

MSCI EU CTB/PAB Overlay Indexes Methodology

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Contents

- 1 Introduction 3
- 2 MSCI ESG Research 4
 - 2.1 MSCI Climate Change Metrics.....4
 - 2.2 MSCI ESG Controversies.....5
 - 2.3 MSCI ESG Business Involvement Screening Research 5
- 3 Constructing the MSCI CTB/PAB Indexes 6
 - 3.1 Applicable Universe6
 - 3.2 Reference Index 6
 - 3.3 Eligible Universe.....6
 - 3.4 Security Selection and Weighting.....8
 - 3.5 Optimization Constraints8
 - 3.6 Determining the Optimized Portfolio 11
- 4 Maintaining the MSCI CTB/PAB Indexes 12
 - 4.1 Semi-Annual Index Reviews.....12
 - 4.2 Ongoing Event Related Changes12
- Appendix I: Calculation of Target Metrics 14
- Appendix II: Barra Equity Model Used in The Optimization 17
- Appendix III: New release of Barra® Equity Model or Barra® Optimizer 18
- Appendix IV: Non-Optimized approach to construct CTB Indexes 19
 - Intermediate Universe.....19
 - Final Universe20

1 Introduction

Two new categories of climate benchmark were introduced by the regulation (EU) 2016/1011 as amended by Regulation (EU) 2019/2089, which sets out the minimum standards for such indexes. The two benchmark types are EU Climate Transition Benchmarks (CTBs) and EU Paris-Aligned Benchmarks (PABs).

The MSCI EU CTB Overlay Indexes and the MSCI EU PAB Overlay Indexes are designed to meet the minimum standards of the EU Climate Transition Benchmark (CTB) and the EU Paris-Aligned Benchmark (PAB) respectively¹. The MSCI EU CTB/PAB Overlay Indexes are constructed from their corresponding Parent Indexes using an optimization-based approach and aim to:

- Reduce the weighted average greenhouse gas intensity by 30% (50% for MSCI EU PAB Overlay Indexes) compared to the underlying investment universe.
- Reduce the weighted average greenhouse gas (GHG) intensity by 7% on an annualized basis
- Achieve a modest tracking error compared to the Parent Index and low turnover.
- Exclude companies based on the following criteria:
 - MSCI EU CTB/PAB Overlay Indexes exclude companies involved in Controversial Weapons businesses, Very Severe ESG Controversies, Severe Environmental Controversies and Tobacco Manufacturing².
 - Additionally, MSCI EU PAB Overlay Indexes also exclude companies involved in Thermal Coal, Oil & Gas and Fossil Fuel-based power generation.

¹ 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 Exclusions for Tobacco Manufacturers will be applied in MSCI EU CTB Overlay Indexes starting from 2023.

2 MSCI ESG Research

MSCI ESG Research provides in-depth research, ratings and analysis of the environmental, social and governance-related business practices of thousands of companies worldwide. It consists of an integrated suite of tools and products to efficiently manage research, analysis and compliance tasks across the spectrum of ESG factors.

The Index uses company ratings and research provided by MSCI ESG Research. In particular, this index uses the following MSCI ESG Research products: MSCI Climate Change Metrics, MSCI ESG Controversies and MSCI ESG Business Involvement Screening Research.

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 provides climate data & tools to support investors integrating climate risk & opportunities into their investment strategy and processes. It supports investors seeking to achieve a range of objectives, including measuring and reporting on climate risk exposure, implementing low carbon and fossil fuel-free strategies, align 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 ESG CONTROVERSIES

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

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

2.3 MSCI ESG BUSINESS INVOLVEMENT SCREENING RESEARCH

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

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

3 Constructing the MSCI EU CTB/PAB Overlay Indexes

3.1 APPLICABLE UNIVERSE

The Applicable Universe includes all the existing constituents of any Non-Optimized MSCI Index³ (“Parent Index”).

3.2 REFERENCE INDEX

The Reference Index aims to represent the Investment Universe for the Parent Index. This Index is the free-float adjusted market capitalization weighted index (“Reference Index”) corresponding to the Parent Index as per the MSCI Global Investible Markets Index (GIMI) methodology⁴. For Parent Indexes which follow the GIMI methodology, the Reference Index is the same as the Parent Index. For further details regarding the Reference Index, kindly refer to Appendix V.

3.3 ELIGIBLE UNIVERSE

The Eligible Universe is constructed from the Applicable Universe by excluding securities of companies based on the exclusion criteria below and as per the implementation schedule detailed in Table 1:

Table 1: Implementation schedule for exclusions in the MSCI CTB/PAB Indexes

	MSCI EU CTB Overlay Indexes	MSCI EU PAB Overlay Indexes
Controversial Weapons	Applicable	Applicable
ESG Controversies	Applicable	Applicable
Environmental Harm	Applicable	Applicable
Tobacco	Applicable from 2023	Applicable

³ A non-optimized MSCI Index is defined as an Index which does not use the Barra Open Optimizer in its Index construction to determine the weights of securities.

⁴ For further details regarding the MSCI Global Investible Markets Index methodology, kindly refer to <https://www.msci.com/index-methodology>

	MSCI EU CTB Overlay Indexes	MSCI EU PAB Overlay Indexes
Thermal Coal Mining	Not Applicable	Applicable
Oil & Gas	Not Applicable	Applicable
Power Generation	Not Applicable	Applicable

1. **Controversial Weapons:** All companies involved in Controversial Weapons as defined by the methodology of the MSCI Ex-Controversial Weapons Indexes⁵.
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. **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.
4. **Tobacco**⁶: All companies that are involved in the manufacturing of Tobacco products

Further, MSCI EU PAB Overlay Indexes also exclude companies based on the additional exclusion criteria below. These exclusions are not applied in the MSCI EU CTB Overlay Indexes.

5. **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 For more details regarding the MSCI Ex-Controversial Weapons Index methodology, please refer to www.msci.com/index-methodology.

⁶ Exclusions for Tobacco Manufacturers will be applied in MSCI CTB Indexes starting from 2023. This exclusion is applied immediately for the MSCI PAB Indexes.

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, 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 generation⁷.

3.4 SECURITY SELECTION AND WEIGHTING

Securities in the Eligible Universe are selected and weighted following an optimization based approach described below in Section 3.5 of this methodology book.

The MSCI EU CTB Overlay C-Series Indexes provide an alternative to the optimization-based approach. These indexes are constructed by following a “non optimized” approach as detailed in Appendix IV.

3.5 OPTIMIZATION CONSTRAINTS

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

1. Climate objectives – constraints detailed in Table 2
2. Diversification objectives – constraints detailed in Table 3

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

⁷ 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.

Table 2: Constraints imposed to meet climate objectives

No.	Climate Objectives	MSCI EU CTB Overlay Indexes	MSCI EU PAB Overlay Indexes
1.	Minimum reduction in Greenhouse Gas (GHG) Intensity (Scope 1+2+3 ⁸) relative to the Reference Index	30%	50%
2.	Minimum average reduction (per annum) in GHG Intensity relative to GHG Intensity of the index at the Base Date ⁹	7%	7%
3.	Minimum active weight in High Climate Impact Sector relative to Reference Index as defined in Appendix I	0%	0%

Table 3: Constraints imposed to meet diversification objectives

No.	Diversification Objective	MSCI EU CTB/PAB Overlay Indexes
4.	Constituent Active Weight relative to the Parent Index	+/- 2%
5.	Security Weight as a multiple of its weight in the Parent Index	20x
6.	Active Sector Weights (the Energy GICS Sector is not constrained) relative to the Parent Index	+/-5%
7.	Active Country Weights relative to the Parent Index ¹⁰	+/-5%
8.	One Way Turnover	5%
9.	Common Factor Risk Aversion	0.0075
10.	Specific Risk Aversion	0.075

⁸ Prior to the May 2020 Semi-Annual Index Review (SAIR) of the Indexes, the Weighted Average Carbon Emissions Intensity has been calculated based on Scope 1+2 Emissions.

⁹ Prior to the May 2020 Semi-Annual Index Review (SAIR) of the Indexes, the average reduction in WACI has been calculated using Scope 1+2 Emissions since Inception.

¹⁰ 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.

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

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

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

3.6 DETERMINING THE OPTIMIZED INDEX

The Index is constructed using the Barra Open Optimizer¹¹ in combination with the relevant Barra Equity Model. The optimization uses the universe of eligible securities and the specified optimization objectives and constraints to determine the constituents of and the weights of constituents in the Indexes.

¹¹ Please refer to Appendix II and III for more details.

4 Maintaining the MSCI EU CTB/PAB Overlay Indexes

4.1 SEMI-ANNUAL INDEX REVIEWS

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

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

4.2 ONGOING EVENT RELATED CHANGES

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

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

The following section briefly describes the treatment of common corporate events within the Index.

No new securities will be added (except where noted below) to the Index between Index Reviews. Parent Index deletions will be reflected simultaneously.

EVENT TYPE

EVENT DETAILS

New additions to the Parent Index

A new security added to the parent index (such as IPO and other early inclusions) will not be added to the index.

Spin-Offs

All securities created as a result of the spin-off of an existing Index constituent will be added to the Index at the time of event implementation. Reevaluation for continued inclusion in the Index will occur at the subsequent Index Review.

Merger/Acquisition

For Mergers and Acquisitions, the acquirer's post event weight will account for the proportionate amount of shares involved in deal consideration, while cash proceeds will be invested across the Index.

If an existing Index constituent is acquired by a non-Index constituent, the existing constituent will be deleted from the Index and the acquiring non-constituent will not be added to the Index.

Changes in Security Characteristics

A security will continue to be an Index constituent if there are changes in characteristics (country, sector, size segment, etc.) Reevaluation for continued inclusion in the Index will occur at the subsequent Index Review.

Further detail and illustration regarding specific treatment of corporate events relevant to this Index can be found in the MSCI Corporate Events Methodology book under the sections detailing the treatment of events in Capped Weighted and Non-Market Capitalization Weighted indexes.

The MSCI Corporate Events methodology book is available at:
<https://www.msci.com/index-methodology>

Appendix I: Calculation of Target Metrics

Calculation of GHG Intensity

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

Security Level GHG Intensity =

$$\frac{\text{Scope 1 + 2 + 3 Carbon Emissions} * (1 + EVIAF)}{\text{Enterprise Value} + \text{Cash(in M\$\text{)}}}$$

Enterprise Value Inflation Adjustment Factor (EVIAF) =

$$EVIAF = \left(\frac{\text{Average(Enterprise Value} + \text{Cash)}}{\text{Previous (Average(Enterprise Value} + \text{Cash))}} \right) - 1$$

Weighted Average GHG Intensity of Parent Index =

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

Weighted Average GHG Intensity of Derived Index =

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

Calculation of Average Decarbonization

On average, the Indexes follow a 7% decarbonization trajectory since the Base Date. The Weighted Average GHG Intensity at the Base Date (W_1) is used to compute the target Weighted Average GHG Intensity at any given Semi-Annual Index Review (W_t) as per the below formula.

$$W_t = W_1 * 0.93^{\frac{(t-1)}{2}}$$

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

Thus, for the 3rd Semi-Annual Index Review since the Base Date (t=3), the target Weighted Average GHG Intensity will be $W_1 * 0.93$.

Climate Impact Sectors

NACE¹² is the European Union’s classification of economic activities. As per the draft DA, stocks in the NACE Section codes A, B, C, D, E, F, G, H, L are classified as “High Climate Impact” sector and other stocks are classified ‘Low Climate Impact’ sector. The GICS¹³ Sub-Industry code for each security is mapped to the corresponding “Climate Impact Sector” using a mapping. This mapping is constructed in the following steps:

1. MSCI has published a mapping¹⁴ between the NACE classes and GICS Sub-Industry.
2. For each GICS Sub-Industry, the number of NACE classes which fall under the High Climate Impact Sector (say the number of classes is N_H) and Low Climate Impact Sector (say the number of classes is N_L) is identified
3. If all the NACE classes for a given GICS Sub-Industry are identified in the High Climate Impact Sector ($N_L = 0$), then the GICS Sub-Industry is mapped to the High Climate Impact Sector. Conversely, if all the NACE classes for a given GICS Sub-Industry are identified in the Low Climate Impact Sector ($N_H = 0$) then the GICS Sub-Industry is mapped to the Low Climate Impact Sector
4. In case a GICS Sub-Industry is mapped to some NACE classes in the High Climate Impact Sector and the others in the Low Climate Impact Sector, the GICS Industry is mapped to the Climate Impact Sector in the following manner:
 - a. **$N_H \geq N_L$** : If the number of NACE classes in the High Climate Impact Sector is at least equivalent to the number of NACE classes in the Low Climate Impact Sector, the GICS Sub-Industry is mapped to the High Climate Impact Sector
 - b. **$N_H < N_L$** : If the number of NACE classes in the High Climate Impact Sector is less than the number of NACE classes in the Low Climate Impact Sector, the GICS Sub-Industry is mapped to the Low Climate Impact Sector

¹² For further details regarding NACE, please refer to https://ec.europa.eu/eurostat/statistics-explained/index.php?title=NACE_background

¹³ For further information regarding GICS, please refer to <https://www.msci.com/gics>

¹⁴ This mapping is available in the [Handbook of Climate Transition Benchmarks, Paris-Aligned Benchmark and Benchmarks’ ESG Disclosures](#)

5. Using the GICS Sub-Industry to Climate Impact Sector mapping created in Step 4, and the security-level GICS Sub-Industry, each security in the Parent Index is classified in either High Climate Impact Sector or Low Climate Impact Sector.

Appendix II: Barra Equity Model Used in The Optimization

The MSCI Climate Paris Aligned Indexes currently use an optimization setup using the MSCI Barra Global Equity Model for Long-Term Investors (GEMTL).

Appendix III: New release of Barra® Equity Model or Barra® Optimizer

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

Appendix IV: MSCI EU CTB Overlay C-Series Indexes

The MSCI EU CTB Overlay C-Series Indexes provide an alternative to the optimization-based approach used in Section 3.5 of this methodology book. These indexes are constructed based on the steps below.

INTERMEDIATE UNIVERSE

Each security in the Applicable Universe is classified into one of two climate impact sectors¹⁵ based on its NACE section code. The Eligible Universe is broken into two smaller universes as described below:

HIGH CLIMATE IMPACT INTERMEDIATE UNIVERSE

High Climate Impact Intermediate Universe is constructed in following two steps –

- Select all securities in the High Climate Impact Sector from the Eligible Universe.
- Renormalize the weights of securities so that the aggregate weight of securities is equal to the weight of High Climate Impact Sector in the Parent Index.

LOW CLIMATE IMPACT INTERMEDIATE UNIVERSE

Low Climate Impact Intermediate Universe is constructed in following two steps –

- Select all securities in the Low Climate Impact Sector from the Applicable Universe.
- Renormalize the weights of securities so that the aggregate weight of securities is equal to the weight of Low Climate Impact Sector in the Parent Index.

¹⁵ For details regarding the Climate Impact Sectors, kindly refer to Appendix I.

FINAL UNIVERSE

The Final Universe is constructed by combining the High Impact Intermediate Universe and the Low Impact Intermediate Universe. The High Impact Sector and Low Impact Sector weights are equal to their respective weight in the Parent Index.

The Final Universe is then assessed against the minimum requirements detailed in Table 2. In case the Final Universe is found deficient on any of the minimum requirements, then the weights of the securities in the Final Universe are determined through an iterative process as described in below.

Step 1. Divide securities in the Applicable Universe into “Top Half” (Lowest Intensity) and “Bottom Half” (Highest Intensity) based on Scope 1+2+3 Intensity.

Step 2. Select the stock with the highest Security Level GHG Intensity in the “Bottom Half” and reduce its weight in steps of 25% (free weight) and distribute the free weight among the stocks of “Top Half” in proportion of their weight at Step 1. The Final Universe is then assessed against the targets imposed. If the targets are met, no further downweighting is required and the iterative process is stopped.

Step 3. If the weight of the stock with the highest Security Level GHG Intensity from Step 1 has been down weighted by more than 75% then select the stock with the next highest Security Level GHG Intensity and repeat step 2. The Final Universe is then assessed against the targets imposed. If the targets are met, no further downweighting is required and the iterative process is stopped.

Step 4. Relaxation Steps:

- a. If all stocks in the “Bottom Half” have been down weighted by 75% and targets are still not met, then repeat step 2 and 3 by downweighting stock with highest Security Level GHG Intensity by 90% of its weight from Step 1.
- b. If targets are not met at Step 4a, then repeat Steps 2 and 3 by excluding – down weighting by 100%, the stocks in order of their Security Level GHG Intensity.

Step 5. STOP: If the targets are still not met at Step 5 then the index is rebalanced with stock weights at the end of Step 5.

Appendix V: Identifying the Reference Index

For Indexes where the Parent Index follows the MSCI Global Investible Markets Index (GIMI) methodology, the Reference Index is the same as the Reference Index. For Indexes where the Parent Index does not follow the MSCI GIMI methodology, the methodology¹⁶ of the Parent Index defines the Global Investible Markets Index on which the Parent Index is constructed.

The below table provides *select examples* which may help identify the Reference Index based on the Parent Index for the corresponding MSCI EU CTB/PAB Overlay Index.

Table 4: Select Examples for identifying Reference Index

Parent Index	Reference Index
Parent Index follows the GIMI Methodology	
MSCI World	MSCI World
MSCI World ex Energy	MSCI World ex Energy
Parent Index does not follow the GIMI Methodology	
MSCI World ex Energy ESG Universal	MSCI World ex Energy
MSCI World ex Fossil Fuels	MSCI World
MSCI World ex Australia Enhanced Value	MSCI World ex Australia

¹⁶ For further details regarding Index methodologies, please refer to <https://www.msci.com/index-methodology>

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