

MSCI ESG Climate Paris Aligned Corporate Bond Custom Indexes

March 2023

Contents

- 1 Introduction 3
- 2 MSCI ESG Research 5
 - 2.1 MSCI Climate Change Metrics..... 5
 - 2.2 MSCI IMPACT SOLUTIONS: Sustainable Impact Metrics 5
 - 2.3 MSCI ESG Controversies 6
 - 2.4 MSCI ESG Business Involvement Screening Research 6
- 3 Index Construction Methodology 7
 - 3.1 Defining the Parent Indexes..... 7
 - 3.2 Defining the Eligible Universe 7
 - 3.3 Optimization Constraints 7
 - 3.4 Determining the Optimized Index 10
- 4 Maintaining the MSCI USD IG Climate Paris Aligned Corporate Bond Custom Index and MSCI EUR IG Climate Paris Aligned Corporate Bond Custom Index 12
 - 4.1 Monthly Index Reviews..... 12
- Appendix I: MSCI Low Carbon Transition Risk Assessment 13
- Appendix II: MSCI Climate Value-At-Risk..... 15
- Appendix III: Calculation of Target Metrics 16
- Appendix IV: Decarbonization Trajectory of Indexes..... 20
- Appendix V: New release of Barra® Optimizer 21
- Appendix VI: ESG-based Exclusion Criteria 22

1 Introduction

The MSCI USD IG ESG Climate Paris Aligned Corporate Bond Custom Index and MSCI EUR IG ESG Climate Paris Aligned Corporate Bond Custom Index (herein, 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 under the EU Benchmark Regulation (EU delegated acts)¹. The Indexes also incorporate business exclusion screens² based on Controversial Weapons, ESG Controversies, Tobacco, Environmental Harm, Thermal Coal Mining, Oil & Gas, Power Generation, Civilian Firearms, Nuclear Weapons, Adult Entertainment, Alcohol, Conventional Weapons, Gambling, Genetically Modified Organisms, Nuclear Power, Nuclear Utilities, Fossil Fuel Reserves Ownership, Fossil Fuel Extraction, Thermal Coal Mining, Unconventional Oil & Gas Extraction, Thermal Coal Power and ESG Rating.

The Indexes are constructed from MSCI USD IG Corporate Bond Custom Index and MSCI EUR IG Corporate Bond Index respectively (herein, the “Parent Indexes”) following an optimization-based approach and aim to:

- Reweight or exclude securities to exceed the minimum requirements of the EU Paris-Aligned Benchmark designation
- Align with a 1.5°C climate scenario using the MSCI Climate Value-at-Risk³ 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% relative to the Parent Index.
- Shift index weight from “fossil fuel-based” to “green”⁴ using the MSCI Low Carbon transition score and by excluding categories of fossil-fuel-linked companies

¹ 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.

² Defined in detail in Appendix VI

³ 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.

⁴ Green revenue is defined in Appendix III

- 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 share⁵ compared to the Parent Index and achieve low turnover

The Parent Index of the MSCI USD IG ESG Climate Paris Aligned Corporate Bond Custom Index, i.e. the MSCI USD IG Corporate Bond Custom Index, is constructed from a global credit universe of bonds denominated in USD by applying various selection criteria defined in Section 3.1. The Parent Index of the MSCI EUR IG ESG Climate Paris Aligned Corporate Bond Custom Index, i.e. the MSCI EUR IG Corporate Bond Index, is constructed from a global credit universe of bonds denominated in EUR by applying various selection criteria defined in MSCI Corporate Bond Indexes Methodology⁶.

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.

⁶ Refer to MSCI Corporate Bond Indexes Methodology available at: <https://www.msci.com/index-methodology>

2 MSCI ESG Research

The Indexes use company ratings and research provided by MSCI ESG Research. In particular, these indexes use the following MSCI ESG Research products: MSCI ESG Ratings, MSCI ESG Controversies, MSCI ESG Business Involvement Screening Research, MSCI Climate Change Metrics and MSCI Impact Solutions.

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

2.1 MSCI CLIMATE CHANGE METRICS

MSCI Climate Change Metrics provide 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-solutions>

2.2 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 | <ol style="list-style-type: none"> 1. Alternative energy 2. Energy efficiency 3. Green building |
| | Natural capital | <ol style="list-style-type: none"> 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.

More detailed taxonomy for each category can be found in Section 2.4 of the MSCI ACWI Sustainable Impact Index Methodology available at <https://www.msci.com/index-methodology>

2.3 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/esg-and-climate-methodologies>

2.4 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

3 Index Construction Methodology

Constructing the Indexes involves the following steps:

- Defining the Parent Indexes
- Defining the Eligible Universe
- Defining the Optimization Constraints
- Defining the Optimized Indexes

3.1 DEFINING THE PARENT INDEXES

The MSCI USD IG Corporate Bond Custom Index is constructed using the methodology defined for MSCI USD IG Corporate Bond Index in the MSCI Corporate Bond Indexes Methodology⁷ except for the below change:

- At rebalancing, each security included in the Index will have a notional amount outstanding greater than or equal to USD 500 million. Issuer Size threshold is not applicable.

The methodology of MSCI EUR IG Corporate Bond Index is defined in the MSCI Corporate Bond Indexes Methodology⁸.

The maintenance of the MSCI USD IG Corporate Bond Custom Index and MSCI EUR IG Corporate Bond Index is defined in Section 3 of the MSCI Corporate Bond Indexes Methodology⁹.

3.2 DEFINING THE ELIGIBLE UNIVERSE

The Eligible Universe is constructed from the Parent Indexes by excluding securities of companies based on the exclusion criteria defined in Appendix VI.

3.3 OPTIMIZATION CONSTRAINTS

At each Monthly Index Review, the Index is 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:

⁷ Refer to MSCI Corporate Bond Indexes Methodology available at: <https://www.msci.com/index-methodology>

⁸ Refer to MSCI Corporate Bond Indexes Methodology available at: <https://www.msci.com/index-methodology>

⁹ Refer to MSCI Corporate Bond Indexes Methodology available at: <https://www.msci.com/index-methodology>

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.

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 ¹⁰ (Scope 1+2+3 ¹¹) relative to Parent Index | 50% |
| 2. | Minimum average reduction (per annum) in absolute GHG Emission relative to absolute GHG Emission at the Base Date ¹² | 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% |
| 6. | Aggregate Climate Value-At-Risk under 1.5 degree scenario ¹³ Please see more detail on Aggregate Climate Value-At-Risk in Appendix II and Appendix III. | $\geq \text{Max}(0, \text{Aggregate Climate VaR of Parent Index})$ |

¹⁰ Based on EU delegated acts, absolute GHG Emissions may be used as a measure of carbon exposure for fixed income indexes

¹¹ 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.

¹² 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.

¹³ For more details on Climate value-At-Risk, please refer to Appendix II. 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% ¹⁴ |

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 ¹⁵ | 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 ¹⁶ | 200% |

Table 3: Constraints imposed to meet diversification objectives

| No. | Diversification Objective | MSCI Fixed Income Climate Paris Aligned Indexes |
|-----|---------------------------|---|
| 11. | Constituent Active Weight | +/- 2% |

¹⁴ 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.

¹⁵ 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.

¹⁶ This is implemented as a soft constraint. Soft constraints are useful for reducing the possibility of Barra Optimizer not finding a feasible solution. For well-behaved convex problems, Barra Optimizer will return an optimal portfolio satisfying the bounds if such a portfolio exists. Otherwise, it will try to find a portfolio with minimal violation of the constraint.

| No. | Diversification Objective | MSCI Fixed Income Climate Paris Aligned Indexes |
|-----|---|---|
| 12. | Issuer capping | 3% |
| 13. | Security Weight as a multiple of its weight in the Parent Index | 10x |
| 14. | Active Sector Weights (the Energy GICS Sector is not constrained) | +/-5% |
| 15. | Active Country Weights ¹⁷ | +/-5% |
| 16. | One Way Turnover | 4% |
| 17. | Active Effective Duration of Index ¹⁸ | +/-0.25 |
| 18. | Active Credit Rating of Index ¹⁹ | +/-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, the relevant Index will not be rebalanced for that Monthly Index Review.

3.4 DETERMINING THE OPTIMIZED INDEX

The Indexes are constructed using the Barra Open Optimizer²⁰. The optimization uses universe of eligible securities and the specified optimization objectives and

¹⁷ 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.

¹⁸ Defined in Section 3 of the MSCI Fixed Income Index Calculation Methodology

¹⁹ Based on credit rating scale defined in Appendix Section 4.2 of MSCI Fixed Income Index Calculation Methodology

²⁰ Please refer to Appendix V for more details.

constraints to determine the constituents of the Indexes. The decarbonization trajectory of the indexes are defined in Appendix IV.

4 Maintaining the MSCI USD IG Climate Paris Aligned Corporate Bond Custom Index and MSCI EUR IG Climate Paris Aligned Corporate Bond Custom Index

4.1 MONTHLY INDEX REVIEWS

The Indexes are reviewed on a monthly basis to coincide with the Monthly Index Review of the Parent Indexes. In general, the pro forma Indexes are announced three business days before the effective date. In general, MSCI uses latest available MSCI ESG Research data on the announcement date for the rebalancing of the Indexes. At each Monthly Index Review, the Eligible Universe is updated, and the composition of the indexes are reassessed based on the methodology described in Section 3.


Appendix I: MSCI Low Carbon Transition Risk Assessment

MSCI ESG Research’s Low Carbon Transition Risk assessment²¹ 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 | |
|--|--------------------------------|-------------|---|--|
|  <p>Score = 0</p> <p>Score = 10</p> | 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. |
| | SOLUTIONS | | Potential to benefit through the growth of low-carbon products and services. | Renewable electricity, electric vehicles, solar cell manufacturers etc. |

Calculation methodology

²¹ For more details on MSCI Climate Change Metrics: <https://www.msci.com/climate-solutions>

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, 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 over the next 15 years and calculate what these costs might signify about financial performance into the foreseeable future.

1.5°C Aggregated Policy Risk Debt Climate VaR (AIM CGE) [%]

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 AIM CGE model. Please refer to the Climate VaR methodology document for further details on scenario options.

1.5°C Technology Opportunity Debt Climate VaR (AIM CGE) [%]

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 AIM CGE model. Please refer to the Climate VaR methodology document for further details on scenario options.

Aggregated Extreme Weather Debt Climate VaR (Aggressive Scenario) [%]

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, tropical cyclones and river low flow continue along different greenhouse gas concentration pathways.

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 =

$$\text{Scope 1 + 2 + 3 Carbon Emissions}$$

Weighted Average absolute GHG Emission of Parent Index =

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

Weighted Average absolute GHG Emission of Derived Index =

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

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) =

$$\text{Absolute Potential Emissions}$$

Weighted Average Potential Emissions of Parent Index =

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

Weighted Average Potential Emissions Emission of Derived Index =

$$\sum (\text{Index Weight} * \text{Security Level PCE})$$

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:

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

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 VaR²² (1.5 Degrees)**: Weighted average of security level 1.5°C Aggregated Policy Risk Debt Climate VaR (AIM CGE) [%]
2. **Technology Opportunities Climate VaR (1.5 Degrees)**: Weighted average of security level 1.5°C Technology Opportunity Debt Climate VaR (AIM CGE) [%]
3. **Extreme Weather Climate VaR (Aggressive Scenario)**: Weighted average of security level Aggregated Extreme Weather Debt Climate VaR (Aggressive Scenario) [%]

²² 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 ²³ | W_1 (tCO2) |
|---|---|-------------------------|--------------|
| MSCI USD IG ESG Climate Paris Aligned Corporate Bond Custom Index | MSCI USD IG Corporate Bond Custom Index | July 01, 2021 | 27430370.51 |
| MSCI EUR IG ESG Climate Paris Aligned Corporate Bond Custom Index | MSCI EUR IG Corporate Bond Index | July 01, 2021 | 23609589.24 |

²³ 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

1. **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
2. **ESG Controversies:** All companies having faced very severe controversies pertaining to ESG issues – Defined as companies with an ESG Controversy Score of 0.
 3. **Tobacco:** All companies classified as a “Producer”. All companies deriving 5% or more aggregate revenue from the production, distribution, retail, supply and licensing of tobacco-related products. All companies deriving 5% or more aggregate revenue from the manufacture of tobacco products.
 4. **Environmental Harm:** All companies having faced very severe and severe controversies pertaining to Environmental issues – Defined as companies with an Environment Controversy Score of 0 or 1.
 5. **Thermal Coal Mining:** All companies deriving any 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).
 6. **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.

7. **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 generation²⁴.
8. **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.
9. **Nuclear Weapons:** 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.
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.
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.

²⁴ 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 100gCO₂/kWh.

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. **Nuclear Utilities:** All Companies the own or operate nuclear power plants.
17. **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>.
18. **Fossil Fuel Extraction:** All companies deriving any revenue (either reported or estimated) from thermal coal mining and unconventional oil and gas extraction.
19. **Thermal Coal Mining:** Revenue from the mining of thermal coal (including lignite, bituminous, anthracite and steam coal) and its sale to external parties. It does not cover 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.
20. **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.
21. **Thermal Coal Power:** All companies deriving 5% or more revenue (either reported or estimated) from thermal coal-based power generation.
22. **ESG Rating:** Securities of companies having an MSCI ESG Rating of “CCC” and “B”.

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