MSCI ESG Metrics Calculation Methodology

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1   Introduction

This document outlines the methodology used to calculate and maintain the index level ESG information ("ESG metrics") that is published by MSCI at: https://www.msci.com/index-profile.

MSCI publishes ESG metrics as per the Commission Delegated Regulation (EU) 2020/1816 of 17 July 2020 supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards the explanation in the benchmark statement of how environmental, social and governance factors are reflected in each benchmark provided and published (the "EU Delegated Act")[1].

The EU Delegated Act was published in the EU Official Journal on December 3, 2020. Annex I to the EU Delegated Act provides the relevant disclosure template, and Annex II provides the list of ESG metrics to be disclosed for ESG indexes based on the underlying assets of the indexes (e.g., equity, fixed income, etc.).

More information on the EU benchmark regulation for MSCI indexes can be found on the index regulation page of MSCI's website at: https://www.msci.com/index-regulation under "Benchmark regulation".

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[1] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L:2020:406:TOC

2   MSCI ESG Research

The calculation of ESG metrics uses company ratings and research provided by MSCI ESG Research. The following MSCI ESG Research products are used for the calculation: MSCI ESG Ratings, MSCI ESG Controversies, MSCI Business Involvement Screening Research, MSCI Climate Change Metrics and MSCI ESG Sustainable Impact Metrics.

For details on MSCI ESG Research's full suite of ESG products, please refer to: https://www.msci.com/esg-investing.

2.1   MSCI ESG Ratings

MSCI ESG Ratings provides research, analysis and ratings of how well companies manage environmental, social and governance risks and opportunities.

MSCI ESG Ratings provides an overall company ESG rating - a seven point scale from 'AAA' to 'CCC'. In addition, the product provides scores and percentiles indicating how well a company manages each key issue relative to industry peers.

For more details on MSCI ESG Ratings, please refer to: https://www.msci.com/esg-ratings.

2.2   MSCI ESG Controversies

MSCI ESG Controversies (formerly known as MSCI Impact Monitor) provides assessments of controversies concerning the negative environmental, social, and/or governance impact of company operations, products and services. The evaluation framework used in MSCI ESG Controversies is designed to be consistent with international norms represented by the UN Declaration of Human Rights, the ILO Declaration on Fundamental Principles and Rights at Work, and the UN Global Compact. MSCI ESG Controversies Score falls on a 0-10 scale, with "0" being the most severe controversy.

For more details on MSCI ESG Controversies, please refer to : https://www.msci.com/documents/10199/acbe7c8a-a4e4-49de-9cf8-5e957245b86b.

2.3   MSCI ESG Business Involvement Screening Research

MSCI ESG Business Involvement Screening Research (BISR) aims to enable institutional investors to manage environmental, social and governance (ESG) standards and restrictions reliably and efficiently.

For more details on MSCI ESG Business Involvement Screening Research, please refer to http://www.msci.com/resources/factsheets/MSCI_ESG_BISR.pdf.

2.4   MSCI Climate Change Metrics

MSCI Climate Change Metrics is designed to support investors seeking to achieve a range of objectives, including measuring and reporting on climate risk exposure, implementing low carbon and fossil fuel-free strategies, and factoring climate change research into their risk management processes. It provides Carbon Emissions, Fossil Fuel exposure, environmental impact (i.e., clean technology) data and screens, as well as climate-related risk exposure and management assessment on companies such as Low Carbon Transition scores and categories.

For more details on MSCI Climate Change Metrics, please refer to https://www.msci.com/climate-change-solutions.

2.5   MSCI ESG Sustainable Impact Metrics

MSCI ESG Research's Sustainable Impact Metrics is designed to identify companies that currently offer products or services that address at least one of the major social and environmental challenges as defined by the UN Sustainable Development Goals. Designed as a positive screen, it is designed to highlight companies that are deriving sales from products or services that may have a positive impact on society and the environment.

For more details on the MSCI ESG Sustainable Impact Metrics, please refer to: https://www.msci.com/esg-sustainable-impact-metrics.

3　Definition of ESG Metrics

Annex II to the EU Delegated Act provides a list of mandatory and voluntary ESG metrics based on the underlying assets of the indexes (e.g., equity, fixed income, etc.). MSCI discloses all mandatory ESG metrics and select voluntary ESG metrics, as well as a set of additional ESG metrics not mentioned in the Delegated Act for the purposes of enhancing transparency for the investment community.

The list and definition of each index level ESG metric published by MSCI is provided below. The table also includes the relevant text from the EU Delegated Act (Annex II).

3.1　Overall ESG Factors

ESG Metric Name	ESG Metric Definition	Text from EU Delegated Act
ESG Score	Weighted average ESG Score. The ESG Score indicates how well the index constituents manage their most material ESG risks relative to sector peers. Scores range from 10 (best) to 0 (worst).	Weighted average ESG rating of the benchmark. *(voluntary metric)*
ESG Rating - Distribution	Index distribution by company ESG Rating. The ESG Rating indicates how well the index constituents manage their most material ESG risks relative to sector peers. ESG Ratings range from AAA (best) to CCC (worst).	N/A *(additional metric)*
ESG Rating - Top Ten Constituents	Company ESG Rating of the largest ten index constituents by index weight. The ESG Rating indicates how well the index constituents manage their most material ESG risks relative to sector peers. ESG Ratings range from AAA (best) to CCC (worst).	Overall ESG rating of top ten benchmark constituents by weighting in the benchmark. *(voluntary metric)*
UN Global Compact Violations %	Exposure to companies in violation of the UN Global Compact (UNGC) principles, in accordance with the MSCI ESG Research methodology.	N/A *(additional metric)*
Very Severe Controversies %	Exposure to companies that are facing Very Severe Controversies related to the environment, customers, human rights, labor rights or governance, in	N/A *(additional metric)*

	accordance with the MSCI ESG Controversies methodology.	

3.2 Environmental Factors

ESG Metric Name	ESG Metric Definition	Text from EU Delegated Act
Environmental Pillar Score	Weighted average Environmental Pillar Score. The Environmental Pillar Score measures index constituents' management of and exposure to key environmental risks and opportunities. Scores range from 10 (best) to 0 (worst).	Weighted average environmental rating of the benchmark. *(voluntary metric)*
Environmental Pillar Score – Distribution	Index distribution by Environmental Pillar Score.	N/A *(additional metric)*
Physical Risk Climate VaR %	An aggregated downside or upside potential based on issuers' "worst-case" (95th percentile) value at risk, expressed as a percentage of the securities' market value, assuming trends in extreme cold, extreme heat, extreme precipitation, heavy snowfall, extreme wind, coastal flooding, fluvial flooding, and tropical cyclones continue along a Business-As-Usual pathway.	Exposure of the benchmark portfolio to climate-related physical risks, measuring the effects of extreme weather events on companies' operations and production or on the different stages of the supply chain (based on issuer exposure). *(voluntary metric)*
Brown Sector Exposure (NACE) %	Exposure to companies that are involved in carbon-intensive activities based on GICS® sub-industries that are mapped from the EU's NACE classification, following a two-step approach: 1. An initial list of sub-industries based on carbon-intensive activities that fall under Divisions 05 to 09, 19 and 20 of Annex I to Regulation (EC) No 1893/2006; 2. The list is then filtered to exclude sub-industries wherein 80% of companies in the MSCI ACWI IMI universe belong to the Solutions or Neutral categories	Exposure of the benchmark portfolio to companies the activities of which fall under Divisions 05 to 09, 19 and 20 of Annex I to Regulation (EC) No 1893/2006.

	using MSCI ESG Research's Low Carbon Transition framework.	
Carbon Intensity (t CO2e/$M EVIC)	Weighted average Scope 1 and Scope 2 carbon emissions intensity normalized by enterprise value including cash. (Unit: tons of CO2/ $ million enterprise value including cash)	Greenhouse gas (GHG) intensity of the benchmark.
Reported Emissions %	Exposure to companies with reported Scope 1 and 2 carbon emissions.	Percentage of GHG emissions reported versus estimated.
Estimated Emissions %	Exposure to companies with estimated Scope 1 and 2 carbon emissions.	
Wtd Avg Carbon Intensity (t CO2e/$M Sales)	Weighted average carbon intensity of index constituents based on reported and estimated Scope 1 and Scope 2 emissions. (Unit: tons of CO2e / million $ of sales).	N/A *(additional metric)*
Fossil Fuel Reserves %	Exposure to companies with evidence of owning proven or probable coal and proven oil and natural gas reserves used for energy generation.	N/A *(additional metric)*
High Climate Impact Sector %	Exposure to companies that belong to high climate impact sectors based on GICS® sub-industries that are mapped from the EU's NACE classification. This includes sectors listed in Sections A to H and Section L of Annex I to Regulation (EC) No 1893/2006 of the European Parliament and of the Council.	Degree of exposure of the portfolio to the sectors listed in Sections A to H and Section L of Annex I to Regulation (EC) No 1893/2006 as a percentage of the total weight in the portfolio.
Green Revenue	Weighted average of index constituents' percentage of revenue derived from alternative energy, energy efficiency, green building, pollution prevention, sustainable water, or sustainable agriculture.	Exposure of the benchmark portfolio to activities included in the environmental goods and services sector, as defined in Article 2, point (5) of Regulation (EU) No 691/2011 of the European Parliament and of the Council.

Green Bonds %[2]	Exposure to securities that meet the green bond criteria as defined by the MSCI ESG Research Green Bond Assessment methodology based on their use of proceeds and adherence to the four Green Bond Principles GBPs).	Percentage of green bonds in the benchmark portfolio.

3.3 Social Factors

ESG Metric Name	ESG Metric Definition	Text from EU Delegated Act
Social Pillar Score	Weighted average Social Pillar Score. The Social Pillar Score measures index constituents' management of and exposure to key social risks and opportunities. Scores range from 10 (best) to 0 (worst).	Weighted average social rating of the benchmark. *(voluntary metric)*
Social Pillar Score – Distribution	Index distribution by Social Pillar Score.	N/A *(additional metric)*
Controversial Weapons %	Exposure to companies with ties to controversial weapons. MSCI ESG Research's Controversial Weapons definition covers cluster munitions, landmines, depleted uranium weapons, biological/chemical weapons, blinding lasers, non-detectable fragments and incendiary weapons.	Weighted average percentage of benchmark constituents in the controversial weapons sector.
Tobacco Involvement - Highly Restrictive %	Exposure to companies classified as tobacco producers, and companies that derive 5% or more aggregate revenue from the manufacture, distribution, retailing, licensing, and supply of tobacco products.	Weighted average % of constituents in the Tobacco sector
Tobacco Involvement - Moderately Restrictive %	Exposure to companies that derive 5% or more revenue from tobacco production, and companies that derive 15% or more aggregate revenue from the manufacture, distribution,	N/A *(additional metric)*

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[2] Only disclosed for fixed income indexes.

	retailing, licensing, and supply of tobacco products.	
Social Violations (Count)	Absolute number of index constituents involved in social violations. Social violations are defined as Very Severe Controversies related to customers, human rights or labor rights, in accordance with the MSCI ESG Controversies methodology.	Number of benchmark constituents subject to social violations (absolute number and relative divided by all benchmark constituents), as referred to in international treaties and conventions, United Nations principles and, where applicable, national law.
Social Violations (% of Constituents)	Percentage of index constituents involved in social violations. Social violations are defined as Very Severe Controversies related to customers, human rights or labor rights, in accordance with the MSCI ESG Controversies methodology.	
Lack of Due Diligence Policy (ILO) %	Exposure to companies without due diligence policies on labor issues addressed by the fundamental International Labor Organisation (ILO) Conventions 1 to 8.	Exposure of the benchmark portfolio to companies without due diligence policies on issues addressed by Conventions 1 to 8 of the International Labor Organisation.
Gender Pay Gap	Weighted average difference between the average gross hourly earnings of male and female employees as a percentage of male gross earnings, based on company reported data. Note that reporting on this metric is inconsistent: some companies report the absolute or uncontrolled pay gap while other control for compensable factors such as role or location.	Weighted average gender pay gap.
Female: Male Board Diversity Ratio	Weighted average ratio of female to male board members (%).	Weighted average ratio of female to male board members.
Total Recordable Injury Rate	Weighted average total recordable injury rate (TRIR) per million hours worked. The TRIR includes fatalities, lost time injuries, restricted work injuries, and medical treatment injuries.	Weighted average ratio of accidents, injuries, fatalities.

Bribery and Corruption Controversies (Sum)	Total number of controversy cases in the last three years related to index constituents' involvement in bribery and corruption issues.	Numbers of convictions and amount of fines for violations of anti-corruption and anti-bribery laws.

3.3.1 Controversial Weapons – International Treaties and Conventions

The EU Delegated Act requires the disclosure of "International treaties and conventions, United Nations principles or, where applicable, national law used in order to determine what constitutes a controversial weapon".

The list of treaties and conventions related to the "Controversial Weapons %" metric is provided below:

- The Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction.

- The Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction.

- Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction.

- Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects.

- The Convention on Cluster Munitions.

3.4 Governance Factors

ESG Metric Name	ESG Metric Definition	Text from EU Delegated Act
Governance Pillar Score	Weighted average Governance Pillar Score. The Governance Pillar Score measures index constituents' management of and exposure to key governance risks. Scores range from 10 (best) to 0 (worst).	Weighted average governance rating of the benchmark. *(voluntary metric)*
Governance Pillar Score – Distribution	Index distribution by Governance Pillar Score.	N/A *(additional metric)*
Board Independence	Weighted average percentage of board members that meet MSCI ESG Research criteria for board independence.	Weighted average percentage of board members who are independent.

Board Diversity	Weighted average percentage of women on the boards of index constituents.	Weighted average % of female board members.

3.5 EU Climate Transition and EU Paris-aligned Benchmarks Factors

ESG Metric Name	Text from EU Delegated Act
Forward-looking year-on-year decarbonization trajectory.	Forward-looking year-on-year decarbonization trajectory.
Degree to which the IPCC decarbonization trajectory (1.5°C with no or limited overshoot) has been achieved on average per year since creation.	Degree to which the IPCC decarbonization trajectory (1.5°C with no or limited overshoot) has been achieved on average per year since creation.
Overlap between the benchmark and its investable universe, using the active share at asset level.	Overlap between those benchmarks and their investable universe, as defined in Article 1, point (e), of Commission Delegated Regulation (EU) 2020/1818, using the active share at asset level.

4   Calculation of ESG Metrics

4.1   Indexes in Scope

The overall ESG factors as well as the Environmental, Social and Governance factors are disclosed for:

- All MSCI indexes of the MSCI equity, fixed income and blended benchmark families that pursue ESG objectives ("ESG indexes").

- All MSCI indexes of the MSCI equity, fixed income and blended benchmark families that do not pursue ESG objectives ("non-ESG indexes"), except for currency-only indexes (e.g., MSCI FX Hedge and Global Currency Indexes) and indexes from select index methodologies[3].

The disclosure of ESG metrics for non-ESG indexes aims to facilitate meaningful comparisons, though this is not required per the EU Delegated Act. For example, MSCI provides ESG metrics for all market capitalization weighted MSCI indexes such as the MSCI Global Investable Market Indexes, which enables the comparison of the ESG characteristics of ESG indexes with their parent indexes.

In addition, the EU Climate Transition and EU Paris-aligned Benchmarks factors are disclosed for all MSCI indexes labelled as 'EU Climate Transition Benchmark' or 'EU Paris-Aligned Benchmark'.

4.2   Data Used for the Calculation

The calculation of index level ESG metrics use the following data:

- Index security weights as of the close of the last weekday of the month. The weights do not take into account changes to be effective after the last weekday of the month.

- ESG data as available from MSCI ESG Research as of the last weekday of the month.

- Global Industry Classification Standard (GICS®) classification of companies as of the last weekday of the month.

- Fundamental data of companies as of the last weekday of the month[4].

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[3] For example, MSCI Daily Hedged, MSCI Risk Control, MSCI Decrement, MSCI Short & Leveraged, MSCI Market Neutral Barra Factor, MSCI PIMFA Private Investor, MSCI Dynamic Planner and MSCI Liquid Real Estate indexes.

[4] For more information, please refer to the MSCI Fundamental Data Methodology available at: https://www.msci.com/index-methodology

The ESG metrics for an MSCI index are generally calculated based on security data for that index.

However, for the following MSCI indexes the ESG metrics are calculated based on security data for the "parent index" or "underlying index"[5].

- MSCI Hedged Indexes
- MSCI Daily Hedged Indexes[6]
- MSCI Adaptive Hedged Indexes
- MSCI Cross Hedged Indexes
- MSCI Dividend Point Indexes
- MSCI Risk Control Indexes[6]
- MSCI Decrement Indexes[6]
- MSCI Short & Leveraged Indexes[6, 7]

4.3 Calculation Details and Formulas

This section shows how the different data (index security weights, ESG data, GICS® classification, Fundamental data) is combined and aggregated to derive each of the index level ESG metrics.

ESG data from MSCI ESG Research is displayed in upper characters. The detailed definition of each ESG datapoint is provided in Appendix 1.

4.3.2 Overall ESG Factors

4.3.2.1   ESG Score

$$\sum_{i=1}^{n} (Weight_i \times INDUSTRY\_ADJUSTED\_SCORE_i) \Big/ \sum_{i=1}^{n} (Weight_i)$$

Where:

- i = index security with ESG score available
- $Weight_i$ = closing index weight for security i

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[5] For more information, please refer to the respective index methodology books available at:
https://www.msci.com/index-methodology

[6] ESG metrics disclosed only for MSCI indexes that pursue ESG objectives.

[7] For indexes that combine long and short positions, the ESG metrics are calculated based on security data for the long component index.

- *INDUSTRY_ADJUSTED_SCORE$_i$* = ESG score of security i

4.3.2.2 ESG Rating − Distribution

The ESG Rating distribution is obtained by performing the following calculation for each ESG Rating value "k":

$$\sum_{i=1}^{n}\left(Weight_i \times ESG\ Rating\ Factor_{i,k}\right) / \sum_{i=1}^{n}\left(Weight_i\right)$$

Where:

- *i* = index security with ESG score available

- *k* = ESG Rating value, where k ranges from AAA (highest) to CCC (lowest)

- *Weight$_i$* = closing index weight for security i

- *ESG Rating Factor$_{i,k}$* = ESG Rating factor for security i and ESG Rating value k

  - Equals to 1 if security i has ESG Rating value k (*IVA_COMPANY_RATING$_i$* = k), otherwise equals to 0

4.3.2.3 UN Global Compact Violations %

$$\sum_{i=1}^{n}\left(Weight_i \times UNGC\ Violations\ Factor_i\right) / \sum_{i=1}^{n}\left(Weight_i\right)$$

Where:

- *i* = index security with ESG score available

- *Weight$_i$* = closing index weight for security i

- *UNGC Violations Factor$_i$* = UN Global Compact violations factor for security i

  - Equals to 1 if security i fails to comply with UNGC principles (*UNGC_COMPLIANCE$_i$* = 'Fail'), otherwise equals to 0

4.3.2.4 Very Severe Controversies %

$$\sum_{i=1}^{n}\left(Weight_i \times Very\ Severe\ Controversies\ Factor_i\right) / \sum_{i=1}^{n}\left(Weight_i\right)$$

Where:

- *i* = index security with ESG score available

- *Weight$_i$* = closing index weight for security i

- *Very Severe Controversies Factor$_i$* = very severe controversies factor for security i
    - Equals to 1 if security i is flagged for a very severe controversy (*OVERALL_FLAG$_i$* = 'Red'), otherwise equals to 0

4.3.3 Environmental Factors

4.3.3.1   Environmental Pillar Score

$$\sum_{i=1}^{n}(Weight_i \times ENVIRONMENTAL\_PILLAR\_WEIGHT_i \times ENVIRONMENTAL\_PILLAR\_SCORE_i)$$

$$/ \sum_{i=1}^{n}(Weight_i \times ENVIRONMENTAL\_PILLAR\_WEIGHT_i)$$

Where:

- *i* = index security with Environmental Pillar Score available
- *Weight$_i$* = closing index weight for security i
- *ENVIRONMENTAL_PILLAR_WEIGHT$_i$* = Environmental pillar weight of security i
- *ENVIRONMENTAL_PILLAR_SCORE$_i$* = Environmental pillar score of security i

4.3.3.2   Environmental Pillar Score – Distribution

The environmental pillar score distribution is obtained by performing the following calculation for each range "k" of environmental pillar scores:

$$\sum_{i=1}^{n}(Weight_i \times ENVIRONMENTAL\_PILLAR\_WEIGHT_i \times Environmental\ Pillar\ Factor_{i,k})$$

$$/ \sum_{i=1}^{n}(Weight_i \times ENVIRONMENTAL\_PILLAR\_WEIGHT_i)$$

Where:

- *i* = index security with environmental pillar score available
- *k* = ranges of environmental pillar scores: {0 to 1, 1 to 2, […], 8 to 9, 9 to 10}
- *Weight$_i$* = closing index weight for security i

- *ENVIRONMENTAL_PILLAR_WEIGHT$_i$* = Environmental pillar weight of security i

- *Environmental Pillar Factor$_{i,k}$* = environmental pillar score factor for security i and range k

    o Equals to 1 if security i's environmental pillar score is within the k range (*ENVIRONMENTAL_PILLAR_SCORE$_i$* ∈ k), otherwise equals to 0

4.3.3.3 Physical Risk Climate VaR %

$$\sum_{i=1}^{n}(Weight_i \times CLIMATE\ VAR_i) / \sum_{i=1}^{n}(Weight_i)$$

Where:

- *i* = index security with extreme weather Climate VaR available

- *Weight$_i$* = closing index weight for security i

- *CLIMATE VAR$_i$* = extreme weather Climate VaR − aggressive scenario (as defined in section 3.3) for security i

4.3.3.4 Brown Sector Exposure (NACE) %

$$\sum_{i=1}^{n}(Weight_i \times Brown\ Sector\ Factor_i) / \sum_{i=1}^{n}(Weight_i)$$

Where:

- *i* = index security

- *Weight$_i$* = closing index weight for security i

- *Brown Sector Factor$_i$* = Brown sector factor for security i

    o Equals to 1 if security i has a GICS® classification that indicates Brown sector exposure, otherwise equals to 0

On each date that the calculation is performed, the set of GICS® Sub-Industries that indicate Brown sector exposure is derived as follows:

- First, the Brown sector classifications as defined by the EU Delegated Act (i.e., NACE classifications from Divisions 05 to 09, 19 and 20 of Annex I

to Regulation (EC) No 1893/2006) are mapped to the GICS® Sub-Industries using the GICS® to NACE mapping[8]

- Second, the mapped GICS® Sub-Industries are filtered to remove GICS® Sub-Industries with more than 80% weight in the Solutions and Neutral categories of the Low Carbon Transition framework

The 80% threshold will be reviewed and adjusted as necessary each time there is a relevant change in the GICS® and/or NACE methodologies or mapping, or a change in the Low Carbon Transition methodology.

4.3.3.5 Carbon Intensity (t CO2/$M EVIC)

$$\sum_{i=1}^{n}(Weight_i \times CARBON\_EMISSIONS\_SCOPE\_12_i / EVIC_i) / \sum_{i=1}^{n}(Weight_i)$$

Where:

- i = index security with both Carbon emissions (scope 1 and 2) and EVIC available

- $Weight_i$ = closing index weight for security i

- $CARBON\_EMISSIONS\_SCOPE\_12_i$ = scope 1 and 2 carbon emissions of security i's issuer (in t CO2)

- $EVIC_i$ = Company enterprise value including cash for security i's issuer (in USD million)

4.3.3.6 Reported Emissions %

$$\sum_{i=1}^{n}(Weight_i \times Reported\ Emissions\ Factor_i)$$

Where:

- i = index security with both Carbon emissions (scope 1 and 2) and EVIC available

- $Weight_i$ = closing index weight for security i

- $Reported\ Emissions\ Factor_i$ = reported emissions factor for security i

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[8] For more information on the mapping, please refer to Appendix B.2 of the Handbook published on December 20, 2019 by the EU Technical Expert Group on Sustainable Finance: https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/192020-sustainable-finance-teg-benchmarks-handbook_en_0.pdf

o Equals to 1 if security i's issuer has reported emissions (*CARBON_EMISSIONS_SCOPE_12_KEY$_i$* = 'Reported'), otherwise equals to 0

4.3.3.7　Estimated Emissions %

$$\sum_{i=1}^{n}(Weight_i \times Estimated\ Emissions\ Factor_i)$$

Where:

- *i* = index security with both Carbon emissions (scope 1 and 2) and EVIC available
- *Weight$_i$* = closing index weight for security i
- *Estimated Emissions Factor$_i$* = estimated emissions factor for security i
    - o Equals to 1 if security i's issuer has estimated emissions (*CARBON_EMISSIONS_SCOPE_12_KEY$_i$* <> 'Reported'), otherwise equals to 0

4.3.3.8　Weighted Average Carbon Intensity (t CO2/$M Sales)

$$\sum_{i=1}^{n}(Weight_i \times CARBON\_EMISSIONS\_SCOPE\_12_i\ /\ SALES_i)\ /\ \sum_{i=1}^{n}(Weight_i)$$

Where:

- *i* = index security with both Carbon emissions (scope 1 and 2) and Sales available
- *Weight$_i$* = closing index weight for security i
- *CARBON_EMISSIONS_SCOPE_12$_i$* = scope 1 and 2 carbon emissions of security i's issuer (in t CO2)
- *SALES$_i$* = Company sales for security i's issuer (in USD million)

4.3.3.9　Fossil Fuel Reserves %

$$\sum_{i=1}^{n}(Weight_i \times Fossil\ Fuel\ Reserves\ Factor_i)\ /\ \sum_{i=1}^{n}(Weight_i)$$

Where:

- *i* = index security
- *Weight$_i$* = closing index weight for security i
- *Fossil Fuel Reserves Factor$_i$* = Fossil Fuel Reserves factor for security i

- Equals to 1 if security i's issuer has evidence of owning fossil fuel reserves used for energy applications (*FF_RESERVES_ENERGY_APPLICATION$_i$* = 'True'), otherwise equals to 0

4.3.3.10   High Climate Impact Sector %

$$\sum_{i=1}^{n}(Weight_i \times High\ Climate\ Impact\ Factor_i) / \sum_{i=1}^{n}(Weight_i)$$

Where:

- *i* = index security

- *Weight$_i$* = closing index weight for security i

- *High Climate Impact Factor$_i$* = High climate impact factor for security i

  - Equals to 1 if security i has a GICS® classification that indicates High climate impact sector exposure, otherwise equals to 0

  - To determine if a GICS® classification indicates High climate impact sector exposure, the High climate impact sector classifications as defined by the EU Delegated Act (i.e., NACE sectors listed in Sections A to H and Section L of Annex I to Regulation (EC) No 1893/2006) are mapped to the GICS® Sub-Industries using the GICS® to NACE mapping[9]

4.3.3.11   Green Revenue

$$\sum_{i=1}^{n}(Weight_i \times CT\_TOTAL\_MAX\_REV_i) / \sum_{i=1}^{n}(Weight_i)$$

Where:

- *i* = index security

- *Weight$_i$* = closing index weight for security i

- *CT_TOTAL_MAX_REV$_i$* = Clean tech revenue for security i

4.3.3.12   Green Bonds %

This metric is calculated for MSCI Fixed Income Indexes only.

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[9] For more information on the mapping, please refer to Appendix B.2 of the Handbook published on December 20, 2019 by the EU Technical Expert Group on Sustainable Finance: https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/192020-sustainable-finance-teg-benchmarks-handbook_en_0.pdf

$$\sum_{i=1}^{n}(Weight_i \times Green\ Bond\ Factor_i) \Big/ \sum_{i=1}^{n}(Weight_i)$$

Where:

- i = index security
- $Weight_i$ = closing index weight for security i
- $Green\ Bond\ Factor_i$ = Green bond factor for security i
  - Equals to 1 if security i meets the relevant green bond criteria ($GB\_ELIGIBLE_i$ = 'True'), otherwise equals to 0

4.3.4 Social Factors

4.3.4.1 Social Pillar Score

$$\sum_{i=1}^{n}(Weight_i \times SOCIAL\_PILLAR\_WEIGHT_i \times SOCIAL\_PILLAR\_SCORE_i)$$

$$\Big/ \sum_{i=1}^{n}(Weight_i \times SOCIAL\_PILLAR\_WEIGHT_i)$$

Where:

- i = index security with Social Pillar Score available
- $Weight_i$ = closing index weight for security i
- $SOCIAL\_PILLAR\_WEIGHT_i$ = Social pillar weight of security i
- $SOCIAL\_PILLAR\_SCORE_i$ = Social pillar score of security i

4.3.4.2 Social Pillar Score – Distribution

The social pillar score distribution is obtained by performing the following calculation for each range "k" of social pillar scores:

$$\sum_{i=1}^{n}\big(Weight_i \times SOCIAL\_PILLAR\_WEIGHT_i \times Social\ Pillar\ Factor_{i,k}\big)$$

$$\Big/ \sum_{i=1}^{n}(Weight_i \times SOCIAL\_PILLAR\_WEIGHT_i)$$

Where:

- i = index security with social pillar score available
- k = ranges of social pillar scores: {0 to 1, 1 to 2, […], 8 to 9, 9 to 10}
- $Weight_i$ = closing index weight for security i

- *SOCIAL_PILLAR_WEIGHT$_i$* = Social pillar weight of security i
- *Social Pillar Factor$_{i,k}$* = social pillar score factor for security i and range k
  - Equals to 1 if security i's social pillar score is within the k range (*SOCIAL_PILLAR_SCORE$_i$* ∈ k), otherwise equals to 0

4.3.4.3 Controversial Weapons %

$$\sum_{i=1}^{n}(Weight_i \times Controversial\ Weapons\ Factor_i) / \sum_{i=1}^{n}(Weight_i)$$

Where:

- *i* = index security
- *Weight$_i$* = closing index weight for security i
- *Controversial Weapons Factor$_i$* = Controversial weapons factor for security i
  - Equals to 1 if security i has ties to controversial weapons (*CWEAP_TIE$_i$* = 'True'), otherwise equals to 0

4.3.4.4 Tobacco Involvement − Highly Restrictive

$$\sum_{i=1}^{n}(Weight_i \times Tobacco\ Highly\ Restrictive\ Screen_i) / \sum_{i=1}^{n}(Weight_i)$$

Where:

- *i* = index security
- *Weight$_i$* = closing index weight for security i
- *Tobacco Highly Restrictive Screen$_i$* = Screening status for security i
  - Equals to 1 if security i is screened for Tobacco Involvement at Highly Restrictive level (*TOB_PRODUCER$_i$* = 'True' or *TOB_MAX_REV_PCT$_i$* >= 5), otherwise equals to 0

4.3.4.5 Tobacco Involvement − Moderately Restrictive

$$\sum_{i=1}^{n}(Weight_i \times Tobacco\ Moderately\ Restrictive\ Screen_i) / \sum_{i=1}^{n}(Weight_i)$$

Where:

- *i* = index security
- *Weight$_i$* = closing index weight for security i

- *Tobacco Moderately Restrictive Screen$_i$* = Screening status for security i
  - o Equals to 1 if security i is screened for Tobacco Involvement at Moderately Restrictive level (*TOB_PROD_MAX_REV_PCT$_i$* >= 5 or *TOB_MAX_REV_PCT$_i$* >= 15), otherwise equals to 0

4.3.4.6   Social Violations (Count)

$$\sum_{i=1}^{n}(Social\ Violations\ Factor_i)$$

Where:

- *i* = index security
- *Social Violations Factor$_i$* = Social violations factor for security i
  - o Equals to 1 if security i has very severe social controversies (*SOCIAL_CONTROVERSY_SCORE$_i$* = 0), otherwise equals to 0

4.3.4.7   Social Violations (% of Constituents)

$$\left.\sum_{i=1}^{n}(Social\ Violations\ Factor_i)\middle/\sum_{i=1}^{n}(i)\right.$$

Where:

- *i* = index security
- *Social Violations Factor$_i$* = Social violations factor for security i
  - o Equals to 1 if security i has very severe social controversies (*SOCIAL_CONTROVERSY_SCORE$_i$* = 0), otherwise equals to 0

4.3.4.8   Lack of Due Diligence Policy (ILO) %

$$\sum_{i=1}^{n}(Weight_i \times ILO\ Due\ Diligence\ Factor_i) / \sum_{i=1}^{n}(Weight_i)$$

Where:

- *i* = index security
- *Weight$_i$* = closing index weight for security i
- *ILO Due Diligence Factor$_i$* = ILO due diligence factor for security i
  - o Equals to 1 if security i's issuer does not have due diligence policies on labor issues addressed by the fundamental ILO Conventions 1 to 8, otherwise:

- Equity to 1 if *LABOR_POLICY_INTL_RECOGNIZED_M$_i$* = 'No', otherwise equals to 0

4.3.4.9   Gender Pay Gap

$$\sum_{i=1}^{n}(Weight_i \times GENDER\ PAY\ GAP\ RATIO_i) / \sum_{i=1}^{n}(Weight_i)$$

Where:

- *i* = index security with gender pay gap ratio available

- *Weight$_i$* = closing index weight for security i

- *GENDER PAY GAP RATIO$_i$* = Gender pay gap ratio (as defined in section 3.3) for security i's issuer

4.3.4.10   Female: Male Board Diversity Ratio

$$\sum_{i=1}^{n}(Weight_i \times FEMALE\ MALE\ BOARD\ RATIO_i) / \sum_{i=1}^{n}(Weight_i)$$

Where:

- *i* = index security with female to male board ratio available

- *Weight$_i$* = closing index weight for security i

- *FEMALE MALE BOARD RATIO$_i$* = Ratio of female to male board members for security i's issuer

4.3.4.11   Total Recordable Injury Rate

$$\sum_{i=1}^{n}(Weight_i \times TRIR_i) / \sum_{i=1}^{n}(Weight_i)$$

Where:

- *i* = index security with total recordable injury rate available

- *Weight$_i$* = closing index weight for security i

- *TRIR$_i$* = Total recordable injury rate per million hours worked (as defined in section 3.3) for security i's issuer

4.3.4.12   Bribery and Corruption Controversies (Sum)

$$\sum_{i=1}^{n}(CONTR\_BRIR\_CORRUP\_N\_TOTAL_i)$$

Where:

- *i* = index issuer (i.e., issuer with at least one index constituent security included in the index)
- *TRIR$_i$* = Total bribery and correction controversy cases of issuer i

4.3.5 Governance Factors

4.3.5.1 Governance Pillar Score

$$\sum_{i=1}^{n}(Weight_i \times GOVERNANCE\_PILLAR\_WEIGHT_i \times GOVERNANCE\_PILLAR\_SCORE_i)$$

$$/ \sum_{i=1}^{n}(Weight_i \times GOVERNANCE\_PILLAR\_WEIGHT_i)$$

Where:

- *i* = index security with Governance Pillar Score available
- *Weight$_i$* = closing index weight for security i
- *GOVERNANCE_PILLAR_WEIGHT$_i$* = Governance pillar weight of security i
- *GOVERNANCE_PILLAR_SCORE$_i$* = Governance pillar score of security i

4.3.5.2 Governance Pillar Score – Distribution

The governance pillar score distribution is obtained by performing the following calculation for each range "k" of governance pillar scores:

$$\sum_{i=1}^{n}(Weight_i \times GOVERNANCE\_PILLAR\_WEIGHT_i \times Governance\ Pillar\ Factor_{i,k})$$

$$/ \sum_{i=1}^{n}(Weight_i \times GOVERNANCE\_PILLAR\_WEIGHT_i)$$

Where:

- *i* = index security with governance pillar score available
- *k* = ranges of governance pillar scores: {0 to 1, 1 to 2, […], 8 to 9, 9 to 10}
- *Weight$_i$* = closing index weight for security i
- *GOVERNANCE_PILLAR_WEIGHT$_i$* = Governance pillar weight of security i
- *Governance Pillar Factor$_{i,k}$* = governance pillar score factor for security i and range k
    - Equals to 1 if security i's governance pillar score is within the k range (*GOVERNANCE_PILLAR_SCORE$_i$* ∈ k), otherwise equals to 0

4.3.5.3   Board Independence

$$\sum_{i=1}^{n}(Weight_i \times BOARD\_INDEP\_PCT_i) \,/\, \sum_{i=1}^{n}(Weight_i)$$

Where:

- i = index security with Board independence percentage available
- $Weight_i$ = closing index weight for security i
- $BOARD\_INDEP\_PCT_i$ = Board independence percentage of security i's issuer

4.3.5.4   Board Diversity

$$\sum_{i=1}^{n}(Weight_i \times CORP\_GOV\_PCT\_WOMEN\_BOARD_i) \,/\, \sum_{i=1}^{n}(Weight_i)$$

Where:

- i = index security with female board members percentage available
- $Weight_i$ = closing index weight for security i
- $CORP\_GOV\_PCT\_WOMEN\_BOARD_i$ = Female board members percentage of security i's issuer

4.3.6   Percentage of Coverage

For each of the overall ESG factors as well as the Environmental, Social and Governance factors defined in sections 3.1 to 3.4, MSCI discloses the corresponding percentage of coverage of the underlying ESG data used for the ESG metric calculation. This information is not required by the Delegated Act and is provided by MSCI for transparency purpose.

The percentage of coverage is derived by dividing the number of index constituent securities that have underlying ESG data available with the total number of index constituent securities.

For example, the percentage of coverage for the ESG Score metric is calculated as follows:

$$\frac{Number\ of\ index\ constituent\ securities\ with\ INDUSTRY\_ADJUSTED\_SCORE\ available}{Total\ number\ of\ index\ constituent\ securities}$$

Where:

- $INDUSTRY\_ADJUSTED\_SCORE_i$ = ESG score of security i

4.3.7 EU Climate Transition and EU Paris-aligned Benchmarks Factors

These metrics are calculated only for MSCI indexes labelled as 'EU Climate Transition Benchmark' or 'EU Paris-Aligned Benchmark'.

4.3.7.1 Degree to which the IPCC decarbonization trajectory has been achieved

This metric is calculated at each Semi-Annual Index Review of the index. The metric is not updated between Semi-Annual Index Reviews.

$$\left(\frac{W_t}{W_1}\right)^{\frac{2}{(t-1)}}$$

Where:

- t = number of Semi-Annual Index Reviews since the index Base Date
- W_t = Carbon Intensity (t CO2/$M EVIC) as of t
- W_1 = Carbon Intensity (t CO2/$M EVIC) as of index Base Date

4.3.7.2 Overlap between the benchmark and its investable universe

$$\left[\sum_{i=1}^{n} Abs\left(Weight\ Parent_i - Weight_i\right)\right] / 2$$

Where:

- i = index security of parent index
- $Weight\ Parent_i$ = parent index closing index weight for security i
- $Weight_i$ = closing index weight for security i

5 Maintenance of ESG Metrics

5.1 Ongoing Review and Publication

The ESG metrics are calculated once a month using end of month data, as described in section 4.2. The calculation is performed on the first business day of the following month and the ESG metrics are published on MSCI's website at https://www.msci.com/index-profile by the third business day of the following month.

The updated ESG metrics information published on MSCI's website replaces the previously available data. MSCI maintains record of historical ESG metrics information for at least five years as per the requirement from the Delegated Act.

5.2 Correction Policy

In certain circumstances, such as errors in the calculation of the metrics or in the input data used for the calculation, MSCI reserves the right to correct the ESG metrics information disclosed on MSCI's website, and in such case would release a relevant announcement accordingly.

Appendix 1: ESG Data Definitions

The list of ESG datapoints ("Factors") provided by MSCI ESG Research and used for the ESG metrics calculation is provided below.

Field Name (Column Header)	Factor Name	Factor Description
BOARD_INDEP_PCT	Board Independence Percentage	The percentage of board members that meet our designated criteria for independence. For companies with a two-tier board, the calculation is based on members of the Supervisory Board only.
CARBON_EMISSIONS_ SCOPE_12	Carbon Emissions - Scope 1+2 (metric tons)	This figure represents the company's most recently reported or estimated Scope 1 + Scope 2 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. Scope 2 emissions are those caused by the generation of electricity purchased by the company.
CARBON_EMISSIONS_ SCOPE_12_KEY	Carbon Emissions - Scope 1+2 KEY	This field indicates whether the Scope 1 + 2 emissions figure was reported by the company or estimated. See the Carbon Estimation Methodology for details.
CONTR_BRIB_CORRUPT_N_ TOTAL	Total number of Bribery and Corruption Controversies	Total number of controversy cases in last three years related to company's involvement in: Bribery & corruption issues.
CORP_GOV_PCT_WOMEN_ BOARD	Corporate Governance Percentage of Women on the Board	This figure indicates the number of women on the board as a percentage of total board members.
CT_TOTAL_MAX_REV	Environmental Impact Solutions - Maximum Percentage of Revenue	This field represents the total of all revenues derived from any of the six environmental impact themes including alternative energy, energy efficiency, green building, pollution prevention, sustainable water, or sustainable agriculture.
CWEAP_TIE	Controversial Weapons - Any Tie	Companies that have any ties to cluster munitions, landmines, biological / chemical weapons, depleted uranium weapons, blinding laser weapons, incendiary weapons, and/or non-detectable fragments.
ENVIRONMENTAL_PILLAR_ SCORE	Environmental Pillar Score	The Environmental Pillar Score represents the weighted average of all Key Issues that fall under the Environment Pillar.
ENVIRONMENTAL_PILLAR_ WEIGHT	Environmental Pillar Weight	The Environmental Pillar Weight represents the sum of the weights of all Key Issues that fall under the Environment Pillar.

FF_RESERVES_ENERGY_ APPLICATION	Fossil Fuel Reserves – Energy Application	This factor identifies companies, regardless of their industries, with evidence of owning fossil fuel reserves used most likely for energy applications. For high intensity industries (Energy, Utilities, Diversified Metals & Mining), this factor flags companies with evidence of fossil fuel reserves (excluding metallurgical coal). For other industries, it flags companies with evidence of fossil fuel reserves (excluding metallurgical coal) and deriving revenue from business segments associated with energy application of fossil fuels such as thermal coal mining, oil & gas exploration & production and downstream activities e.g. refining; distribution & retail; pipeline & transportation; trading and fossil fuel based power generation. Fossil fuel reserves are defined as proved and probable reserves (i.e. 2P) for coal and proved reserves (i.e. 1P) for oil and natural gas. Evidence of owning reserves includes companies providing the exact volume of reserves, and companies making a statement about their ownership of reserves.
GOVERNANCE_PILLAR _SCORE	Governance Pillar Score	The Governance Pillar Score provides an assessment of risk and management practices related to Corporate Governance and Corporate Behavior. The 0-10 score is based on the sum of deductions derived from Key Metrics included in the Corporate Governance (including Board, Pay, Ownership & Control, and Accounting) and Corporate Behavior (including Business Ethics and Tax Transparency) themes. Low scores correspond to companies with weak corporate governance practices, weak business ethics programs, high exposure to corruption risk, and/or involvement in business ethics-related controversies. (Score: 0-10)
GOVERNANCE_PILLAR_ WEIGHT	Governance Pillar Weight	The Governance Pillar Weight represents the sum of the weights of all Key Issues that fall under the Governance Pillar.
INDUSTRY_ADJUSTED_ SCORE	Final Industry-Adjusted Company Score	The score is calculated by normalizing the Weighted Average Key Issue Score to the Industry peer set, adjusted to reflect any Ratings Review Committee overrides; see the ESG Rating Methodology document for details.
IVA_COMPANY_RATING	ESG Rating	A company's final ESG Rating. To arrive at a final letter rating, the weighted average of the key issue scores are aggregated and companies are ranked from best (AAA) to worst (CCC).
LABOR_POLICY_INTL_ RECOGNIZED_M	Policy addressing internationally	Flagged as "Yes" if company has a policy addressing internationally recognized labor conventions for its workforce.

	recognized labor conventions (Yes, No)	
OVERALL_FLAG	Company Summary - Overall Flag	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.
SOCIAL_CONTROVERSY_SCORE	Social - Controversy Score	This Social pillar is an assessment of controversies (if any) related to a firm's impact on Customers, Human Rights & Community, and Labor Rights & Supply Chain. The score is derived from the lowest scoring sub-pillar (Customers, Human Rights & Community, and Labor Rights & Supply Chain) within the Social pillar.
SOCIAL_PILLAR_SCORE	Social Pillar Score	The Social Pillar Score represents the weighted average of all Key Issues that fall under the Social Pillar.
SOCIAL_PILLAR_WEIGHT	Social Pillar Weight	The Social Pillar Weight represents the sum of the weights of all Key Issues that fall under the Social Pillar.
TOB_MAX_REV_PCT	Tobacco Total - Maximum Percentage of Revenue	The recent-year percent of revenue, or maximum estimated percent, a company has derived from tobacco-related business activities.
TOB_PROD_MAX_REV_PCT	Tobacco Producer - Maximum Percentage of Revenue	The recent-year percent of revenue, or maximum estimated percent, a company has derived from the manufacture of tobacco products.
TOB_PRODUCER	Tobacco Producer	Companies that manufacture tobacco products, such as cigars, blunts, cigarettes, e-cigarettes, inhalers, beedis, kreteks, smokeless tobacco, snuff, snus, dissolvable and chewing tobacco. This also includes companies that grow or process raw tobacco leaves.
UNGC_COMPLIANCE	Global Compact Compliance	This factor indicates whether the company is in compliance with the United Nations Global Compact principles. The possible values are Fail, Watch List, or Pass. See the ESG Controversies and Global Norms methodology document for detailed explanations.

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