MSCI FIXED INCOME CLIMATE PARIS ALIGNED INDEXES METHODOLOGY

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1. Introduction

The MSCI Fixed Income Climate Paris Aligned 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 MSCI Fixed Income Climate Paris Aligned Indexes incorporate the Task Force on Climate-related Financial Disclosures (TCFD)[1] recommendations and are designed to exceed the minimum standards of the EU Paris-Aligned Benchmark under the EU Benchmark Regulation (EU delegated acts)[2]. The MSCI Fixed Income Climate Paris Aligned Indexes are constructed from their corresponding Parent Indexes following an optimization-based approach and aim to:

- Reweight or exclude securities to exceed the minimum requirements[3] of the EU Paris-Aligned Benchmark designation
- Align with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)
- Align with a 1.5°C climate scenario using the MSCI Climate Value-at-Risk[4] and a "self-decarbonization" rate of 10% year on year
- Reduce the Index's exposure to physical risk arising from extreme weather events by at least 50%
- Shift index weight from "fossil fuel-based" to "green" using the MSCI Low Carbon transition score and by excluding categories of 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 an effective duration and credit rating similar to the Parent Index
- Minimize active share[5] compared to the Parent Index and achieve low turnover

[1] https://www.fsb-tcfd.org/publications/final-recommendations-report/

[2] Regulation (EU) 2016/1011 as amended by Regulation (EU) 2019/2089. In case there are changes in the EU delegated acts and an update to the Index methodology is required, MSCI will issue an announcement prior to implementing the changes in the methodology. MSCI will not conduct a formal consultation for such an update.

[3] Minimal requirements include ESG exclusions as defined in Section 3.2, 50% reduction in Scope 1+2+3 carbon emission relative to Parent Index and 7% reduction in Scope 1+2+3 carbon emission per year relative to the base date

[4] MSCI Climate Value-at-Risk is applicable to the MSCI USD IG Climate Paris Aligned Corporate Bond Index and the MSCI EUR IG Climate Paris Aligned Corporate Bond Index.

[5] Active Share is a measure of the turnover that will be incurred in shifting from the Parent Index to the derived Index. Active Share minimization is achieved by minimizing the sum of squared active weights.

2. Constructing the Index

The Index uses company ratings and research provided by MSCI ESG Research[6] for the Index construction.

Constructing the Index involves the following steps:

- Defining the Applicable Universe
- Defining the Eligible Universe
- Defining the Optimizing Constraints
- Determining the Optimized Index

2.1 Defining the Applicable Universe

The applicable universe includes all the existing constituents of the parent index ("Parent Index"). This approach aims to provide an opportunity set with sufficient liquidity and investment capacity.

2.2 Defining the Eligible Universe

The Eligible Universe is constructed from the Applicable Universe by excluding securities of companies based defined in Appendix VI.

2.3 Defining the Optimization Constraints

At each Monthly Index Review, the indexes are constructed using an optimization process that aims to achieve replicability and investability as well as minimize active share relative to the Parent Index 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

The definitions of the target metrics for the optimization are detailed in Appendix III.

[6] See section 4 for further information regarding ESG and climate data used in the Indexes that MSCI Limited sources 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. MSCI Limited and MSCI Deutschland GmbH are the benchmark administrators for the MSCI indexes.

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

No.	Transition and Physical Risk Objective	MSCI Fixed Income Climate Paris Aligned Indexes
1.	Minimum reduction in absolute Greenhouse Gas (GHG) Emission[7] (Scope 1+2+3[8]) relative to Parent Index	50%
2.	Minimum average reduction (per annum) in absolute GHG Emission relative to absolute GHG Emission at the Base Date[9]	10%
3.	Minimum Increase in aggregate weight in companies setting targets relative to the aggregate weight of such companies in the Parent Index. Companies Setting Targets are defined in Appendix III	20%
4.	Minimum reduction in Weighted Average Potential Emissions relative to Parent Index	50%
5.	Minimum increase in weighted average Low Carbon Transition (LCT) Score relative to Parent Index Please see more detail on LCT Score in Appendix I	5%

In addition to the above, the following two constraints are applicable to the MSCI USD IG Climate Paris Aligned Corporate Bond Index and the MSCI EUR IG Climate Paris Aligned Corporate Bond Index:

No.	Transition and Physical Risk Objective	MSCI Fixed Income Climate Paris Aligned Indexes
6.	Aggregate Climate Value-At-Risk under 1.5 degree scenario[10] Please see more detail on Aggregate Climate Value-At-Risk in Appendix II and Appendix III.	>= Max(0, Aggregate Climate VaR of Parent Index)

[7] Based on EU delegated acts, absolute GHG Emissions may be used as a measure of carbon exposure for fixed income indexes

[8] Prior to the May 2020 Monthly Index Review of the Indexes, the absolute Weighted Average Carbon Emissions has been calculated based on Scope 1+2 Emissions.

[9] Prior to the May 2020 Monthly Index Review of the Indexes, the reduction in absolute Weighted Average Carbon Emission has been calculated using Scope 1+2 Emissions since Inception.

[10] For more details on Climate value-At-Risk, please refer to Appendix III. Prior to the May 2020 Monthly Index Review of the Indexes, the Policy Risk Climate VaR used Scope 1 Emissions since Inception.

No.	Transition and Physical Risk Objective	MSCI Fixed Income Climate Paris Aligned Indexes
7.	Minimum reduction in Weighted Average Extreme Weather Climate Value-At-Risk (Aggressive Scenario) relative to Parent Index	50%[11]

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

No.	Transition Opportunity Objective	MSCI Fixed Income Climate Paris Aligned Indexes
8.	Minimum increase in weighted average LCT Score relative to Parent Index[12]	5%
9.	Minimum ratio of Weighted Average Green Revenue/ Weighted Average Fossil fuel-based Revenue relative to Parent Index	4 times
10.	Minimum increase in Weighted Average Green Revenue relative to the Parent Index	100%

Table 3: Constraints imposed to meet diversification objectives

No.	Diversification Objective	MSCI Fixed Income Climate Paris Aligned Indexes
11.	Constituent Active Weight	+/- 2%
12.	Issuer capping[13]	3%
13.	Security Weight as a multiple of its weight in the Parent Index	10x
14.	Active Sector Weights (the Energy GICS®[14] Sector is not constrained)	+/-5%

[11] 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 Index.

[12] 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.

[13] The issuer capping is applied at 4% in the MSCI CAD IG Climate Paris Aligned Corporate Bond Index

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

15.	Active Country Weights[15]	+/-5%
16.	One Way Turnover	4%
17.	Active Effective Duration of Index[16]	+/-0.25
18.	Active Credit Rating of Index[17]	+/-0.25

During the Monthly 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 10%
- Relax the maximum security weight multiple constraint in steps of 2 up to 20
- The one-way index turnover constraint and the maximum security weight multiple 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, MSCI can further relax the other optimization constraints to successfully rebalance the index. In case no optimal solution is found after all the above relaxations the relevant Index will not be rebalanced for that Monthly Index Review.

2.4 Determining the Optimized Index

The Index is constructed using the Barra Open Optimizer[18]. The optimization uses universe of eligible securities and the specified optimization objectives and constraints to determine the constituents of the Indexes. The decarbonization trajectory of the indexes are defined in Appendix IV.

2.5 Treatment for entities not covered by MSCI ESG Research

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 Controversies

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

[15] Based on country of domicile. In case there are countries in the parent index which weigh less than 2.5% in the parent index then for such countries the active country upper bound of +5% is not applicable. When a country weighs less than 2.5% in parent index then the upper bound of country weight in the Index is set at three times of the country's weight in parent index.

[16] Defined in Section 3 of the MSCI Fixed Income Index Calculation Methodology

[17] Based on credit rating scale defined in Appendix Section 4.2 of MSCI Fixed Income Index Calculation Methodology

[18] Please refer to Appendix V for more details.

3. Maintaining the Indexes

3.1 Monthly Index Review

- The Indexes undergo a monthly review, with the rebalancing impact taking effect on the first business day of each month (termed as Rebalancing Date). To elaborate, bonds are incorporated into the index at the close of the last business day of every month, but the impact on returns is observed on the first business day of the subsequent month.

- The rebalanced Index composition is determined by the most recent data available three days prior to the Rebalancing Date, termed as the Cut-Off Date. If a security in the universe satisfies any inclusion or exclusion criteria after the Cut-Off Date, it will typically become effective at the next monthly rebalancing, provided conditions remain constant. In extraordinary circumstances, such as cases of input data correction, MSCI has the discretion to shorten the Cut-Off Date for Index rebalancing from T-3 to T-2, T-1, or T. In such scenarios, MSCI will inform Index clients of these changes through an announcement.

- MSCI will disclose proforma index rebalancing results starting the second business day of each month. MSCI will freeze the pro forma index rebalancing results as of the Cut-Off Date.

- Bonds are either added to or removed from the index solely on monthly rebalancing dates, barring an exchange event[19]. For existing index components, any changes to index eligibility will only be reflected in the subsequent monthly rebalancing.

- Any cash that accumulates within the index each month is re-invested on the Rebalancing Date according to Section 2.6 of the Methodology.

- Specific variants of the total return calculation of the index on the Rebalancing Date may be adjusted for transaction costs[20] as securities are added to the index at the offer price.

For additional information on the index total return calculation and corporate events handling, please refer to the MSCI Fixed Income Index Calculation Methodology[21]. For the holiday calendar used in the indexes, please refer to the MSCI Fixed Income Data Methodology[22].

[19] Refer to the MSCI Fixed Income Index Calculation Methodology for detail. Available at https://www.msci.com/index-methodology

[20] Refer to the MSCI Fixed Income Index Calculation Methodology for detail. Available at https://www.msci.com/index-methodology

[21] Refer to the MSCI Fixed Income Index Calculation Methodology for detail. Available at https://www.msci.com/index-methodology

[22] The methodologies are available at: https://www.msci.com/index-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 Climate Value-at-Risk, MSCI ESG Sustainable Impact Metrics, 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/our-solutions/esg-investing/climate-solutions/scenario-analysis

4.3 MSCI ESG 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 at: 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.

The MSCI Business Involvement Screening Research methodology can be found at: https://www.msci.com/legal/disclosures/esg-disclosures.

Appendix I: MSCI Low Carbon Transition Risk Assessment

MSCI ESG Research's Low Carbon Transition Risk assessment[23] is designed to identify potential leaders and laggards by holistically measuring companies' exposure to and management of risks and opportunities related to the low carbon transition.

The outputs of this assessment are 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 predominant and secondary risks a company faces. It is industry agnostic and represents an absolute 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	
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; Oil sands exploration/production
	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.	Oil & gas exploration & production; Petrol/diesel based automobile manufacturers, thermal power plant turbine manufacturers etc.
		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.	Fossil fuel based power generation, cement, steel etc.
	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, etc.
Score = 10	SOLUTIONS		Potential to benefit through the growth of low-carbon products and services.	Renewable electricity, electric vehicles, solar cell manufacturers etc.

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 Carbon Intensity profile – which is informed by its Product Carbon Intensity,

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

Operational Carbon Intensity and Total Carbon Intensity. In the next step, we compute Low Carbon Transition Risk Exposure Category and Score based on Total Carbon Intensity.

Step 2: Assess Low Carbon Transition Risk Management

In the second step, we assess 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 are 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 II: 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 Debt Climate VaR (REMIND NGFS Orderly) [%]

A company's debt aggregated downside policy risk exposure according to all emission sources (Scope 1, 2, 3), expressed as a percentage of the company's debt 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 Opportunity Debt Climate VaR (REMIND NGFS Orderly) [%]

A company’s debt upside technology opportunity exposure, expressed as a percentage of the company’s debt market value, 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 Debt Climate VaR (IPCC SSP3-7.0, Aggressive Outcome) [%]

A company’s debt "worst-case" (95th percentile) downside or upside potential, expressed as a percentage of the company’s debt 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 III: Calculation of Target Metrics

Calculation of absolute GHG Emission

For Parent Index constituents where the Scope 1+2+3 Emission is not available, the average Scope 1+2+3 Emission of all the constituents of the Parent Index in the same GICS Industry Group in which the constituent belongs is used.

Security Level absolute GHG Emission =

$$Scope\ 1+2+3\ Carbon\ Emissions$$

Weighted Average absolute GHG Emission of Parent Index =

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

Weighted Average absolute GHG Emission of Derived Index =

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

Calculation of Potential Carbon Emissions Emission

For newly added companies to the index where data is not available yet, MSCI uses zero fossil fuel reserves.

Security Level Potential Carbon Emissions (PCE) = $Security\ Level\ PCE$

Weighted Average Potential Emissions of Parent Index =

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

Weighted Average Potential Emissions Emission of Derived Index =

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

Calculation of Average Decarbonization

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

$$W_t = W_1 * \ 0.90^{\frac{(t-1)}{12}}$$

Where '*t*' is the number of Monthly Index Reviews since the Base Date.

Thus, for the 13th Monthly Index Review since the Base Date (t=13), the target Weighted Average absolute GHG Emission will be W_1*0.90.

Companies Setting Targets

Relative to their corresponding Parent Indexes, the Indexes require a minimum 20% increase in the aggregate weight of companies setting emissions reduction targets

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

Calculation of Green Revenue to Fossil fuel-based Revenue Multiple

Green Revenue

For each constituent in the Parent Index, 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 fuel-based Revenue

For each constituent in the Parent Index, the Fossil fuel-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 fuel-based Revenue% is calculated as:

$$= \sum(Weight\ in\ Index * \ Fossil\ fuel - based\ Revenue\%)$$

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

$$= \frac{Weighted\ Average\ Green\ Revenue\%}{Weighted\ Average\ Fossil\ fuel - based\ Revenue\%}$$

Aggregate Climate Value-at-Risk (VaR)

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

1. **Policy Risk Climate VaR[24] (1.5 Degrees)**: Weighted average of security level 1.5°C Aggregated Policy Risk Debt Climate VaR (REMIND NGFS Orderly) [%]
2. **Technology Opportunities Climate VaR (1.5 Degrees)**: Weighted average of security level 1.5°C Technology Opportunity Debt Climate VaR (REMIND NGFS Orderly) [%]
3. **Aggregated Physical Risk Climate VaR (4 Degrees)**: Weighted average of security level Aggregated Physical Risk Debt Climate VaR (IPCC SSP3-7.0, Aggressive Outcome) [%]

[24] Starting from the May 2020 Monthly 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 Monthly Index Review of the Indexes is as of September 30, 2020.

Appendix IV: Decarbonization Trajectory of Indexes

The Weighted Average absolute GHG Emission on the Base Date (W_1) is used to compute the target Weighted Average absolute GHG Emission at any given Monthly Index Review (W_t) as per the below formula.

$$W_t = W_1 * \ 0.90^{\frac{(t-1)}{12}}$$

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

Index	Parent Index	Base Date[25]	W_1 (in mn $tCO2e$)
MSCI USD IG Climate Paris Aligned Corporate Bond Index	MSCI USD IG Corporate Bond Index	July 01, 2021	30.37
MSCI EUR IG Climate Paris Aligned Corporate Bond Index	MSCI EUR IG Corporate Bond Index	July 01, 2021	22.86
MSCI GBP IG Climate Paris Aligned Corporate Bond Index	MSCI GBP IG Corporate Bond Index	June 01, 2020	14.15
MSCI USD HY Climate Paris Aligned Corporate Bond Index	MSCI USD HY Corporate Bond Index	June 01, 2020	9.34
MSCI EUR HY Climate Paris Aligned Corporate Bond Index	MSCI EUR HY Corporate Bond Index	June 01, 2020	9.20
MSCI CAD IG Climate Paris Aligned Corporate Bond Index	MSCI CAD IG Corporate Bond Index	June 01, 2020	10.78

[25] The Base Date used for the MSCI USD IG Climate Paris Aligned Corporate Bond Index and the MSCI EUR IG Climate Paris Aligned Corporate Bond Index is July 1, 2021. The Base Date used for the other indexes in the table is June 1, 2020. At a given Monthly Index Review, if there is significant change in the calculation methodology of absolute GHG emission, the EU delegated acts allows for selection of a new base date.

Appendix V: New release of Barra® Optimizer

A major new release of the relevant Barra Optimizer may replace the former version within a suitable timeframe.

Appendix VI: ESG-based Exclusion Criteria

Controversial Weapons:

All companies with any tie to Controversial Weapons as defined below:

- **Cluster Bombs**
  - MSCI ESG Research's cluster bomb research identifies public companies that are involved in the production of cluster bombs and munitions, or the essential components of these products.
- **Landmines**
  - MSCI ESG Research's landmines research identifies public companies that are involved in the production of anti‐personnel landmines, anti‐vehicle landmines, or the essential components of these products.
- **Depleted Uranium Weapons**
  - MSCI ESG Research's depleted uranium weapons research identifies public companies involved in the production of depleted uranium weapons and armor.
- **Chemical and Biological Weapons**
  - MSCI ESG Research's chemical and biological weapons research identifies public companies that are involved in the production of chemical and biological weapons, or the essential components of these products.
- **Blinding Laser Weapons**
  - MSCI ESG Research's blinding laser weapons research identifies public companies that are involved in the production of weapons utilizing laser technology to cause permanent blindness.
- **Non-Detectable Fragments**
  - MSCI ESG Research's non-detectable fragments research identifies public companies that are involved in the production of weapons that use non-detectable fragments to inflict injury.
- **Incendiary Weapons (White Phosphorus)**
  - MSCI ESG Research's incendiary weapons research identifies companies that are involved in the production of weapons using white phosphorus.

Involvement criteria:

- Producers of the weapons
- Producers of key components of the weapons (only applies to cluster bombs, landmines, depleted uranium weapons as well as chemical and biological weapons)
- Ownership of 20% or more of a weapons or components producer
  - The minimum limit is raised to 50% for financial companies having an ownership in a company that manufactures controversial weapons or key components of controversial weapons
- Owned 50% or more by a company involved in weapons or components production

Revenue limits:

- Any identifiable revenues, i.e., zero tolerance

1. **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.
2. **Tobacco**: All companies classified as a "Producer" or deriving 5% or more aggregate revenue from the production, distribution, retail, supply and licensing of tobacco-related products.
3. **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).
   - 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.
4. **Thermal Coal Mining**: All companies deriving 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. 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).
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[26].

[26] As per https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter7.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.

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/FIInfo
- MSCI Fixed Income Data Methodology –

  https://www.msci.com/index/methodology/latest/FIDATA
- MSCI Fixed Income Calculation Methodology –

  https://www.msci.com/index/methodology/latest/FIINDEXCALC
- MSCI Fixed Income Glossary of Terms –

  https://www.msci.com/index/methodology/latest/FIGLOSS
- MSCI Fixed Income Index Policies –

  https://www.msci.com/index/methodology/latest/FIINDEXPOLICY
- MSCI Corporate Bond Indexes Methodology–

  https://www.msci.com/index/methodology/latest/FIIGCORP
- ESG Factors in Methodology*

The Methodology Set for the Indexes can 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 this Document

The following sections have been modified since December 2024:

- Section 2.3 amended to clarify on possible constraint relaxations required in case no optimal solution achieved in a monthly index rebalancing
- Section 2.5 added to clarify treatment of issuers which are missing MSCI ESG Controversies coverage
- Appendix VII added with links to document that constitute the index Methodology Set.

The following sections have been modified since July 2024:

- Section 2.2 was updated to reflect the latest definitions of ESG Controversies and Environmental Harm
- The treatment of companies with ratings and research not available from MSCI ESG Research was added to Section 2.5
- A footnote was added in section 2.3 to reflect the relaxation of Aggregate Climate Value-At-Risk constraint
- Section 3.1 was updated to reflect Monthly index review in detail
- The ESG Research Product descriptions were moved from section 2 to section 4
- The Climate Value-at-Risk models and scenarios used were updated in Appendix III and IV
- GHG Emission Data was updated in Appendix 5 for MSCI EUR IG Climate Paris Aligned Corporate Bond Index
- Details on the Methodology Set for the Indexes was added in the Appendix

The following sections have been modified since September 2022:

- Appendix IV has been updated to reflect the Base Date and the weighted average absolute GHG Emissions of the MSCI CAD IG Climate Paris Aligned Corporate Bond Index
- Footnote 13 has been added to Section 3.3 to reflect the issuer capping applicable to the MSCI CAD IG Climate Paris Aligned Corporate Bond Index

The following sections have been modified since November 2021:

- Appendix IV has been updated to reflect the new Base Date and the weighted average absolute GHG Emissions of the additional indexes
- Section 1 and Section 3.3 have been updated to reflect the applicability of MSCI Climate Value-at-Risk based constraints to the indexes

The following sections have been modified since August 2021:

- Appendix IV has been updated to reflect the new Base Date and the weighted average absolute GHG Emissions
- Section 1, Section 3.3 and Appendix III have been updated to replace occurrences of 'brown revenue' with 'fossil-fuel based revenue'
- Appendix II has been updated to reflect the latest description of Aggregated Extreme Weather Debt Climate VaR

- Section 3.2 has been updated to clarify the criteria corresponding to Controversial Weapons and Tobacco

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