MSCI WORLD SELECT MULTIPLE FACTOR ESG LOW CARBON TARGET

February 2024

Contents

1. Introduction

The MSCI World Select Multiple Factor ESG Low Carbon Target Index[1] (the "Index") represents the performance of a factor investing strategy that integrates environmental, social and governance (ESG) factors and two dimensions of carbon exposure (carbon emissions and fossil fuel reserves).

The Index seeks to maximize exposure to the target style factors relative to the MSCI World Index (the "Parent Index") by applying an optimization process. The Index also aims to achieve an 20% improvement in ESG factors and a 50% reduction in carbon exposure relative to the Parent Index.

[1] The Index is 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.

2. Constructing the Index

Constructing the Index involves the following steps:

- Defining the Eligible Universe
- Defining the Carbon Exposure of each security in the Eligible Universe
- Defining the Optimization setup
- Determining the Optimized Index
- Treatment of Unrated Companies

2.1 Eligible Universe

The Eligible Universe is constructed from the constituents of the Parent Index by excluding securities based on the criteria listed below:

- **ESG Controversy:** All companies assessed as having involvement in ESG controversies that are classified as Red Flags (MSCI ESG Controversy Score of 0). A Red Flag indicates an ongoing, Very Severe ESG controversy implicating a company directly through its actions, products, or operations.
- **Tobacco:** All companies classified as "Producer" or deriving 15% or more aggregate revenue from the production, distribution, retail and supply of tobacco-related products.
- **Controversial Weapons:** All companies involved in Controversial Weapons as defined in the description of the screens in Appendix 1.
- **Nuclear Weapons**: All companies involved meeting specific Nuclear Weapons business involvement criteria as described in Appendix 1.
- **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.
- **Thermal Coal:** 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 (either reported or estimated)

- **UN Global Compact:** All companies which have been deemed to have failed to comply with the UN Global Compact Principles (which cover human rights, labour standards, the environment and anti-corruption).

2.2 Defining the Carbon Exposure of each security in the Parent Index

The carbon exposure of a security is measured in terms of its greenhouse gas emissions and its potential carbon emissions from fossil fuel reserves. The Index uses MSCI Climate Change Metrics data from MSCI ESG Research[2] to determine eligibility for index inclusion.

2.2.1 Greenhouse Gas Emissions

MSCI ESG Research collects company-specific direct (Scope 1) and indirect (Scope 2) greenhouse gas emissions data from company public documents and/or the Carbon Disclosure Project. If a company does not report GHG emissions, then MSCI ESG Research estimates Scope 1 and Scope 2 GHG emissions. The data is updated on an annual basis. Since the current carbon emissions of a company are directly influenced by its current business activity, MSCI normalizes for size by dividing the annual carbon emissions of the company by the annual sales of the company.

For newly added companies to the Index which do not report emission data and where MSCI ESG Research has not estimated the greenhouse gas emissions yet, MSCI uses the average emissions per dollar of issuer market capitalization for the companies in the same industry group, multiplied by the market capitalization of the company as the estimated emissions for the company.

2.2.2 Potential Emissions from Fossil Fuels

MSCI ESG Research collects fossil fuel reserves data where relevant for companies which have reserves, typically in the Oil & Gas, Coal Mining and Electric Utilities industries[3]. Fossil fuel reserves can be used for several applications including energy or industrial purposes (e.g. coking coal used for steel production). For the construction of the MSCI Global Low Carbon Leaders Core Indexes, only fossil fuel reserves used for energy purposes are taken into account. The data is updated on an annual basis based on information disclosed by companies. Sources include company publications, other public records and third party data providers. For newly added companies to the index where data is not available yet, MSCI uses zero fossil fuel reserves. MSCI normalizes for the company's size by dividing the potential carbon emissions of the company by its market capitalization.

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[2] See section 4 for further information regarding ESG and climate data used in the Indexes that MSCI Limited sources from MSCI ESG Research LLC, a separate subsidiary of MSCI Inc. MSCI ESG Research is solely responsible for the creation, determination and management of such data. MSCI Limited is the benchmark administrator for the MSCI indexes.

[3] For more information on MSCI Climate Change Metrics, please refer to https://www.msci.com/climate-change-solutions

To convert reserves data to potential carbon emissions, MSCI ESG Research applies a formula from the Potsdam Institute for Climate Impact Research.[4]

2.3 Defining the Optimization Setup

The Index is constructed using an optimization process. The optimization objective is to maximize the Alpha score (representative of the exposures to the set of target factors) subject to other constraints such as an improvement in the index-level ESG score and a reduction in carbon exposure relative to the Parent Index for a given tracking error budget. The ex-ante tracking error target for the Index is 3%. The Alpha score is defined below.

ESG scores are normalized and used in the optimization process. The normalization of the ESG scores is designed to allow the optimization process to assess each score in the context of the overall distribution of ESG scores.

The optimization is performed using a base currency. The default currency is the US Dollar. Please refer to Appendix I for the Optimization constraints.

Calculation of the alpha score

The Alpha score of the Index is defined for each security *i* as follows:

$$\propto_i = (0.25) * \mathrm{Value}_i + (0.25) * \mathrm{Quality}_i + (0.25) * \mathrm{Size}_i + (0.25) * \mathrm{Momentum}_i$$

Please refer to Appendix IV for a description of the target factors.

2.4 Determining the Optimized index

The Index is constructed using the Barra Open Optimizer in combination with the relevant Barra Equity Model[5]. The optimization uses the universe of eligible securities and the specified optimization objective and constraints to determine the Index. The Optimization constraints are listed in Appendix I and the process for handing infeasible optimizations is listed in Appendix II.

2.5 Treatment of Unrated Companies

Companies not assessed by MSCI ESG Research on data for any of the following MSCI ESG Research products are not eligible for inclusion in the Indexes.

- MSCI ESG Controversies

For the treatment of unrated companies in the calculation of Carbon Exposure Metrics, please refer to Appendix VI.

[4] Malte Meinshausen, Nicolai Meinshausen, William Hare, Sarah C. B. Raper, Katja Frieler, Reto Knutti, David J. Frame & Myles R. Allen. *Greenhouse-gas emission Target for limiting global warming to 2 °C.* ***Nature*** 458, 1158-1162 (30 April 2009) | doi:10.1038/nature08017; Received 25 September 2008; Accepted 25 March 2009. Supplementary Information, p. 7.

[5] Please refer to Appendix II for the detailed information on model usage

3. Maintaining the Indexes

3.1 Quarterly Index Reviews

The Index is rebalanced on a quarterly basis as of the close of the last business day of February, May, August and November, coinciding with the regular Index Review 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. MSCI uses MSCI ESG Research data (including MSCI ESG Ratings, MSCI ESG Controversies Scores, MSCI Business Involvement Screening Research and MSCI Climate Change Metrics) as of the end of the month preceding the Index Reviews for the rebalancing of the Index. For some securities, such 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 Index.

The pro forma Index is in general announced nine business days before the effective date.

3.2 Ongoing event related changes

The general treatment of corporate events in the 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.

4. MSCI ESG Research

The Indexes are products of MSCI Inc. that utilize information such as company ratings and research produced and provided by MSCI ESG Research LLC (MSCI ESG Research), a subsidiary of MSCI Inc. In particular, the Indexes use the following MSCI ESG Research products: MSCI ESG Controversies, MSCI ESG Business Involvement Screening Research and MSCI Climate Change Metrics. MSCI Indexes are administered by MSCI Limited.

4.1 MSCI ESG Ratings

MSCI ESG Ratings aim to measure entities' management of environmental, social and governance risks and opportunities. MSCI ESG Ratings use a weighted average key issue calculation that is normalized by industry to arrive at an industry-adjusted ESG score (0-10), which is then translated to a seven-point scale from 'AAA' to 'CCC', indicating how an entity manages relevant key issues relative to industry peers.

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

4.2 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.

4.3 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.

4.4 MSCI Climate Change Metrics

MSCI Climate Change Metrics provides 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-change-solutions.

Appendix I: Optimization Contraints

At each Quarterly Index Review, the Indexes are constructed using an optimization process that aims to achieve replicability and investability as well as maximize the Alpha score relative to the Parent Index subject to the constraints in the below table:

No.	Parameter	Values
1	Ex-Ante Tracking Error	3.0%
2	Weighted Average industry adjusted ESG Score improvement relative to the Parent Index	20%
3	Minimum Reduction in the Carbon Emissions Intensity and Potential Emissions per dollar of Market Capitalization, relative to the Parent Index	50%
4	Minimum weight of Index constituents that belong to the Large cap size segment	Max (weight of constituent in the Parent Index – 2%, 0%)
5	Maximum weight of Index constituents that belong to the Large cap size Segment	Min (weight of constituent in the Parent Index + 2%, 10 times the weight of constituents in the Parent Index)
6	Minimum weight of Index constituents that belong to the Mid cap Size Segment	Max (weight of constituent in the Parent Index -1%, 0%)
7	Maximum Constituent Weight in Mid Cap size segment	Min (weight of constituent in the Parent Index + 1%, 5 times the weight of constituent in the Parent Index)
8	Active Exposure to the target Barra Style factors (Book-to-Price, Earnings Yield, Earnings Quality, Investment Quality, Profitability & Momentum) relative to the Parent Index	Between 0.1 and 0.6
9	Active Exposure to the target Barra Style factors (Size, Earnings Variability, Leverage) relative to the Parent Index	Between -0.6 and -0.1

No.	Parameter	Values
10	Active Exposure to the non-target Barra Style factors (Growth, Liquidity, Beta, Residual Volatility)	+/- 0.1 standard deviation relative to the Parent Index
11	Active Sector Weights	+/-5%
12	Active Country Weights[6]	+/-5%
13	One Way Turnover during each Index Review	10%
14	Specific Risk Aversion	0.015
15	Common Factor Risk Aversion	0.0015

[6] For countries with weight greater than 2.5% in the Parent Index, the weight in the Index is restricted to +/- 5% relative to 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 the weight of the specific country in the Parent Index.

Appendix II: 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

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

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 each Quarterly Index Review.

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

The methodology presently uses MSCI Barra Global Equity Model for Long-Term Investors ("GEMLTL") 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 IV: 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 V: Controversial Weapons and Nuclear Weapons Screening Criteria

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.

Appendix VI: Calculation of Carbon Exposure Metrics

Greenhouse Gas (GHG) Emissions Intensity

Carbon emissions of a company are normalized for size by dividing annual carbon emissions by Sales. The Carbon Emissions Intensity is calculated using the latest Scope 1+2 carbon emissions, and Sales of a company.

Security Level GHG Intensity relative to Sales =

$$\frac{(Scope\ 1+2\ Carbon\ Emissions)}{Sales\ (in\ M\$)}$$

If Scope 1+2 carbon emissions and/or EVIC are not available, the average Scope 1+2 intensity of all the constituents of the MSCI ACWI in the same GICS Industry Group in which the security belongs is used:

Weighted Average GHG Intensity of Parent Index =

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

Weighted Average GHG Intensity of Derived Index =

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

Calculation of Potential Carbon Emissions from Fossil Fuels

Parent Index Potential Carbon Emissions from Fossil Fuels–

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

Derived Index Potential Carbon Emissions from Fossil Fuels–

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

Appendix VII: Methodology Set

Description of methodology set –
https://www.msci.com/index/methodology/latest/ReadMe

MSCI Corporate Events Methodology –
https://www.msci.com/index/methodology/latest/CE

MSCI Fundamental Data Methodology –
https://www.msci.com/index/methodology/latest/FundData

MSCI Index Calculation Methodology –
https://www.msci.com/index/methodology/latest/IndexCalc

MSCI Index Glossary of Terms –
https://www.msci.com/index/methodology/latest/IndexGlossary

MSCI Index Policies –
https://www.msci.com/index/methodology/latest/IndexPolicy

MSCI Global Industry Classification Standard (GICS) Methodology –
https://www.msci.com/index/methodology/latest/GICS

MSCI Global Investable Market Indexes Methodology –
https://www.msci.com/index/methodology/latest/GIMI

ESG Factors in Methodology*

The Methodology Set for the Indexes can also 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 the Document

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.

The following sections have been modified effective December 2023:

- Section 2.1: Moved the description of the ESG Screening criteria for all screens except controversial and nuclear weapons from Appendix II.
- Section 2.4: Created a new section for companies not assessed by MSCI ESG Research
- Section 4: Moved the ESG Product descriptions from Section 2.
- Appendix VI: The calculation of carbon exposure metrics was updated to reflect the change to weighted average carbon emissions intensity.

The following sections have been updated as of February 2024:

- Section 2.5: Added details on the treatment of unrated companies
- Appendix VI: The calculation of potential emissions was clarified.
- Appendix VII: Added details on the Methodology Set for the Index

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