

# MSCI World Select Multiple Factor ESG Low Carbon Target Index Methodology

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## 1 Introduction

The MSCI World Select Multiple Factor ESG Low Carbon Target Index (the “Index”) is an index designed to represent the performance of a factor investing strategy that seeks systematic integration of environmental, social and governance (ESG) norms and two dimensions of carbon exposure (carbon emissions and fossil fuel reserves), by seeking higher exposure to a combination of style factors along with improvement in the ESG profile and reduction in carbon exposure of the Index.

This index methodology aims to incorporate ESG-based and carbon-based constraints in a bottom-up index construction approach.

The MSCI World Select Multiple Factor ESG Low Carbon Target Index is constructed using individual stock exposures to the target factors along with specific ESG Score and carbon exposure criteria. The Index construction aims to achieve relatively high exposure to the target style factors while improving the Index’s ESG profile and reducing the Index’s carbon exposure (Carbon Emissions relative to sales and Potential Carbon Emissions per dollar of market capitalization) relative to that of the MSCI World Index (the “Parent Index”) by using risk-constrained optimization.

## 2 MSCI ESG Research

The Index uses company ratings and research provided by MSCI ESG Research. In particular, the Index uses the following MSCI ESG Research products: MSCI ESG Ratings, MSCI ESG Controversies, MSCI ESG Business Involvement Screening Research, and MSCI Climate Change Metrics. For details on MSCI ESG Research’s full suite of ESG products, please refer to:

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

### 2.1 MSCI ESG Ratings

MSCI ESG Ratings aim to measure entities’ management of environmental, social and governance risks and opportunities. MSCI ESG Ratings are based on a seven-point scale from ‘AAA’ to ‘CCC’, indicating how an entity manages relevant key issues relative to industry peers.

MSCI ESG Ratings methodology can be found at: <https://www.msci.com/esg-and-climate-methodologies>

### 2.2 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>

### 2.3 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](http://www.msci.com/resources/factsheets/MSCI_ESG_BISR.pdf).

## 2.4 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>

### 3 Index Construction Methodology

The Applicable Universe includes all the existing constituents of an underlying Parent Index. This approach aims to provide an opportunity set with sufficient liquidity and capacity.

The MSCI World Select Multiple Factor ESG Low Carbon Target Index is constructed based on an optimization process from the underlying Parent Index using a Barra Equity Model to maximize the exposure to the target factors less a penalty for the common factor and stock-specific risk characteristics of each potential constituent while controlling the Tracking Error relative to the Parent Index.

The steps for constructing the Index are described below.

#### 3.1 Eligible Universe

The Eligible Universe consists of the securities in the Parent Index that are not involved in Very Severe ESG controversies (“Red flags”) or in controversial businesses as defined in detail in Appendix IV. The exclusions are based on the data provided by MSCI ESG Research and are made quarterly coinciding with the MSCI Semi-Annual and Quarterly Index Reviews.

#### 3.2 Constituent Selection

The inclusion and weighting of constituents from the Applicable Universe is done using an optimization process. The optimization is performed using a base currency. The default currency is the US Dollar.

##### 3.2.1 Calculation of the Alpha Score

The Alpha Score of the Index is defined for each security  $i$  as follows:

$$\alpha_i = (0.25) * Value_i + (0.25) * Quality_i + (0.25) * Size_i + (0.25) * Momentum_i$$

The factor exposures for the target factors are sourced as described in Appendix III.

#### 3.3 Optimization Constraints

At each Quarterly Index Review (QIR), the following optimization constraints are employed:

- The ex-ante Tracking Error of the Index, relative to the Parent Index will be capped at 3%.
- The weighted-average industry-adjusted ESG Score of the Index will be at least 20% more than the weighted-average industry-adjusted ESG Score of the Parent Index.

- The reduction in the Carbon Emission Intensity and the Potential Emissions per dollar of market capitalization of the Index relative to the Parent Index will be at least 50%. The Carbon Emission Intensity and the Potential Emissions per dollar of market capitalization of the Index are calculated using the formulae defined in Appendix V.
- The maximum weight of an index constituent that belong to the Large Cap size segment will be restricted to the lower of (the weight of the security in the Parent Index + 2%) and 10 times the weight of the security in the Parent Index. The minimum weight of an index constituent will be restricted to the higher of the (weight of the security in the Parent Index - 2%) and 0.
- The maximum weight of index constituents that belong to the Mid Cap size segment will be restricted to the lower of (the weight of the security in the Parent Index + 1%) or 5 times the weight of the security in the Parent Index. The minimum weight of an index constituent will be restricted to the higher of the (weight of the security in the Parent Index - 1%) or 0.
- Active exposure of the Index to the target Barra style factors, namely, Book-to-Price, Earnings Yield, Earnings Quality, Investment Quality, Profitability and Momentum will be constrained to be greater than 0.1 and less than 0.6 relative to the Parent Index and the target Barra style factors, namely, Size, Earnings Variability and Leverage will be constrained to be greater than -0.6 and less than -0.1 relative to the Parent Index.
- The active exposure of the Index to the non-target Barra style factors (Growth, Liquidity, Beta and Residual Volatility) will be restricted to +/- 0.1 standard deviations relative to the Parent Index.
- The sector weights of the Index will be restricted to +/-5% from the sector weights of the Parent Index.
- For countries with weight greater than 2.5% in the Parent Index, the weight in the Index will be restricted to +/- 5% from the country weight in the Parent Index.
- For countries with weight less than 2.5% in the Parent Index, the weight in the Index will be capped at 3 times their weight in the Parent Index.
- The one-way turnover of the Index will be constrained to a maximum of 10% at each Index Review.
- The common factor risk aversion parameter used in the optimization of the risk-adjusted target factor exposure is 0.0015 and the specific risk aversion parameter is 0.015.

### 3.4 Determining the Optimized Index

The MSCI World Select Multiple Factor ESG Low Carbon Target Index is constructed using the Barra Open Optimizer in combination with the relevant Barra Equity Model<sup>1</sup>. The optimization uses the universe of eligible securities and the specified optimization objective and constraints to determine the Index. Infeasible optimizations are handled as explained in Appendix I.

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<sup>1</sup> Please refer to Appendix II for the detailed information on model usage



## 4 Maintaining the Indexes

### 4.1 Semi-Annual Index Reviews

The MSCI World Select Multiple Factor ESG Low Carbon Target Index is rebalanced on a quarterly basis, usually as of the close of the last business day of February, May, August and November, coinciding with the regular Index Reviews (Semi-Annual Index Reviews in May and November and Quarterly Index Reviews in February and August) of the MSCI Global Investable Market Indexes. The Barra Equity Model data as of the day before the rebalancing day is used. This approach aims to capture timely updates to the risk characteristics of the companies and coincide with the rebalancing frequency of the relevant Parent Index. The ESG data used for the Quarterly Index Reviews will be taken as of the end of the month preceding the Index Review i.e., January, April, July and October. For some securities, ESG data may not be published by MSCI ESG Research by the end of the month preceding the Index Review. For such securities, MSCI will use ESG data published after the end of month, when available, for the rebalancing of MSCI World Select Multiple Factor ESG Low Carbon Target Index. This approach aims to capture timely updates to ESG data of the constituents and coincides with the rebalancing of the relevant MSCI Parent Indexes.

The pro forma MSCI World Select Multiple Factor ESG Low Carbon Target Index is in general announced nine business days before the effective date.

### 4.2 Ongoing event related changes

The general treatment of corporate events in the MSCI World Select Multiple Factor ESG Low Carbon Target Index 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 MSCI World Select Multiple Factor ESG Low Carbon Target Index, the changes made to the Parent Index during intermediate Index Reviews will be neutralized in the MSCI World Select Multiple Factor ESG Low Carbon Target Index.

The following section briefly describes the treatment of common corporate events within the MSCI World Select Multiple Factor ESG Low Carbon Target 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 NonMarket Capitalization Weighted indexes.

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

## Appendix I: Handling Infeasible Optimizations

During the Index Review, in the event that there is no optimal solution that satisfies all the optimization constraints defined in Section 3.3, the following constraints are relaxed, until an optimal solution is found:

- Relax the turnover constraint in steps of 2% up to a maximum of 20%
- Relax the asset upper bound multiple in steps of 2 for the Large Cap size segment and in steps of 1 for the Mid Cap size segment, up to a maximum of 5 iterations based upon the following formula

$$wm_{i+1} = step + wm_i \text{ for } i = 0 - 4$$

Where  $wm_i$  = Maximum Active weight multiple

$wm_0 = 10$  and  $step=2$  for the Large Cap size segment

$wm_0 = 5$  and  $step=1$  for the Mid Cap size segment

- The turnover and the asset upper bound multiple constraints are alternately relaxed until a feasible solution is achieved. For example, constraints relaxation is executed in the sequence as illustrated below:

Order of Relaxation	Turnover Limit	Asset Upper Bound Multiple Constraint
1	12.0%	10 times (for Large Cap)/ 5 times (for Mid Cap) the weight of the security in the Parent Index
2	12.0%	12 times (for Large Cap)/ 6 times (for Mid Cap) the weight of the security in the Parent Index
3	14.0%	12 times (for Large Cap)/ 6 times (for Mid Cap) the weight of the security in the Parent Index
4	14.0%	14 times (for Large Cap)/ 7 times (for Mid Cap) the weight of the security in the Parent Index

In the event that no optimal solution is found after the above constraints have been relaxed over all the iterations, the MSCI World Select Multiple Factor ESG Low Carbon Target Index will not be rebalanced for that Quarterly Index Review.

## **Appendix II: New release of Barra <sup>®</sup> Equity Model or Barra <sup>®</sup> Optimizer**

The methodology presently uses MSCI Barra Global Equity Model for Long-Term Investors (“GEMTL”) for the optimization. A new release of the relevant Barra Equity Model or Barra Optimizer may replace the former version within a suitable timeframe.

### Appendix III: Target Factor Definition Summary

The style factor groups targeted in the Index are: Value, Quality, Size and Momentum. These factor groups are described using individual factor scores from the relevant Barra Equity Model. The choice of factors used within each factor group is governed by the current model used for the optimization, which may change with a new release of the Barra Equity Model (as specified in Appendix II). The model data will be used from a day prior to the rebalancing date. All factor exposures are re-normalized at the Parent Index level prior to the calculation of the Alpha Score. Following are the definitions of factor groups currently used in the Index.

*Value:*

The Value Score for each security is calculated by combining the security-level exposures to two factors, Book-to-Price and Earnings Yield, from the relevant Barra Equity Model. A sector-relative score is derived from the combined score by standardizing (z-score) the latter within each sector and winsorizing at +/- 3.

$$\text{Value}_i = (0.33) * \text{BtoP}_i + (0.67) * \text{EarningsYield}_i$$

*Quality:*

The Quality Score for each security is calculated by combining in equal proportion the security-level exposures to five factors - Profitability, Investment Quality, Earnings Quality, Leverage and Earnings Variability - from the relevant Barra Equity Model. A sector-relative score is derived from the combined score by standardizing (z-score) the latter within each sector and winsorizing at +/- 3.

$$\text{Quality}_i = (0.2) * \text{Profitability}_i + (0.2) * \text{Investment Quality}_i + (0.2) * \text{Earnings Quality}_i + (-1) * (0.2) * \text{Earnings Variability}_i + (-1) * (0.2) * \text{Leverage}_i$$

*Size:*

The Size Score for each security is the winsorized (at +/- 3) z-score of negative of the Size factor score taken from the relevant Barra Equity Model.

*Momentum:*

The Momentum Score for each security is the winsorized (at +/- 3) z-score of the Momentum factor score taken from the relevant Barra Equity Model.

## Appendix IV: ESG-based Exclusion Criteria

### ESG Controversy Score (“Red Flags”):

Securities of companies having faced very severe controversies pertaining to ESG issues are not eligible for inclusion in the Index. This is implemented by excluding constituents of Parent Index with MSCI ESG Controversy Score = 0 (“Red Flag” companies). For more details on MSCI ESG Controversies Score, please refer to <https://www.msci.com/esg-integration>.

### Controversial Weapons:

- All companies that are involved in the production of cluster bombs and munitions, or the essential components of these products.
- All companies that are involved in the production of anti-personnel landmines, anti-vehicle landmines, or the essential components of these products.
- All companies involved in the production of depleted uranium weapons and armor.
- All companies that are involved in the production of chemical and biological weapons, or the essential components of these products.
- All companies that are involved in the production of weapons utilizing laser technology to cause permanent blindness.
- All companies that are involved in the production of weapons that use nondetectable fragments to inflict injury.
- All companies that are involved in the production of weapons using white phosphorus.

### Nuclear Weapons:

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

**Thermal Coal:**

- All companies deriving 30% or more revenue (either reported or estimated) from the thermal coal-based power generation.
- All companies deriving 30% 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.

**United Nations Global Compact Principles:**

- All companies that fail to be in compliance with the United Nations Global Compact principles.

**Tobacco:**

- All companies deriving 15% or more aggregate revenue from the production, distribution, retail and supply of tobacco-related products.
- All companies classified as a “Producer”.

**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 revenue from the distribution (wholesale or retail) of firearms or small arms ammunition intended for civilian use.

## Appendix V: Calculation of Carbon Exposure Metrics

### Index Carbon Emissions –

Parent Index Carbon Emissions –

$$\sum_i \left( \frac{(\text{Float Market Capitalization} * \text{Absolute Emissions})}{\text{Issuer Market Capitalization}} \right)$$

Derived Index Carbon Emissions –

$$\sum_i \left( \frac{(\text{Derived Index Market Capitalization} * \text{Absolute Emissions})}{\text{Issuer Market Capitalization}} \right)$$

Parent Index Carbon Emission Intensity is defined as Parent Index Carbon Emissions, as defined above, divided by Parent Index Sales –

$$\sum_i \left( \frac{(\text{Float Market Capitalization} * \text{Absolute Emissions})}{\text{Issuer Market Capitalization}} \right) / \sum_i \left( \frac{(\text{Float Market Capitalization} * \text{Sales})}{\text{Issuer Market Capitalization}} \right)$$

Derived Index Carbon Emissions Intensity is defined as Derived Index Carbon Emissions, as defined above, divided by Derived Index Sales –

$$\sum_i \left( \frac{(\text{Derived Index Market Capitalization} * \text{Absolute Emissions})}{\text{Issuer Market Capitalization}} \right) / \sum_i \left( \frac{(\text{Derived Index Market Capitalization} * \text{Sales})}{\text{Issuer Market Capitalization}} \right)$$

### Index Potential Carbon Emissions from Fossil Fuels –

Parent Index Potential Carbon Emissions from Fossil Fuels–

$$\sum_i \left( \frac{(\text{Float Market Capitalization} * \text{Absolute Potential Emissions})}{\text{Issuer Market Capitalization}} \right)$$

Derived Index Potential Carbon Emissions from Fossil Fuels–

$$\sum_i \left( \frac{(\text{Derived Index Market Capitalization} * \text{Absolute Potential Emissions})}{\text{Issuer Market Capitalization}} \right)$$



**The following sections have been modified effective May 2022:**

- Section 3.3 has been updated to reflect the change in optimization constraints.
- Section 4.1 has been updated to reflect the changes in rebalancing frequency.
- Appendix I has been updated to reflect the change in handling of optimization infeasibility.
- Appendix III has been updated to reflect the parent-level normalization of target factors.

**The following sections have been modified effective December 2022:**

- Appendix V: Added to reference formulae used for Carbon Emission Intensity and the Potential Emissions per dollar of market capitalization calculation.

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