MSCI Climate Paris Aligned ex Select Business Involvement Screens Indexes Methodology

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Contents

1 Introduction

The MSCI Climate Paris Aligned Ex Select Business Involvement Screens Indexes[1] (the 'Indexes') are designed to support investors seeking to reduce their exposure to transition and physical climate risks and who wish to pursue opportunities arising from the transition to a lower-carbon economy while aligning with the Paris Agreement requirements. The Indexes are designed to exceed the minimum standards of the EU Paris-Aligned Benchmark. Additionally, the Indexes apply certain values-based exclusion criteria. The Indexes are constructed from their corresponding market capitalization weighted indexes ("the Parent Indexes") following an optimization-based approach and aim to:

- Exceed the minimum technical requirements laid out in the EU Delegated Act[2].
- Align with a 1.5°C climate scenario using the MSCI Climate Value-at-Risk and a "self-decarbonization" rate of 10% year on year.
- Reduce the Indexes' exposure to physical risk arising from extreme weather events by at least 50%.
- Shift index weight from companies facing climate transition risks to companies having climate transition opportunities, using the MSCI Low Carbon Transition Score, and by excluding certain fossil fuel-linked companies.
- Increase the weight of companies which are exposed to climate transition opportunities and reduce the weight of companies which are exposed to climate transition risks.
- Reduce the weight of companies assessed as high carbon emitters using scope 1, 2 and 3 emissions
- Increase the weight of companies with credible carbon reduction targets through the weighting scheme.
- Achieve a modest tracking error compared to the Parent Indexes and low turnover[3].

[1] The Indexes are governed by a set of methodology and policy documents ("Methodology Set"), including the present index methodology document. Please refer to Appendix VII for more details.

[2] On December 3, 2020, the European Commission has published the delegated acts in the Official Journal (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R1818&from=EN) which contain the minimum technical requirements for the EU Paris-aligned Benchmarks.

2 Index Construction Methodology

The Indexes and their respective Parent Indexes are in the table below:

Index	Parent Index
MSCI World Climate Paris Aligned Ex Select Business Involvement Screens Index	MSCI World Index
MSCI USA Climate Paris Aligned Ex Select Business Involvement Screens Index	MSCI USA Index
MSCI EMU Climate Paris Aligned Ex Select Business Involvement Screens Index	MSCI EMU Index

The Indexes use company research provided by MSCI ESG Research[4] to determine eligibility for index inclusion.

2.1 Eligible Universe

The Eligible Universe is constructed from the constituents of the Parent Index by excluding securities based on the exclusion criteria[5] listed below:

1. **ESG Ratings:** Companies are required to have an MSCI ESG Rating of 'BB' or above to be eligible for inclusion in the Indexes.
2. **Controversial Weapons**: All companies involved in Controversial Weapons as defined by the methodology of the MSCI Ex-Controversial Weapons Indexes.
3. **ESG Controversies**: All companies assessed as having involvement in ESG controversies that are classified as Red Flags (MSCI ESG Controversy Score of 0). A Red Flag indicates an ongoing, Very Severe ESG controversy implicating a company directly through its actions, products, or operations.
4. **Environmental Harm**: All companies assessed as having involvement in environmental controversies that are classified as Red (MSCI Environmental Controversy Score of 0) or Orange Flags (score of 1).

[4] See section 4 for further information regarding ESG and climate data used in the Indexes that MSCI Limited and MSCI Deutschland GmbH source from MSCI ESG Research LLC, a separate subsidiary of MSCI Inc. MSCI ESG Research is solely responsible for the creation, determination and management of such data as a provider to MSCI Limited and MSCI Deutschland GmbH. MSCI Limited and MSCI Deutschland GmbH are the benchmark administrators for the MSCI indexes.

[5] Prior to the May 2023 Index Review, the MSCI World Climate Paris Aligned ex Business Involvement Screens applied a different exclusion criteria. The MSCI USA, EMU Climate Paris Aligned ex Business Involvement Screens Indexes apply the current exclusion criteria for the full history.

- A Red Flag indicates an ongoing, Very Severe ESG controversy implicating a company directly through its actions, products, or operations.
- An Orange Flag indicates an ongoing Severe ESG controversy implicating a company directly, or a Very Severe ESG controversy that is either partially resolved or indirectly attributed to the company's actions, products, or operations.

5. **Oil & Gas**: All companies deriving 10% or more revenue from oil and gas related activities, including distribution / retail, equipment and services, extraction and production, petrochemicals, pipelines and transportation and refining but excluding biofuel production and sales and trading activities.
6. **Power Generation**: All companies deriving 50% or more revenue from thermal coal based power generation, liquid fuel based power generation and natural gas based power generation[6].
7. **Tobacco**: All companies classified as "Producer" or derive 5% or more aggregate revenue from the production, retail, supply and licensing of tobacco-related products.
8. **Nuclear Weapons:** All companies involved meeting specific Nuclear Weapons business involvement criteria as described in Appendix VI.
9. **Civilian Firearms**
   - All companies classified as "Producer" of firearms and small arms ammunitions for civilian markets. It does not include companies that cater to the military, government, and law enforcement markets.
   - All companies deriving 5% or more aggregate revenue from the production and distribution (wholesale or retail) of firearms or small arms ammunition intended for civilian use.
10. **Adult Entertainment**
    - All companies deriving 5% or more revenue from the production of adult entertainment materials.
    - All companies deriving 15% or more aggregate revenue from the production, distribution and retail of adult entertainment materials.
11. **Alcohol**
    - All companies deriving 5% or more revenue from the production of alcohol-related products.
    - All companies deriving 15% or more aggregate revenue from the production, distribution, retail and supply of alcohol-related products.

[6] As per https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapte`r7.pdf, thermal coal based power generation, liquid fuel based power generation and natural gas based power generation have median lifecycle emissions exceeding 100gCO_2/kWh.

12. **Conventional Weapons**
    - All companies deriving 5% or more revenue from the production of conventional weapons and components.
    - All companies deriving 15% or more aggregate revenue from weapons systems, components, and support systems and services.
13. **Gambling**
    - All companies deriving 5% or more revenue from ownership of operation of gambling-related business activities.
    - All companies deriving 15% or more aggregate revenue from gambling-related business activities.
14. **Genetically Modified Organisms (GMO)**
    - All companies deriving 5% or more revenue from activities like genetically modifying plants, such as seeds and crops, and other organisms intended for agricultural use or human consumption.
15. **Nuclear Power**
    - All companies generating 5% or more of their total electricity from nuclear power in a given year.
    - All companies that have 5% or more of installed capacity attributed to nuclear sources in a given fiscal year.
    - All companies deriving 15% or more aggregate revenue from nuclear power activities.
16. **Fossil Fuel Reserves Ownership:** All companies with evidence of owning proven & probable coal reserves and/or proven oil and natural gas reserves used for energy purposes, as defined by the methodology of the MSCI Global Ex Fossil Fuels Indexes available at: https://www.msci.com/index-methodology

17. **Fossil Fuel Extraction:** All companies deriving any revenue (either reported or estimated) from thermal coal mining or unconventional oil and gas extraction:
    - Thermal Coal Mining: Revenue (either reported or estimated) from the mining of thermal coal (including lignite, bituminous, anthracite and steam coal) and its sale to external parties. It excludes revenue from metallurgical coal, coal mined for internal power generation (e.g. in the case of vertically integrated power producers), intra-company sales of mined thermal coal, and revenue from coal trading.
    - Unconventional Oil & Gas Extraction: Revenue from oil sands, oil shale (kerogen-rich deposits), shale gas, shale oil, coal seam gas, and coal bed methane. It does not cover all types of conventional oil and gas production including Arctic onshore/offshore, deep water, shallow water and other onshore/offshore.

18. **Thermal Coal Power:** All companies deriving 5% or more revenue (either reported or estimated) from thermal coal-based power generation.
19. **Active Fossil Fuel Sector:**
    - All companies that have exposure to fossil fuel related activities, including extraction, processing, storage and transportation of petroleum products, natural gas, thermal and metallurgical coal.
20. **Nuclear Utilities:** All companies that own or operate nuclear power plants.

2.2 Optimization Constraints

At each Semi-Annual Index Review, the indexes are constructed using an optimization process that aims to achieve replicability and investability as well as minimize ex-ante tracking error relative to the Parent Indexes subject to the following constraints:

1. Transition and physical risk objectives – constraints detailed in Table 1
2. Transition opportunities objectives – constraints detailed in Table 2
3. Diversification objectives – constraints detailed in Table 3

Table 1: Constraints imposed to meet transition and physical risk objectives

No.	Transition and Physical Risk Objective	Target Value
1.	Minimum reduction in Greenhouse Gas (GHG) Intensity (Scope 1+2+3[7]) relative to Parent Indexes	50%
2.	Minimum average reduction (per annum) in GHG Intensity relative to GHG Intensity at the Base Date[8]	10%
3.	Minimum active weight in High Climate Impact sector relative to Parent Indexes as defined in Appendix IV	0%
4.	Aggregate Climate Value-At-Risk[9] under 1.5 degree scenario	>= Max(-5, Aggregate Climate VaR of Parent Index)[10]

[7] Prior to the May 2020 Semi-Annual Index Review (SAIR) of the Indexes, the Weighted Average Carbon Emissions Intensity was calculated based on Scope 1+2 Emissions.

[8] Prior to the May 2020 Semi-Annual Index Review (SAIR) of the Indexes, the average reduction in WACI was calculated using Scope 1+2 Emissions since Inception.

[9] For more detail on Aggregate Climate Value-At-Risk, please refer to Appendix III and Appendix IV of the MSCI Climate Paris Aligned Indexes Methodology at www.msci.com/index- methodology

[10] Prior to the May 2023 Index Review, the Aggregate Climate Value-at-Risk had a value of ">=Max (0, Aggregate Climate VaR of Parent Index)" for the MSCI World Climate Paris Aligned ex Business Involvement Screens Index

No.	Transition and Physical Risk Objective	Target Value
5.	Minimum Increase[11] in the aggregate weight of Companies Setting Targets relative to the aggregate Parent Indexes weight of such companies that meet the eligibility criteria. The eligibility criteria is defined in Section 2.1.	20%
6.	Minimum reduction in Weighted Average Potential Emissions Intensity relative to Parent Indexes	50%
7.	Minimum increase in weighted average Low Carbon Transition (LCT) Score relative to Parent Indexes Please see more detail on the LCT Score in Appendix V	10%[12]
8.	Minimum reduction in Weighted Average Extreme Weather Climate Value-At-Risk (Aggressive Scenario) relative to Parent Indexes	50%[13]

Table 2: Constraints imposed in order to meet transition opportunity objectives

No.	Transition Opportunity Objective	Target Value
9.	Minimum increase in weighted average LCT Score relative to Parent Indexes[14]	10%[15]
10.	Minimum ratio of Weighted Average Green Revenue/ Weighted Average Fossil fuels-based Revenue relative to Parent Indexes	4 times
11.	Minimum increase in Weighted Average Green Revenue for the MSCI World Climate Paris Aligned ex Business Involvement Screens Index relative to the Parent Indexes	300%

[11] Prior to the May 2023 Index Review, the Companies Setting Target definition did not include Science Based Targets Initiative (SBTi) and applied the minimum increase in aggregate weight relative to the Parent Index for the MSCI World Climate Paris Aligned ex Business Involvement Screens Index.

Prior to the November 2021 Index Review, the Companies Setting Target definition did not include Science Based Targets Initiative (SBTi) and applied the minimum increase in aggregate weight relative to the Parent Index for the MSCI USA, EMU Climate Paris Aligned ex Business Involvement Screens Index. For more detail on Companies Setting Target, please refer to Appendix IV.

[12] The MSCI USA Climate Paris Aligned ex Business Involvement Screens Index targets a 5% increase in weighted average Low Carbon Transition (LCT) Score relative to the Parent Index

[13] In case the Parent Index has a positive Weighted Average Extreme Weather Climate VaR, the floor will be applied at the level of the Weighted Average Extreme Weather Climate VaR of the Parent Indexes.

[14] The constraint on increase in LCT Score is designed to underweight companies with a low LCT Score (assessed as companies facing risks from a low carbon transition) and overweight companies with a high LCT Score (assessed as companies which may have opportunities from a low carbon transition). Thus, the constraint has been repeated in Table 2 to illustrate how the constraint meets both the objectives.

[15] The MSCI USA Climate Paris Aligned ex Business Involvement Screens Index targets a 5% increase in weighted average Low Carbon Transition (LCT) Score relative to the Parent Index

No.	Transition Opportunity Objective	Target Value
12.	Minimum increase in Weighted Average Green Revenue for the MSCI USA, EMU Climate Paris Aligned ex Business Involvement Screens Index relative to the Parent Indexes	200%

Table 3: Constraints imposed to meet diversification objectives

No.	Diversification Objective	Target Value
13.	Constituent Active Weight	+/- 2%
14.	Minimum constituent weight	0.01%
15.	Security Weight as a multiple of its weight in the Parent Indexes	20x
16.	Active Sector Weights (the Energy Global Industry Classification Standard (GICS®)[16] (GICS) Sector is not constrained)	+/- 5%
17.	Active Country Weights[17]	+/- 5%
18.	One Way Turnover	5%
19.	Common Factor Risk Aversion	0.0075
20.	Specific Risk Aversion	0.075

The following optimization constraints on minimum Index Sustainable Investment ("SI")[18] are used for the Indexes

Diversification Objective	Index SI Threshold
MSCI World Climate Paris Aligned ex Select Business Involvemet Screens	30%
MSCI USA Climate Paris Aligned ex Select Business Involvemet Screens	30%
MSCI EMU Climate Paris Aligned ex Select Business Involvemet Screens	30%

The Weighted Average GHG Intensity on the base Date and the base dates for the respective indexes are described in Appendix I.

The definition of the company level sustainable investment qualification and the calculation of index level sustainable investment are described in Appendix II.

[16] GICS, the global industry classification standard jointly developed by MSCI Inc. and S&P Dow Jones Market Intelligence.

[17] In case there are countries in the Parent Indexes which weigh less than 2.5% in the Parent Indexes then for such countries the active country upper bound of +5% is not applicable. When a country weighs less than 2.5% in Parent Indexes then the upper bound of country weight in the Indexes is set at three times of the country's weight in the Parent Indexes.

[18] The Sustainable Investment criteria is applied since the May 2023 Index Review for MSCI World Climate Paris Aligned ex Business Involvement Screens and since the November 2022 Index Review for the MSCI USA, EMU Climate Paris Aligned ex Business Involvement Screens Indexes.

During the Semi-Annual Index Review, in the event that there is no optimal solution that satisfies all the optimization constraints, the following constraints will be relaxed, until an optimal solution is found:

- Relax the one-way index turnover constraint in steps of 1% up to 20%
- Relax the active sector weight constraint in steps of 1% up to +/-20%
- The one-way index turnover constraint and the active sector weight constraint are alternately relaxed until a feasible solution is achieved.

In the event that no optimal solution is found after the above constraint relaxations are exhausted, the relevant Index will not be rebalanced for that Semi-Annual Index Review.

2.3 Determining the Optimized Index

The Indexes are constructed using the Barra Open Optimizer in combination with the relevant Barra Equity Model. The optimization uses universe of eligible securities and the specified optimization objectives and constraints to determine the constituents of the Indexes.

2.4 Treatment of Unrated Companies

Companies not assessed by MSCI ESG Research on data for any of the following MSCI ESG Research products are not eligible for inclusion in the Indexes:

- MSCI ESG Ratings
- MSCI ESG Controversies

For the treatment of unrated companies in the calculation of target metrics for the optimization, please refer to Appendix IV.

3 Index Maintenance

3.1 Semi-Annual Index Reviews

The Indexes are rebalanced on a semi-annual basis, as of the close of the last business day of May and November, coinciding with the May and November Index Reviews of the MSCI Global Investable Market Indexes. The pro forma Indexes are in general announced nine business days before the effective date.

In general, MSCI uses MSCI ESG Research data (including MSCI Climate Change Metrics, MSCI Climate Value-at-Risk, MSCI ESG Sustainable Impact Metrics, MSCI ESG Controversies and MSCI Business Involvement Screening Research) as of the end of the month preceding the Index Reviews for the rebalancing of the Indexes.

3.2 Ongoing Event Related Changes

The general treatment of corporate events in the Indexes aims to minimize turnover outside of Index Reviews. The methodology aims to appropriately represent an investor's participation in an event based on relevant deal terms and pre-event weighting of the index constituents that are involved. Further, changes in index market capitalization that occur as a result of corporate event implementation will be offset by a corresponding change in the Variable Weighting Factor (VWF) of the constituent.

Additionally, if the frequency of Index Reviews in the Parent Indexes is greater than the frequency of Index Reviews in the Indexes, the changes made to the Parent Indexes during intermediate Index Reviews will be neutralized in the Indexes.

The treatment of the common corporate events in the indexes follow the corporate events treatments as described in section 3.2 of the MSCI Climate Paris Aligned Indexes methodology.

4 MSCI ESG Research

The Indexes are products of MSCI Inc. that utilize information such as company ratings and research produced and provided by MSCI ESG Research LLC (MSCI ESG Research), a subsidiary of MSCI Inc. In particular, the Indexes use the following MSCI ESG Research products: MSCI Climate Change Metrics, MSCI ESG Ratings, MSCI Climate Value-at-Risk, MSCI Impact Solutions, MSCI ESG Controversies and MSCI ESG Business Involvement Screening Research. MSCI Indexes are administered by MSCI Limited and MSCI Deutschland GmbH.

4.1 MSCI Climate Change Metrics

MSCI Climate Change Metrics provides climate data & tools to support institutional investors seeking to integrate climate risk & opportunities into their investment strategy and processes. This includes investors seeking to achieve a range of objectives, including measuring and reporting on climate risk exposure, implementing low carbon and fossil fuel-free strategies, alignment with temperature pathways and factoring climate change research into their risk management processes, in particular through climate scenario analysis for both transition and physical risks.

The dataset spans across the four dimensions of a climate strategy: transition risks, green opportunities, physical risks and 1.5° alignment.

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

4.2 MSCI Climate Value-at-Risk

Climate Value-at-Risk (Climate VaR) is designed to provide a forward-looking and return-based valuation assessment to measure climate related risks and opportunities in an investment portfolio. The fully quantitative model offers deep insights into how climate change could affect company valuations.

For more details on MSCI Climate Value-At-Risk, please refer to

https://www.msci.com/climate-data-and-metrics.

4.3 MSCI Impact Solutions: Sustainable Impact Metrics

MSCI Impact Solutions' Sustainable Impact Metrics is designed to identify companies that derive revenue from products or services with positive impact on society and the environment. The Sustainable Impact Metrics are comprised of six Environmental Impact categories and seven Social Impact categories arranged by theme.

MSCI Sustainable Impact Taxonomy

Pillar	Themes	Categories
Environmental Impact	Climate Change	1. Alternative energy 2. Energy efficiency 3. Green building
	Natural capital	4. Sustainable water 5. Pollution prevention 6. Sustainable agriculture
Social Impact	Basic needs	7. Nutrition 8. Major Disease Treatment 9. Sanitation 10. Affordable Real Estate
	Empowerment	11. SME Finance 12. Education 13. Connectivity – Digital divide

Under each of the actionable environmental and social impact themes, MSCI ESG Research has identified specific categories of products and services that it has determined companies can offer as potential solutions to environmental and social challenges.

For more details on MSCI Sustainable Impact Metrics, please refer to: https://www.msci.com/legal/disclosures/esg-disclosures

4.4 MSCI ESG Controversies

MSCI ESG Controversies provide assessments of controversies concerning the potential 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.

The MSCI ESG Controversies methodology can be found in: https://www.msci.com/legal/disclosures/esg-disclosures

4.5 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 https://www.msci.com/legal/disclosures/esg-disclosures

4.6 MSCI ESG Ratings

MSCI ESG Ratings aim to measure entities' management of environmental, social and governance risks and opportunities. MSCI ESG Ratings use a weighted average key issue calculation that is normalized by industry to arrive at an industry-adjusted ESG score (0-10), which is then translated to a seven-point scale from 'AAA' to 'CCC', indicating how an entity manages relevant key issues relative to industry peers.

The MSCI ESG Ratings methodology can be found at: https://www.msci.com/legal/disclosures/esg-disclosures.

Appendix I: Decarbonization Trajectory of Indexes

The Weighted Average GHG Intensity on the Base Date (W_1) is used to compute the target Weighted Average GHG Intensity at any given Semi-Annual Index Review (W_t) as per the below formula.

$$W_t = W_1 * \ 0.90^{\frac{(t-1)}{2}}$$

Where 't' is the number of Semi-Annual Index Reviews since the Base Date. The table below shows the Weighted Average GHG Intensity on the Base Date(W_1) for each of the regions where the Indexes are constructed:

Index	Parent Index	Base Date	W_1 (tCO2/M$ Enterprise Value + Cash)
MSCI World Climate Paris Aligned ex Business Involvement Screens Select Index	MSCI World Index	June 01, 2020	201.59
MSCI EMU Climate Paris Aligned ex Business Involvement Screens Select Index	MSCI EMU Index	June 01, 2020	282.79
MSCI USA Climate Paris Aligned ex Business Involvement Screens Select Index	MSCI USA Index	June 01, 2020	186.34

Appendix II: Company-Level and Index Level Sustainable Investments (%)

A company qualifies as having company-level sustainable investment if it meets all the following conditions:

1. MSCI ESG Rating of "BB" or above[19]
2. MSCI ESG Controversies Score of 2 or above[20]
3. At least one of the following conditions is met:
    a. Derives 20% or more aggregate revenue from any of the thirteen social and environmental impact categories of Sustainable Impact Metrics (including nutrition, sanitation, major diseases treatment, SME finance, education, connectivity, affordable real estate, alternative energy, energy efficiency, green building, pollution prevention, sustainable agriculture and sustainable water)
    b. Has one or more active carbon emissions reduction target(s) approved by the Science Based Targets initiative (SBTi)
4. Not flagged by the following business involvement criteria:
    a. Has any tie to Controversial Weapons (cluster munitions, landmines, depleted uranium weapons, biological/chemical weapons, blinding lasers, non-detectable fragments and incendiary weapons), in line with the methodology of the MSCI Ex-Controversial Weapons Indexes available at https://www.msci.com/index-methodology
    b. Derives 1% or more revenue (either reported or estimated) from the mining of thermal coal (including lignite, bituminous, anthracite and steam coal) and its sale to external parties.
    c. Manufactures tobacco products, such as cigars, blunts, cigarettes, e-cigarettes, inhalers, beedis, kreteks, smokeless tobacco, snuff, snus, dissolvable and chewing tobacco.
    d. Derives 5% or more aggregate revenue from the production, distribution, retail, supply and licensing of tobacco-related products

The index-level sustainable investment is calculated as the sum of the weight of companies in the index that qualify as having company-level sustainable investment.

[19] The condition is not met if the MSCI ESG Rating is missing for the company.

[20] The condition is not met if the MSCI ESG Controversies Score is missing for the company.

Appendix III: MSCI Climate Value-at-Risk

The MSCI Climate Value-at-Risk measurement helps investors to assess future costs related to climate change and understand what those future costs could mean in the current valuation of securities. The premise of Climate Value-at-Risk is to aggregate costs related to specific climate risks and calculate what these costs might signify about financial performance into the foreseeable future.

1.5°C Aggregated Policy Risk Equity Climate VaR (REMIND NGFS Orderly) [%]

An equity's aggregated downside policy risk exposure according to all emission sources (Scope 1, 2, 3), expressed as a percentage of the equity's market value, assuming a global 1.5°C target and using carbon prices from the REMIND model under the NGFS Orderly scenario. Please refer to the Climate VaR methodology document for further details on scenario options.

1.5°C Technology Opportunities Equity Climate VaR (REMIND NGFS Orderly) [%]

An equity's upside technology opportunity exposure, expressed as a percentage of the equity's market value capped at 100%, assuming a global 1.5°C target and calculated using carbon prices from the REMIND model under the NGFS Orderly scenario. Please refer to the Climate VaR methodology document for further details on scenario options.

4°C Aggregated Physical Risk Equity Climate VaR (IPCC SSP3-7.0, Aggressive Outcome) [%]

An equity's "worst-case" (95th percentile) downside or upside potential, expressed as a percentage of the equity's market value, assuming trends in extreme cold, extreme heat, extreme precipitation, heavy snowfall, extreme wind, coastal flooding, fluvial flooding, river low flow, tropical cyclones and wildfires continue along the 4°C IPCC SSP3-7.0 scenario.

Appendix IV: Calculation of Target Metrics

Greenhouse Gas (GHG) Emissions Intensity

MSCI ESG Research collects company-specific direct (Scope 1) and indirect (Scope 2) greenhouse gas emissions (GHG) data from company public documents and/or the Carbon Disclosure Project. If a company does not report GHG emissions, then MSCI ESG Research estimates Scope 1 and Scope 2 GHG emissions.

MSCI ESG Research estimates company-specific indirect (Scope 3) GHG emissions from the Scope 3 Carbon Emissions Estimation Model. The data is generally updated on an annual basis.

Calculation of GHG Intensity

Carbon emissions of a company are normalized for size by dividing annual carbon emissions by Enterprise Value including Cash (EVIC). The Carbon Emissions Intensity is calculated using the latest Scope 1+2 carbon emissions, Scope 3 carbon emissions and EVIC of a company.

Security Level GHG Intensity (Scope 1+2+3) =

*(Unadjusted Security Level GHG Intensity (Scope 1+2) + Unadjusted Security Level GHG Intensity (Scope 3)) * (1 + EVIAF)*

Unadjusted Security Level GHG Intensity (Scope 1+2) =

$$\frac{(Scope\ 1+2\ Carbon\ Emissions)}{EVIC\ (in\ M\$)}$$

If Scope 1+2 carbon emissions and/or EVIC are not available, the average Scope 1+2 intensity of all the constituents of the MSCI ACWI in the same GICS Industry Group in which the security belongs is used.

Unadjusted Security Level GHG Intensity (Scope 3) =

$$\frac{(Scope\ 3\ Carbon\ Emissions)}{EVIC\ (in\ M\$)}$$

If Scope 3 carbon emissions and/or EVIC are not available, the average Scope 3 intensity of all the constituents of the MSCI ACWI in the same GICS Industry Group in which the security belongs is used.

Enterprise Value Inflation Adjustment Factor (EVIAF) =

$$\left(\frac{Average(EVIC)}{Previous\ (Average(EVIC))}\right) - 1$$

Weighted Average GHG Intensity of Parent Indexes =

$$\sum(Weight\ in\ Parent\ Index *\ Security\ Level\ GHG\ Intensity)$$

Weighted Average GHG Intensity of Derived Indexes =

$$\sum(Index\ Weight *\ Security\ Level\ GHG\ Intensity)$$

Calculation of Potential Carbon Emissions Intensity

Security Level Potential Carbon Emissions (PCE) Intensity =

$$\frac{Absolute\ Potential\ Emissions}{EVIC(in\ M\$)}$$

If Absolute Potential Emissions data is not available, MSCI uses zero fossil fuel reserves.

Weighted Average Potential Emissions Intensity of Parent Indexes =

$$\sum(Weight\ in\ Parent\ Index *\ Security\ Level\ PCE\ Intensity)$$

Weighted Average Potential Emissions Intensity of Derived Indexes =

$$\sum(Index\ Weight *\ Security\ Level\ PCE\ Intensity)$$

Calculation of Average Decarbonization

On average, the Indexes follow a 10% decarbonization trajectory since the Base Date. The Weighted Average GHG Intensity at the Base Date (W_1) is used to compute the target Weighted Average GHG Intensity at any given Semi-Annual Index Review (W_t) as per the below formula.

$$W_t = W_1 *\ 0.90^{\frac{(t-1)}{2}}$$

Where '*t*' is the number of Semi-Annual Index Reviews since the Base Date.

Thus, for the 3rd Semi-Annual Index Review since the Base Date (t=3), the target Weighted Average GHG Intensity will be W_1*0.90.

Companies Setting Targets

The Indexes requires a minimum 20% increase in the aggregate weight of companies setting emissions reduction targets compared to the aggregate weight of such companies in the Parent Indexes that meet the requirements for inclusion in the Eligible Universe as defined in Section 2.1. Companies setting targets are defined as companies having one or more active carbon emissions reduction target(s) approved by the Science Based Targets initiative (SBTi), or companies meeting all the following requirements:

- Companies publishing emissions reduction targets
- Companies publishing their annual emissions and
- Companies reducing their GHG intensity by 7% over each of the last 3 years.

Calculation of Green Revenue to Fossil fuels-based Revenue Multiple

Green Revenue

For each constituent in the Parent Indexes, the Green Revenue% is calculated as the cumulative revenue (%) from the six Clean Tech themes which are as follows:

- Alternative Energy – products and services that support the transmission, distribution and generation of renewable energy and alternative fuels to reduce carbon and pollutant emissions in supporting affordable and clean energy to combat climate change.
- Energy Efficiency – products, and services that support the maximization of productivity in labor, transportation, power and domestic applications with minimal energy consumption to ensure universal access to affordable, reliable and modern energy services.
- Sustainable Water – products, services, infrastructure projects and technologies that resolve water scarcity and water quality issues, through minimizing and monitoring current water demand, improving the quality and availability of water supply to improve resource management in both domestic and industrial use.
- Green Building – design, construction, redevelopment, retrofitting, or acquisition of green-certified properties to promote mechanisms for raising capacity for effective climate change mitigation and adaptation.
- Pollution Prevention – products, services, infrastructure projects and technologies that reduces volume of waste materials through recycling, minimizes introduction of toxic substances, and offers remediation of existing contaminants such as heavy metals and organic pollutants in various environmental media to significantly address pollution in all levels and its negative effects
- Sustainable Agriculture - revenues from forest and agricultural products that meet environmental and organic certification requirements to address significantly biodiversity loss, pollution, land disturbance, and water overuse

The Weighted Average Green Revenue% is calculated as:

$$= \sum (Weight\ in\ Index * \ Green\ Revenue\%)$$

Fossil fuels-based Revenue

For each constituent in the Parent Indexes, the Fossil fuels-based Revenue% is calculated as the cumulative revenue (%) from the following sources:

- Revenue% (either reported or estimated) from the mining of thermal coal (including lignite, bituminous, anthracite and steam coal) and its sale to external parties. It excludes revenue from metallurgical coal, coal mined for internal power generation (e.g. in the case of vertically integrated power producers), intra-company sales of mined thermal coal and revenue from coal trading (either reported or estimated)
- Revenue% from the extraction, production and refining of Conventional and Unconventional Oil & Gas. Conventional Oil and Gas includes Arctic onshore/offshore, deep water, shallow water and other onshore/offshore. Unconventional Oil and Gas includes oil sands, oil shale (kerogen-rich deposits), shale gas, shale oil, coal seam gas, and coal bed methane.
- Revenue% from thermal coal based power generation, liquid fuel based power generation and natural gas based power generation.

The Weighted Average Fossil fuels-based Revenue% is calculated as:

$$= \sum (Weight\ in\ Index * \ Brown\ Revenue\%)$$

The Green Revenues to Fossil fuels-based Revenues multiple for either the Parent Indexes or the Indexes is calculated as a ratio of the Weighted Average Green Revenue to the Weighted Average Fossil fuels-based Revenue as per the formula below:

$$= \frac{Weighted\ Average\ Green\ Revenue\%}{Weighted\ Average\ Brown\ Revenue\%}$$

Aggregated Climate Value-at-Risk (VaR)

The Index-level Aggregated Climate Value-at-Risk for any Index is calculated as the sum of the below 3 components:

1. **Policy Risk Climate VaR[21] (1.5 Degrees)**: Weighted average of security level 1.5°C Aggregated Policy Risk Equity Climate VaR (REMIND NGFS Orderly) [%]
2. **Technology Opportunities Climate VaR (1.5 Degrees)**: Weighted average of security level 1.5°C Technology Opportunities Equity Climate VaR (REMIND NGFS Orderly) [%]

[21] Starting from the May 2020 Semi-Annual Index Review, the Policy Risk Climate VaR used in the Indexes incorporate Scope 2 and Scope 3 emissions as well. The Policy Risk Climate VaR used in the May 2020 Semi-Annual Index Review of the Indexes is as of September 30, 2020.

3. **Physical Risk Climate VaR (4 Degrees, Aggressive Outcome)**: Weighted average of security level Aggregated Physical Risk Equity Climate VaR (Aggressive Outcome) [%]

Climate Impact Sectors

NACE[22] is the European Union's classification of economic activities. As per the draft DA, stocks in the NACE Section codes A, B, C, D, E, F, G, H, L are classified as "High Climate Impact" sector and other stocks are classified 'Low Climate Impact' sector. The GICS[23] Sub-Industry code for each security is mapped to the corresponding "Climate Impact Sector" using a mapping. This mapping is constructed in the following steps:

1. MSCI has published a mapping[24] between the NACE classes and GICS Sub-Industry.
2. For each GICS Sub-Industry, the number of NACE classes which fall under the High Climate Impact Sector (say the number of classes is N_H) and Low Climate Impact Sector (say the number of classes is N_L) is identified
3. If all the NACE classes for a given GICS Sub-Industry are identified in the High Climate Impact Sector ($N_L = 0$), then the GICS Sub-Industry is mapped to the High Climate Impact Sector. Conversely, if all the NACE classes for a given GICS Sub-Industry are identified in the Low Climate Impact Sector ($N_H = 0$) then the GICS Sub-Industry is mapped to the Low Climate Impact Sector
4. In case a GICS Sub-Industry is mapped to some NACE classes in the High Climate Impact Sector and the others in the Low Climate Impact Sector, the GICS Industry is mapped to the Climate Impact Sector in the following manner:
   a. **$N_H >= N_L$**: If the number of NACE classes in the High Climate Impact Sector is at least equivalent to the number of NACE classes in the Low Climate Impact Sector, the GICS Sub-Industry is mapped to the High Climate Impact Sector
   b. **$N_H < N_L$**: If the number of NACE classes in the High Climate Impact Sector is less than the number of NACE classes in the Low Climate Impact Sector, the GICS Sub-Industry is mapped to the Low Climate Impact Sector
5. Using the GICS Sub-Industry to Climate Impact Sector mapping created in Step 4, and the security-level GICS Sub-Industry, each security in the Parent Indexes is classified in either High Climate Impact Sector or Low Climate Impact Sector

[22] For further details regarding NACE, please refer to https://ec.europa.eu/eurostat/statistics-explained/index.php?title=NACE_background

[23] For further information regarding GICS, please refer to https://www.msci.com/gics

[24] This mapping is available in the Handbook of Climate Transition Benchmarks, Paris-Aligned Benchmark and Benchmarks' ESG Disclosures. Please note that the mapping does not reflect changes in the GICS structure that were implemented in the MSCI indexes on June 1, 2023.

Appendix V: MSCI Low Carbon Transition Risk Assessment

MSCI ESG Research's Low Carbon Transition Risk assessment[25] is designed to identify potential leaders and laggards by measuring companies' exposure to and management of risks and opportunities related to the low carbon transition. The assessment is derived from company disclosures and estimates.

The final output of this assessment is two company-level factors:

(1) **Low Carbon Transition Category**: This factor groups companies in five categories that highlight the predominant risks and opportunities they are most likely to face in the transition (Exhibit 1).

(2) **Low Carbon Transition Score:** This score is based on a multi-dimensional risks and opportunities assessment and considers both primary and secondary risks a company faces. It is an industry agnostic assessment of a company's position vis-à-vis the transition.

Exhibit 1: Low Carbon Transition Categories and Scores

LOW CARBON TRANSITION SCORE	LOW CARBON TRANSITION CATEGORY		LOW CARBON TRANSITION RISK / OPPORTUNITY	INDUSTRY EXAMPLES
SCORE = 0	ASSET STRANDING		Potential to experience "stranding" of physical / natural assets due to regulatory, market, or technological forces arising from low carbon transition.	Coal mining & coal-based power generation; industries in the Oil & Gas value chain
	TRANSITION	PRODUCT	Reduced demand for carbon-intensive products and services. Leaders and laggards are defined by the ability to shift product portfolio to low-carbon products.	Petrol/diesel-based automobile manufacturers
		OPERATIONAL	Increased operational and/or capital cost due to carbon taxes and/or investment in carbon emission mitigation measures leading to lower profitability of the companies.	Cement, Steel
	NEUTRAL		Limited exposure to low carbon transition carbon risk. Though companies in this category could have exposure to physical risk and/or indirect exposure to low carbon transition risk via lending, investment etc.	Consumer Staples, Healthcare
SCORE = 10	SOLUTIONS		Potential to benefit through the growth of low-carbon products and services.	Renewable electricity, Electric vehicles, Solar cell manufacturers

[25] For more details on MSCI Climate Change Metrics: https://www.msci.com/climate-change-solutions

Calculation methodology

The Low Carbon Transition Categories and Scores are determined by a combination of each company's current risk exposure and its efforts to manage the risks and opportunities presented by the low carbon transition. The 3-step process followed by MSCI ESG Research is explained below.

Step 1: Measure Low Carbon Transition Risk Exposure

The first step towards measuring the Low Carbon Transition Risk Exposure for a company is the computation of its estimated total net carbon intensity – which considers operational and product carbon emissions. In the next step, we compute Low Carbon Transition Risk Exposure Category and Score based on total net carbon intensity.

Step 2: Assess Low Carbon Transition Risk Management

In the second step, MSCI ESG Research assesses a company's management of risks and opportunities presented by the low carbon transition. This assessment is based on policies and commitments to mitigate transition risk, governance structures, risk management programs and initiatives, targets and performance, and involvement in any controversies.

Step 3: Calculate Low Carbon Transition Category and Score

In the final step, the Low Carbon Transition Risk Exposure Category and Score that was calculated in Step 1 is adjusted for the strength of management efforts. Following this adjustment, Low Carbon Transition Risk Exposure Score of companies with top or second quartile risk management improves and some top and second quartile companies may move up one category.

Appendix VI: Companies Involved in Nuclear Weapons Business

Companies, whose activities meet the following criteria, as determined by MSCI ESG Research, are excluded from the Index:

- All companies that manufacture nuclear warheads and/or whole nuclear missiles
- All companies that manufacture components that were developed or are significantly modified for exclusive use in nuclear weapons (warheads and missiles)
- All companies that manufacture or assemble delivery platforms that were developed or significantly modified for the exclusive delivery of nuclear weapons.
- All companies that provide auxiliary services related to nuclear weapons.
- All companies that manufacture components that were not developed or not significantly modified for exclusive use in nuclear weapons (warheads and missiles) but can be used in nuclear weapons.
- All companies that manufacture or assemble delivery platforms that were not developed or not significantly modified for the exclusive delivery of nuclear weapons but have the capability to deliver nuclear weapons.
- All companies that manufacture components for nuclear-exclusive delivery platforms.

Appendix VII: Methodology Set

The Indexes are governed by a set of methodology and policy documents ("Methodology Set"), including the present index methodology document as mentioned below:

- Description of methodology set – https://www.msci.com/index/methodology/latest/ReadMe
- MSCI Corporate Events Methodology – https://www.msci.com/index/methodology/latest/CE
- MSCI Fundamental Data Methodology – https://www.msci.com/index/methodology/latest/FundData
- MSCI Index Calculation Methodology – https://www.msci.com/index/methodology/latest/IndexCalc
- MSCI Index Glossary of Terms – https://www.msci.com/index/methodology/latest/IndexGlossary
- MSCI Index Policies – https://www.msci.com/index/methodology/latest/IndexPolicy
- MSCI Global Industry Classification Standard (GICS) Methodology – https://www.msci.com/index/methodology/latest/GICS
- MSCI Global Investable Market Indexes Methodology – https://www.msci.com/index/methodology/latest/GIMI
- MSCI Global ex Controversial Weapons Indexes Methodology – https://www.msci.com/index/methodology/latest/XCW
- MSCI Global ex Tobacco Involvement Index – https://www.msci.com/index/methodology/latest/ExTobacco
- MSCI SRI Indexes Methodology – https://www.msci.com/index/methodology/latest/SRI
- MSCI Climate Paris Aligned Indexes Methodology – https://www.msci.com/index/methodology/latest/ClimatePAB
- ESG Factors in Methodology*

The Methodology Set for the Indexes can also be accessed from MSCI's webpage https://www.msci.com/index-methodology in the section 'Search Methodology by Index Name or Index Code'.

* 'ESG Factors in Methodology' contains the list of environmental, social, and governance factors considered, and how they are applied in the methodology (e.g., selection, weighting or exclusion). It can be accessed in the Methodology Set as described above.

Appendix VIII: Changes to the Document

The following sections have been updated as of May 2023:

- The methodology book was updated with a description of the Index and footnotes on the Methodology Set in Section 1.
- The target for Aggregate Climate Value -At-Risk updated to reflect the methodology enhancement in Table 1.
- The definition of Companies Setting Targets was updated to reflect the methodology enhancement in Table 1.
- The green revenue constraint was updated in Table 2.
- Eligibility criteria based on ESG Rating or ESG Controversial Business Involvements screening criteria was added.
- The constraint for Sustainable Investment was added to Section 2.
- The ESG Research Product descriptions were moved from section 2 to section 4.
- The Weighted Average GHG Intensity on the Base Date was added for the Index to Appendix I.
- The company level and index sustainable investment criteria was added to Appendix II.

The following sections have been updated as of November 2023:

- The treatment of companies with ratings and research not available from MSCI ESG Research was added to Section 2.4.
- The Companies Setting Target description was updated in Table 1 and
- The description of Climate Value-at-Risk models and scenarios were added in Appendix III.
- The calculation of optimization parameters were added in Appendix IV.

The following sections have been updated as of June 2024:

- The USA and EMU regions were added in Section 2.
- All the screens are described in Section 2.1.
- Updated Section 2.4 to include MSCI ESG Ratings.
- Updated the links in Section 4 and added a description for MSCI ESG Ratings.

- Added details of the Low Carbon Transition Risk Assessment in Appendix V.
- Added Appendix VI.

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