

MSCI WORLD SELECT 5-FACTOR ESG LOW CARBON TARGET INDEX METHODOLOGY

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1 INTRODUCTION

The MSCI World Select 5-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 5-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. The index construction selects the final index by maximizing the exposure to the target factors less a penalty for the common factor and stock-specific risk characteristics of each potential constituent.

2 ESG RESEARCH FRAMEWORK

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 MSCI World Select 5-Factor ESG Low Carbon Target Index uses company ratings and research data provided by MSCI ESG Research. In particular, this index uses the following MSCI ESG Research products: MSCI ESG Ratings Score, MSCI ESG Controversies Score, and MSCI ESG Business Involvement Screening Research and MSCI ESG CarbonMetrics.

For details on MSCI ESG Research’s full suite of ESG products, please refer to: http://www.msci.com/products/esg/about_msci_esg_research.html

2.1 MSCI ESG CARBONMETRICS

MSCI ESG CarbonMetrics evaluates all constituents of the MSCI ACWI Investible Market Indexes. When reported carbon emissions data is not available, Scope 1 & 2 carbon emissions are estimated using MSCI ESG Research’s proprietary carbon estimation model. Using MSCI ESG CarbonMetrics, MSCI provides a variety of metrics for assessing the carbon characteristics of an index or investment portfolio. Based on both reported and estimated Scope 1 & 2 carbon emissions, MSCI measures the carbon responsibility, efficiency, and exposure attributed to the MSCI Indexes.

For more details on MSCI ESG CarbonMetrics, please refer to <https://www.msci.com/index-carbon-footprint-metrics>

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 5-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 weapons. The exclusions are based on the data provided by MSCI ESG Research and are determined quarterly coinciding with the MSCI Semi-Annual and Quarterly Index Reviews. More detailed information about the ESG-based exclusions is provided in Appendix IV.

3.2 CONSTITUENT SELECTION

The selection 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:

$$\alpha_i = (0.2) * Value_i + (0.2) * Quality_i + (0.2) * Size_i + (0.2) * Momentum_i + (0.2) * Volatility_i$$

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

3.3 OPTIMIZATION CONSTRAINTS

At each Index Review, the following optimization constraints are employed:

- The ex-ante tracking error of the Index, relative to the Parent Index will be capped at 4%.

- 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 I of the MSCI Global Low Carbon Leaders Indexes Methodology (for details about the methodology, please refer to: <https://www.msci.com/index-methodology>).
- The maximum weight of an index constituent 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 active exposure of the Index to the Book-to-Price, Earnings Yield, Momentum, Profitability, Earnings Quality and Investment Quality target Barra style factors will be restricted to lie within 0.15 and 0.75 standard deviations relative to the Parent Index. The active exposure of the Index to the Size, Leverage, Earnings Variability, Beta and Residual Volatility target Barra style factors will be restricted to lie within -0.75 and -0.15 standard deviations relative to the Parent Index.
- The active exposure of the Index to the Growth and Liquidity Barra style factors will be restricted to +/- 0.25 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 5% 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 5-Factor ESG Low Carbon Target Index is constructed using the Barra Open Optimizer in combination with the relevant Barra Equity Model¹. 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.

¹ Please refer to Appendix II for the detailed information on model usage

4 MAINTAINING THE INDEXES

4.1 INDEX REVIEWS

The MSCI World Select 5-Factor ESG Low Carbon Target Index is rebalanced on a quarterly basis, usually as of the close of the last business day of May, August, November and February, coinciding with the May and November Semi-Annual Index Reviews (SAIRs) and the February and August Quarterly Index Reviews (QIRs) of the MSCI Global Investable Market Indexes. The Barra Equity Model data as of the end of April, July, October and January are used respectively. 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. Similarly, the ESG data used for the Index Reviews will be taken as of the end of the month preceding the Index Review i.e., April, July, October and January. 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 the MSCI World Select 5-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 5-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 5-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 5-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 5-Factor ESG Low Carbon Target Index.

The following section briefly describes the treatment of common corporate events within the MSCI World Select 5-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 Non-Market 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 1% up to a maximum of 10%
- Relax the asset upper bound multiple (default is 10) constraint in steps of 2, up to a maximum of 20
- 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	6.0%	10 times the weight of the security in the Parent Index
2	6.0%	12 times the weight of the security in the Parent Index
3	7.0%	12 times the weight of the security in the Parent Index
4	7.0%	14 times 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 5-Factor ESG Low Carbon Target Index will not be rebalanced for that Index Review.

APPENDIX II: NEW RELEASE OF BARRA[®] EQUITY MODEL OR BARRA[®] 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 the five style factor groups and their combinations: Value, Quality, Size, Momentum and Low Volatility. 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. The model data will be used from previous end-of-month, prior to the rebalancing date. 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 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 the latter within each sector and winsorizing at +/- 3.

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

Volatility:

The volatility score for each security is currently based on the Beta and Residual Volatility factors from the relevant Barra Equity Model.

$$\text{Volatility}_i = (-1) * (0.5) * \text{Beta}_i + (-1) * (0.5) * \text{Residual Volatility}_i$$

Size:

The size score for each security is the negative of the Size factor score taken from the relevant Barra Equity Model.

Momentum:

The momentum score for each security is same as 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 Involvement

For details, please refer to MSCI Global ex Controversial Weapons Indexes Methodology at <https://www.msci.com/index-methodology>.

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