



December 2025

# MSCI CLIMATE PARIS ALIGNED PAB CORPORATE BOND INDEXES



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## 1 Introduction

The MSCI Climate Paris Aligned PAB Corporate Bond Indexes<sup>1</sup> (“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 incorporate the Task Force on Climate-related Financial Disclosures (TCFD)<sup>2</sup> recommendations and are designed to exceed the minimum standards of the EU Paris-Aligned Benchmark under the EU Benchmark Regulation (EU Delegated Acts)<sup>3</sup>. The 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 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<sup>4</sup> 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 risk
- 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 duration, yield and credit rating similar to the Parent Index
- Minimize active share<sup>5</sup> relative to the Parent Index and achieve low turnover

<sup>1</sup> 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.

<sup>2</sup> <https://www.fsb-tcf.org/publications/final-recommendations-report/>

<sup>3</sup> The corresponding minimum requirements are defined in Commission Delegated Regulation (EU) 2020/1818, available under [https://eur-lex.europa.eu/eli/reg\\_del/2020/1818/oj](https://eur-lex.europa.eu/eli/reg_del/2020/1818/oj). MSCI’s approach to meeting these requirements is described in the MSCI EU CTB/PAB Index Framework, available under <https://www.msci.com/index/methodology/latest/EUCTBPABIndexFramework>. In case changes to the Index methodology are required to maintain compliance with the regulatory CTB/PAB labels, MSCI will issue an announcement prior to implementing the changes in the methodology. MSCI will not conduct a formal consultation for such an update.

<sup>4</sup> MSCI Climate Value-at-Risk is applicable to the MSCI USD IG Core Climate Paris Aligned PAB Corporate Bond Index and the MSCI EUR IG Climate Paris Aligned PAB Corporate Bond Index.

<sup>5</sup> 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 Indexes

The Indexes use company ratings and research provided by MSCI Solutions LLC (“MSCI Solutions”)<sup>6</sup> for the Index construction.

Constructing the Indexes 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. 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 on the exclusion criteria 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 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

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

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See Section 4 for further information regarding sustainability and climate data used in the Indexes that MSCI Limited and MSCI Deutschland GmbH source from MSCI Solutions LLC, a separate subsidiary of MSCI Inc. MSCI Solutions 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.

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

No.	Transition and Physical Risk Objective	MSCI Climate Paris Aligned PAB Corporate Bond Indexes
1.	Minimum reduction in absolute Greenhouse Gas (GHG) Emission <sup>7</sup> (Scope 1+2+3 <sup>8</sup> ) relative to Parent Index	50%
2.	Minimum average reduction (per annum) in absolute GHG Emission relative to absolute GHG Emission of the Index at the Base Date <sup>9</sup>	10%
3.	Minimum Increase in aggregate weight in Companies Setting Targets <sup>10</sup> relative to the aggregate Parent Index weight of such companies that meet the eligibility criteria defined in Section 2.2.	20%
4.	Minimum reduction in Weighted Average Potential Emissions relative to Parent Index	50%
5.	Minimum increase in weighted average Low Carbon Transition <sup>11</sup> (LCT) Score relative to Parent Index.	5%

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

No.	Transition and Physical Risk Objective	MSCI Climate Paris Aligned PAB Corporate Bond Indexes
6.	Aggregate Climate Value-At-Risk <sup>12</sup> threshold	>= Max (-5%, Aggregate Climate VaR of Parent Index)

<sup>7</sup> Based on EU Delegated Acts, absolute GHG Emissions may be used as a measure of carbon exposure for Fixed Income Indexes.

<sup>8</sup> Prior to the May 2020 Monthly Index Review of the Indexes, the absolute Weighted Average Carbon Emissions were calculated based on Scope 1+2 Emissions.

<sup>9</sup> Prior to the May 2020 Monthly Index Review of the Indexes, the reduction in absolute Weighted Average Carbon Emission was calculated using Scope 1+2 Emissions since Inception.

<sup>10</sup> For more details on the Companies Setting Targets criteria, please refer to Appendix III.

<sup>11</sup> For more details on Low Carbon Transition (LCT) Score, please refer to Appendix I.

<sup>12</sup> For more details on Climate value-At-Risk, please refer to Appendix II and Appendix III. Prior to the May 2020 Monthly Index Review of the Indexes, the Policy Risk Climate VaR used Scope 1 Emissions since Inception.

7.	Minimum reduction in Weighted Average Physical Risk Climate Value-At-Risk <sup>13</sup> (Aggressive Scenario) relative to Parent Index	50% <sup>14</sup>
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Table 2: Constraints imposed in order to meet transition opportunity objectives:

No.	Transition Opportunity Objective	MSCI Climate Paris Aligned PAB Corporate Bond Indexes
8.	Minimum increase in weighted average LCT Score relative to Parent Index <sup>15</sup>	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 Climate Paris Aligned PAB Corporate Bond Indexes
11.	Constituent Active Weight	+/- 2%
12.	Issuer capping <sup>16</sup>	3%
13.	Security Weight as a multiple of its weight in the Parent Index	10x
14.	Active Sector Weights (the Energy GICS® <sup>17</sup> Sector is not constrained)	+/- 5%

<sup>13</sup> If the Physical Risk Climate Value-at-Risk is unavailable for a security, that security is excluded from the calculation of the Index's weighted average Physical Risk Climate Value-at-Risk. The weighted average calculation is based on renormalized weights of securities included in the calculation.

<sup>14</sup> In case the Parent Index has a positive Weighted Average Physical Risk Climate VaR, the floor will be applied at the level of the Weighted Average Physical Risk Climate VaR of the Parent Index.

<sup>15</sup> 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.

<sup>16</sup> The issuer capping is applied at 4% in the MSCI CAD IG Climate Paris Aligned PAB Corporate Bond Index.

<sup>17</sup> GICS is the Global Industry Classification Standard (GICS) which was developed by and is the exclusive property of MSCI and S&P Dow Jones Indices.

15.	Active Country Weights <sup>18</sup>	+/- 5%
16.	One Way Turnover	4%
17.	Active Effective Duration <sup>19</sup> of Index	+/-0.25
18.	Active Credit Rating <sup>20</sup> of Index	+/-0.25
19.	Active Yield <sup>21</sup> of Index	+/-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 15%
- 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<sup>22</sup>. 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 Solutions

Companies not assessed by MSCI Solutions on data for any of the following MSCI sustainability and climate products are not eligible for inclusion in the Indexes:

<sup>18</sup> Based on country definition as defined in Section 2 of MSCI Corporate Bond Index Methodology. 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.

<sup>19</sup> Defined in the MSCI Fixed Income Index Calculation Methodology available at: <https://www.msci.com/index-methodology>. The constraint is defined as a soft constraint.

<sup>20</sup> Defined in the MSCI Fixed Income Index Calculation Methodology available at: <https://www.msci.com/index-methodology>. The constraint is defined as a soft constraint.

<sup>21</sup> Defined in the MSCI Fixed Income Index Calculation Methodology available at: <https://www.msci.com/index-methodology>. The constraint is defined as a soft constraint.

<sup>22</sup> Please refer to Appendix V for more details.

- MSCI Controversies
- MSCI Business Involvement Screening Research

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

### 3 Index Rebalancing & Maintenance

- The composition of the Indexes is reviewed monthly, with an effective rebalancing impact on the first business day of the month (termed as Rebalancing Date). For clarification, bonds are added to the Index on the closing of last business day of every month, however, the return impact is on the first business day of the month.
- Change in the Index composition is based on the latest<sup>23</sup> data available as of three days prior to the Rebalancing Date, which is defined as the Cut-Off Date. Any inclusion or exclusion criteria satisfied for a given security in the universe, after the Cut-Off Date, will generally become effective at the following monthly rebalancing; should conditions remain unchanged. In exceptional cases, for instance, cases of input data correction, MSCI can reduce the Cut-Off Date for Index rebalancing from T-3 to T-2, T-1, or T. In such instances, MSCI will notify Index clients of such changes via 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 added to or deleted from the Index only on monthly rebalancing dates. For the existing Index components any changes to Index eligibility will only be reflected in the next monthly rebalancing.
- Any inclusion or exclusion criteria satisfied for a given security in the universe, after the Cutoff Date, will generally become effective at the following monthly rebalancing; should conditions remain unchanged.
- Any cash that accrues within the Index in each month is re-invested on a pro-rata basis across the Index constituents, on the Rebalancing Date. In essence, cash in the Index is swept out on rebalancing and the opening Index portfolio on the Rebalancing Date starts with zero accrued cash balance.
- Specific variants of total return calculation of the Index on the Rebalancing Date may be adjusted for transaction costs<sup>24</sup> as securities are added to the Index at the offer price.

For further information on Index total return calculation and corporate events handling please refer to the MSCI Fixed Income Index Calculation Methodology<sup>25</sup>. For the holiday calendar used in the Indexes, please refer to the MSCI Fixed Income Data Methodology<sup>26</sup>. MSCI leverages the GICS<sup>®27</sup> sector classification framework for MSCI Corporate Bond Indexes as well. Please refer to MSCI GICS Methodology<sup>28</sup> for details.

<sup>23</sup> Sustainability and Climate data will utilize the most recent, quality-assured information available. For index rebalancing, the latest data that has successfully undergone quality assurance checks will be employed. In cases where recent data changes are still undergoing verification, only data that has passed the quality assurance process will be considered

<sup>24</sup> Refer to the MSCI Fixed Income Index Calculation Methodology for detail. Available at <https://www.msci.com/Index-methodology>

<sup>25</sup> Refer to the MSCI Fixed Income Index Calculation Methodology for detail. Available at <https://www.msci.com/Index-methodology>

<sup>26</sup> The methodologies are available at: <https://www.msci.com/Index-methodology>.

<sup>27</sup> GICS, the global industry classification standard jointly developed by MSCI Inc. and S&P Dow Jones Indices

<sup>28</sup> The GICS methodology is available at: <https://www.msci.com/gics>

## 4 MSCI Solutions

The Indexes are products of MSCI Inc. that utilize information such as company ratings and research produced and provided by MSCI Solutions LLC (“MSCI Solutions”), a subsidiary of MSCI Inc. In particular, the Indexes use the following MSCI sustainability and climate products: MSCI Climate Change Metrics, MSCI Climate Value-at-Risk, MSCI Sustainable Impact Metrics, MSCI Controversies and MSCI 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 and tools to support institutional investors seeking to integrate climate risk and 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.

#### 4.1.1. Fossil Fuels and Power Generation Metrics

MSCI Solutions identifies companies involved in fossil fuel-related assets and activities including fossil fuel reserves, resource extraction, power generation and generation capacity, revenue from such assets and activities and capital investments in such assets and activities. The metrics are based on disclosed activities, disclosed revenue and estimates of revenue that are extrapolated from company disclosures and eligible third-party sources (such as NGOs).

#### 4.1.2. Greenhouse Gas (GHG) Emissions

MSCI Solutions collects reported emissions and uses proprietary estimation methodologies that follows the GHG Protocol in including carbon dioxide (CO<sub>2</sub>) and the five other principal GHGs: hydrofluorocarbons (HFCs), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). Emissions of these other gases are accounted for in terms of the quantity of CO<sub>2</sub> that has an equivalent global warming potential.

#### 4.1.3. Low-Carbon Transition (LCT) Risk Assessment

MSCI Solutions’ LCT data assesses companies’ exposure to risks and opportunities related to the low-carbon transition (the transition) based on the carbon-intensive nature of their business lines. In particular, in the event that the transition takes place, demand for carbon-intensive products would decline in favor of low- and zero-carbon products, which would put carbon-intensive companies and

industries (for example, coal-based power generation and coal mining) at risk of having stranded assets over the long term (5+ years). MSCI Solutions considers a company exposed to low-carbon transition risks and opportunities through two main transmission channels: (1) exposure through involvement in carbon-intensive operations, and (2) exposure through involvement in or solutions for carbon-intensive products.

#### 4.1.4. Climate Value-at-Risk

Climate VaR provides a forward-looking and return-based valuation assessment to measure climate related risks and opportunities. Climate VaR is a quantitative assessment calculated at the company and security level. The aggregated company Climate VaR is calculated as a percentage of market value (from -100% to +100%) for multiple climate scenarios and includes the valuation impacts arising from technology opportunities, policy risks and physical risks. The Climate VaR model uses a data-driven approach, examining a company's positioning within its industry and the regions where it operates. It considers the potential costs and profits associated with different climate scenarios, including the impacts of carbon pricing, regulatory changes, and physical climate events. By simulating these scenarios, the model estimates how climate change could affect a company's financial performance and overall valuation.

#### 4.1.5. Other metrics: Targets and Management

MSCI Solutions also provides a number of other climate-related metrics such as MSCI ESG Ratings-based Key Issues (e.g., Carbon Emissions, Product Carbon Footprint, etc.) and their underlying metrics (e.g., targets, mitigation, performance), which are referenced and governed within the MSCI ESG Ratings Methodology (see Section 2C of this document). In addition, MSCI Solutions collects additional target-level datapoints, including whether the target has been submitted to the Science Based Targets initiative (SBTi), whether SBTi has approved the target and whether the company is committed to setting a science-based target in the future.

For more details on MSCI Climate Change Metrics, please refer to <https://www.msci.com/legal/disclosures/climate-disclosures>

## 4.2 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"> <li>1. Alternative energy</li> <li>2. Energy efficiency</li> <li>3. Green building</li> </ol>
	Natural capital	<ol style="list-style-type: none"> <li>4. Sustainable water</li> <li>5. Pollution prevention</li> <li>6. Sustainable agriculture</li> </ol>
Social Impact	Basic needs	<ol style="list-style-type: none"> <li>7. Nutrition</li> <li>8. Major Disease Treatment</li> <li>9. Sanitation</li> <li>10. Affordable Real Estate</li> </ol>
	Empowerment	<ol style="list-style-type: none"> <li>11. SME Finance</li> <li>12. Education</li> <li>13. Connectivity – Digital divide</li> </ol>

Under each of the actionable environmental and social impact themes, MSCI Solutions 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>.

### 4.3 MSCI Controversies

MSCI 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 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 Controversies Score falls on a 0-10 scale, with “0” being the most severe controversy.

The MSCI Controversies methodology can be found at: . <https://www.msci.com/legal/disclosures/esg-disclosures>

### 4.4 MSCI Business Involvement Screening Research

MSCI 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 Solutions' Low Carbon Transition Risk assessment<sup>29</sup> 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	INDUSTRY EXAMPLES
SCORE = 0	<b>ASSET STRANDING</b>		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
	<b>TRANSITION</b>	<b>PRODUCT</b>	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
<b>OPERATIONAL</b>		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	
SCORE = 10	<b>NEUTRAL</b>		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
	<b>SOLUTIONS</b>		Potential to benefit through the growth of low-carbon products and services.	Renewable electricity, Electric vehicles, Solar cell manufacturers

<sup>29</sup> 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 Solutions 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 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 absolute GHG Emissions is not available, the average of Scope 1+2+3 absolute GHG Emissions based on top quartile<sup>30</sup> (highest emitters) of all constituents of the Parent Index, within corresponding GICS Industry Group, is used. The average of top quartile Scope 1+2+3 absolute GHG Emissions within corresponding GICS Sector is used if all securities within the GICS Industry Group have missing data. The average of top quartile Scope 1+2+3 absolute GHG Emissions within the Parent Index is used if all securities in both the corresponding GICS Industry Group and GICS Sector have missing data.

$$\text{Security Level absolute GHG Emission} = \text{Scope 1 + 2 + 3 Carbon Emissions}$$

$$\text{Weighted Average absolute GHG Emission of Parent Index} = \sum (\text{Weight in Parent Index} * \text{Security Level GHG Emission})$$

$$\text{Weighted Average absolute GHG Emission of Derived Index} = \sum (\text{Index Weight} * \text{Security Level GHG Emission})$$

### Calculation of Potential Carbon Emissions:

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

$$\text{Security Level Potential Carbon Emissions (PCE)} = \text{Security Level PCE}$$

$$\text{Weighted Average Potential Carbon Emissions of Parent Index} = \sum (\text{Weight in Parent Index} * \text{Security Level PCE})$$

$$\text{Weighted Average Potential Carbon Emissions Emission of Derived Index} = \sum (\text{Index Weight} * \text{Security Level PCE})$$

<sup>30</sup> The top quartile is based on absolute GHG emissions in descending order, followed by security weight in descending order as a secondary criterion.

### 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 13<sup>th</sup> 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:

The Index requires a minimum 20% increase in the aggregate weight of companies setting emissions reduction targets relative to the aggregate Parent Index weight of such companies that meet the eligibility criteria defined in Section 2.2. 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 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

In cases where Green Revenue% is unavailable for a security, it is considered to be zero.

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.

In cases where Fossil fuel-based Revenue% is unavailable for a security, it is considered to be zero.

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<sup>31</sup> (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) [%]

If the Aggregate Climate Value-at-Risk is unavailable for a security, that security is excluded from the calculation of the Index's weighted average Aggregate Climate Value-at-Risk. The weighted average calculation is based on renormalized weights of securities included in the calculation.

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<sup>31</sup> 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 <sup>32</sup>	$W_1$ (in mn tCO <sub>2e</sub> )
MSCI USD IG Core Climate Paris Aligned PAB Corporate Bond Index	MSCI USD IG Core Corporate Bond Index	July 01, 2021	30.37
MSCI EUR IG Climate Paris Aligned PAB Corporate Bond Index	MSCI EUR IG Corporate Bond Index	July 01, 2021	22.86
MSCI GBP IG Climate Paris Aligned PAB Corporate Bond Index	MSCI GBP IG Corporate Bond Index	June 01, 2020	14.15
MSCI USD HY Climate Paris Aligned PAB Corporate Bond Index	MSCI USD HY Corporate Bond Index	June 01, 2020	9.34
MSCI EUR HY Climate Paris Aligned PAB Corporate Bond Index	MSCI EUR HY Corporate Bond Index	June 01, 2020	9.20
MSCI CAD IG Climate Paris Aligned PAB Corporate Bond Index	MSCI CAD IG Corporate Bond Index	June 01, 2020	10.78

<sup>32</sup> The Base Date used for the MSCI USD IG Core Climate Paris Aligned PAB Corporate Bond Index and the MSCI EUR IG Climate Paris Aligned PAB 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 allow 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 Solutions’ 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 Solutions’ 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 Solutions’ depleted uranium weapons research identifies public companies involved in the production of depleted uranium weapons and armor.
- **Chemical and Biological Weapons**
  - MSCI Solutions’ 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 Solutions’ 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 Solutions’ 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 Solutions’ incendiary weapons research identifies companies that are involved in the production of weapons using white phosphorus.

**Involvement criteria:**

- Producers of 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. Controversies:**

All companies assessed as having involvement in controversies that are classified as Red Flags (MSCI Controversies Score of 0). A Red Flag indicates an ongoing, Very Severe controversy implicating a company directly through its actions, products, or operations.

**3. 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.

**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).

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

**5. Thermal Coal:**

- **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)
- **Thermal Coal Distribution:** All companies with evidence of thermal coal distribution or transport involvement. This includes transport of thermal coal by road, rail, shipping or air, and physical trading of thermal coal. It does not include involvement in storage of thermal coal, or involvement in metallurgical coal-related activities.

## 6. Oil & Gas:

- All companies deriving 10% or more revenue from various oil related activities, including extraction and production of oil and natural gas liquids, oil and natural gas liquid pipelines, transportation of oil and oil products, refining of oil fuels, distribution of oil and related products (including storage facilities and terminals and bulk stations), exploration services (excluding extraction and production) and drilling services (excluding extraction and production).
- All companies deriving 50% or more revenue from various gas related activities, including extraction and production of natural gas, natural gas pipelines, transportation of natural gas, processing of natural gas fuels, distribution of gas and related products (including liquefied petroleum gas and natural gas), exploration services (excluding extraction and production) and drilling services (excluding extraction and production).

## 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 generation<sup>33</sup>.

## 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:

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<sup>33</sup> As per [https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc\\_wg3\\_ar5\\_chapter7.pdf](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<sub>2</sub>/kWh.

All companies involved meeting specific Nuclear Weapons business involvement criteria as described below:

- 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/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>
- MSCI EU CTB/PAB Index Framework –  
<https://www.msci.com/index/methodology/latest/EUCTBPABIndexFramework>
- 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 updated effective August 2021:

- Appendix IV was updated to reflect the new Base Date and the weighted average absolute GHG Emissions.
- Section 1, Section 3.3 and Appendix III were updated to replace occurrences of 'brown revenue' with 'fossil-fuel based revenue'.
- Appendix II was updated to reflect the latest description of Aggregated Extreme Weather Debt Climate VaR.
- Section 3.2 was updated to clarify the criteria corresponding to Controversial Weapons and Tobacco.

### The following sections have been updated effective November 2021:

- Appendix IV was updated to reflect the Base Date and the weighted average absolute GHG Emissions of the additional Indexes.
- Section 1 and Section 3.3 were updated to reflect the applicability of MSCI Climate Value-at-Risk based constraints to the Indexes.

### The following sections have been updated effective September 2022:

- Appendix IV was 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 was 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 updated effective December 2024:

- Section 2.2 was updated to reflect the latest definitions of Controversies and Environmental Harm.
- Section 2.3 was amended to clarify on possible constraint relaxations required in case no optimal solution achieved in a monthly Index rebalancing.
- Section 2.5 was updated to clarify treatment of issuers which are missing MSCI Controversies coverage.
- Section 3 was updated to reflect the 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 II and III.
- GHG Emission Data was updated in Appendix IV for MSCI EUR IG Climate Paris Aligned Corporate Bond Index.
- Appendix VII was added with links to documents that constitute the Index Methodology Set.

**The following sections have been updated effective April 2025:**

- Methodology Book was updated using the latest branding template.
- Footnote was updated in Section 1 with reference to the MSCI EU CTB/PAB Index Framework
- Section 2.3 was updated to reflect the change in the threshold for Aggregated Climate Value -At-Risk from greater than or equal to 0% to greater than or equal to -5%.
- The definition of Companies Setting Targets was expanded in Appendix III to include any company which has received Science Based Targets from the Science Based Targets Initiative (SBTi).
- The calculation of aggregate weight of 'Companies Setting Target' was updated in Section 2.3 to only include companies which are not excluded from the Index, as per the exclusion criteria described in Section 2.2 of the methodology document.
- Section 2.3 was updated to reflect an additional investability constraint based on Yield and the maximum turnover relaxation threshold from 10% to 15%.
- MSCI Climate Change Metrics was updated in Section 4.1 to reflect the sub-sections under Climate Change Metrics to provide additional details on Fossil Fuels related activities, Greenhouse Gas Emissions, Low-Carbon Transition, Climate Value-at-Risk, and other metrics such as Science Based Targets initiative.
- The language and the Low Carbon Transition Categories and Scores table was updated in Appendix I.
- Appendix III was updated to reflect the methodology for estimating missing GHG emissions.
- Appendix VI was updated to reflect additional exclusions based on Nuclear Weapons and Civilian Firearms.
- Appendix VI was updated to reflect the inclusion of thermal coal distribution screen in the thermal coal-based exclusion criteria
- Appendix VI was updated to reflect the updated criteria for excluding companies involved in oil and gas related activities.
- Appendix VII was updated to reflect the reference to MSCI EU CTB/PAB Index Framework.

**The following sections have been updated effective December 2025:**

- Index Names were updated, effective December 2025; MSCI Climate Paris Aligned Corporate Bond Indexes has been renamed as MSCI Climate Paris Aligned PAB Corporate Bond Indexes

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