often disclose the total waste and its corresponding breakdown of hazardous and non-hazardous wastes. As a quality check, neither of these waste types, recycled, hazardous, or other waste, should be greater

²⁵ Radioactive waste is currently only captured where reported as part of hazardous waste disclosures.

than total waste. Note, MSCI ESG Research does not verify that waste categories reported by companies cover all relevant Directives. MSCI ESG Research collects data as reported and does not have further insight into the types of waste categories captured and reported by companies.

PAI 10: Violations of UN Global Compact (UNGC) principles and Organisation for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises

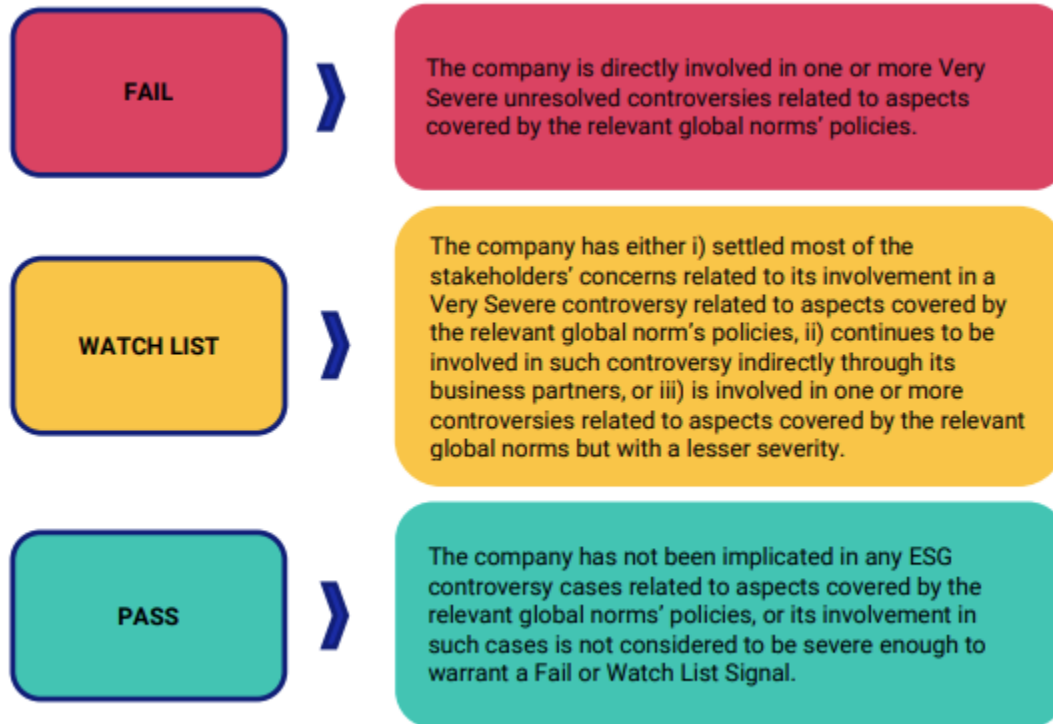
MSCI ESG Research provides three metrics mapped to PAI 10: Labor Compliance – Broad²⁶, Company – Overall Flag and OECD Alignment – all of which are based on the MSCI ESG Controversies and Global Norms methodology. The OECD Alignment factor indicates an assessment on whether the company is aligned with the Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprise.

The screening factor values include Fail, Watch List, or Pass Signals based on the Severity of specific cases in which a company is implicated (see Exhibit 19). A Fail Signal indicates that a company is directly involved in one or more Very Severe unresolved controversies in the areas covered by the OECD Guidelines. Note that the OECD Alignment factor was developed as a designated signal to replace Company Overall Flag. The MSCI ESG Controversies framework fully overlaps with all areas of adverse impact covered by the OECD guidelines. A Company Overall Flag signal "Red" is corresponding to an OECD Alignment signal "Fail". Company Overall Flag is planned to be excluded from MSCI SFDR dataset by after the next reporting period in June 2024.

MSCI ESG Research also provides a dedicated UN Global Compact (UNGC) screen for a subset of ESG controversies pertaining to UNGC 10 principles. This screen is not included here as all aspects related to violations of the UNGC would already be captured through controversies mapped to the OECD.

²⁶ Earlier iterations of the regulatory technical standards (RTS) referenced ILO principles for PAI 10. The final SFDR RTS expanded the reference beyond labor conventions to the UN Global Compact and OECD Guidelines. We have retained the "Labor Due Diligence Policy (ILO)" indicator for transitional use. We may discontinue this factor in the future.

Exhibit 19: Interpretation of the Global Norms Screen Signal



Source: MSCI ESG Research.

PAI 11: Lack of processes and compliance mechanisms to monitor compliance with UN Global Compact principles and OECD Guidelines for Multinational Enterprises

PAI 11 is intended to capture evidence, or lack thereof, of companies' mechanisms and due diligence efforts to monitor compliance with UN Global Compact principles and OECD Guidelines for Multinational Enterprises. The OECD Guidelines do not have a formal list of signatories, nor is there an exhaustive list of all metrics required for policy compliance monitoring and reporting. The UNGC, on the other hand, requires its members to report on an annual basis their efforts to ensure compliance.

Typically, such reporting includes company assurance around available internal policies and guidelines, initiatives to align operations for UNGC principles, etc. Therefore, MSCI ESG Research provides the metric MECH_UN_GLOBAL_COMPACT with

respect to companies' UNGC signatory status as it translates to a requirement to provide annual update on policy implementation.

PAI 12: Unadjusted gender pay gap

The SFDR RTS defines "unadjusted gender pay gap" as the difference between average gross hourly earnings of male paid employees and of female paid employees as a percentage of average gross hourly earnings of male paid employees. When it comes to disclosures, however, there is inconsistency in the methodology for measuring and reporting gender pay gap information across different markets and companies (e.g., whether the metric is applicable for all locations or only specific locations – for instance many companies report only UK workforce since such disclosure is mandatory in the UK), adjusted or non-adjusted to job function, period of pay (annual, monthly, hourly).

Companies typically disclose the data as:

- the male and female average pay;
- gender pay ratio in decimal, number, or, percentage;
- gender pay gap as a percentage of male pay (standard), or female pay (non-standard).

To facilitate comparability, MSCI ESG Research standardizes the various ways companies report gender pay gap into the function $(\text{Male pay} - \text{Female pay}) / \text{Male pay}$.

How to interpret the values for Gender Pay Gap:

- a **positive percentage** figure reveals that typically, or overall, employees who are women have lower pay or bonuses than employees who are men
- a **negative percentage** figure reveals that typically, or overall, employees who are men have lower pay or bonuses than employees who are women
- a **zero-percentage figure** would reveal no gap between the pay or bonuses of employees who are men and employees who are women (or there is equal pay and bonuses overall.) This is highly unlikely, but could exist for a median (midpoint) gender pay gap where a lot of employees are concentrated in the same pay grade)

PAI 13: Board gender diversity

MSCI ESG Research provides the factor Female Directors Percentage (FEMALE_DIRECTORS_PCT) mapped to PAI 13, which represents the percentage of board members who are female, which is calculated based on data as reported by companies. For companies with a two-tier board, the calculation is based on members of the Supervisory Board only.

Note, based on February 2, 2021 SFDR update, this factor replaces the retired factor Board gender diversity (FM_BOARD_RATIO), which represented the ratio of female to male board directors. The input data used for this retired factor, is the same as that used for the Female Directors Percentage factor.

PAI 14: Exposure to controversial weapons (anti-personnel mines, cluster munitions, chemical weapons, and biological weapons)

MSCI ESG Research provides the factor Exposure to controversial weapons, i.e. landmines, anti-personnel mines, cluster munitions, chemical weapons and biological weapons, (CONTRO_WEAP_CBLMBW_ANYTIE) as a calculated value based on data as reported by companies. Note, industry tie includes ownership, manufacture, or investment. Landmines do not include related safety products.

PAI 15 (applicable to investments in sovereigns and supranationals): GHG intensity

MSCI ESG Research provides the factor Country GHG intensity (CTRY_GHG_INTEN_GDP_EUR) mapped to PAI 15, based on reported data. The underlying factors are as follows:

- GHG emissions (tons of CO2 eq) (CARBON_GOVERNMENT_GHG): Total GHG emissions in a country represented in terms of tons CO2 equivalent. Six greenhouse gases, considered under the Kyoto Protocol, are considered for this data point: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. (Source: EDGAR).
- GDP nominal (USD) (CARBON_GOVERNMENT_GDP_NOMINAL_USD): This data point represents nominal GDP of a country in USD terms. (Source: World Development Indicators (WDI), Central Intelligence Agency (CIA)).
- The FX rate used to convert nominal GDP from USD to EUR is taken directly from the World Bank – annual average EUR USD rate (monthly data).

PAI 16 (applicable to investments in sovereigns and supranationals): Investee countries subject to social violations

PAI 16 refers to “investee countries subject to social violations...as referred to in international treaties and conventions, United Nations principles and, where applicable, national law.”

Based on our review of financial markets participants interpretation of the metric, and to avoid any political bias, MSCI ESG Research uses the EU Sanctions list (GOVERNMENT_EU_SANCTIONS) as a reference to sovereign states implicated in social violations. Please note that EU Sanctions list includes sovereign entities noted in the unilateral UN Sanctions list. While input data are collected and reviewed, MSCI ESG Research does not currently publish the granular information about the reason for introduction of specific EU sanctions. Such reasons may include: (i) sanctions strictly related to human rights violations, ongoing social or political conflict, and (ii) sanctions related to terrorism, nuclear proliferation, sovereignty threat or governmental fraud,

all which entail social violations. For specific cases, it is recommended to refer to the EU legal acts detailing the reasons for introduction of sanctions.

Additional climate and other environment-related indicator 15: Deforestation

SFDR additional climate and other environment-related indicator 15: Deforestation is described as “share of investments in companies without a policy to address deforestation.” No clear definition is provided as to what qualifies as a deforestation policy.

MSCI ESG Research established criteria for the MSCI SFDR Adverse Impact Metric “Deforestation Policy” based on a review of EU and international frameworks.²⁷

Based on MSCI ESG Research criteria, a company has a clear policy on deforestation if it commits to at least one of the following areas:

Zero conversion: No conversion of any natural ecosystems (e.g., peat, savannah, biomes, native grassland) into agricultural production areas, tree plantations or other land-use forms (also referred to as zero gross conversion).

Zero-deforestation: No loss/conversion of natural forests into agricultural production areas, tree plantations or other land-use forms (also referred to as zero gross deforestation). A reference to zero or no-deforestation by the company is enough.

Zero deforestation of priority forest types: Protects certain type of forests such as primary forests, rainforest, high conservation value (HCV) forests, WWF Deforestation Fronts etc.

Zero-net deforestation: Offset forest loss through forest restoration. A general commitment or statement of intent to avoiding deforestation does not qualify as a policy under this definition.

²⁷ Sources informing the methodology: Greenpeace, “Example of Zero Deforestation Policy for Companies,” 2016; Food and Agricultural Organisation, Terms and Definitions, “Global Forest Resources Assessment 2010” (FRA 2010), 2010; World Wildlife Fund, “Deforestation-Free Supply Chains”; World Resources Institute, “What Does it Really Mean When a Company Commits to “Zero Deforestation?” 2015; European Commission, “Questions and Answers on Deforestation and Forest Degradation, 2002.”

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