MSCI High Dividend Yield Select ESG Low Carbon Target Indexes Methodology

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1 Introduction

The MSCI High Dividend Yield Select ESG Low Carbon Target Indexes (herein, 'the Indexes') are designed to represent the performance of a strategy that seeks to maximize the exposure to a yield factor while systematically integrating environmental, social and governance (ESG) norms.

The Indexes are constructed by selecting constituents of a market capitalization weighted index (the 'Parent Index'[1]) and applying an optimization process that aims to maximize the exposure to a yield factor, reduce the carbon-equivalent exposure to CO_2 and other Green House Gases (GHG) by thirty percent (30%) and improve the weighted-average industry-adjusted ESG score of the index with respect to their respective underlying Parent Indexes using certain constraints described below.[2]

[1] Please refer to Appendix I for more details.

[2] The Index is governed by a set of methodology and policy documents ("Methodology Set"), including the present index methodology document. The Methodology Set for the Index can be accessed from MSCI's webpage https://www.msci.com/index-methodology in the section 'Search Methodology by Index Name or Index Code.

The Methodology Set includes a document 'ESG Factors in Methodology' that contains the list of environmental, social, and governance factors considered, and how they are applied in the methodology (e.g., selection, weighting or exclusion). Please refer to Appendix VII for more details.

2 Index Construction Methodology

The Indexes use company ratings and research provided by MSCI ESG Research[3] for the Index construction.

Constructing the Indexes involve the following steps:

- Defining the Parent Index
- Defining the Eligible Universe
- Defining the exclusion criteria
- Defining dividend yield-related screens
- Defining the security level carbon exposure
- Defining the optimization setup
- Determining the optimized index

The steps mentioned above are defined in detail in the subsequent sections.

2.1 Defining the Parent Index

Construction of the Indexes begin with identifying the Parent Index and the Eligible Universe for optimization. The Parent Index serves as the universe of eligible securities for optimization. Please refer to Appendix I for more details.

2.2 Eligible Universe

The Eligible Universe is constructed from the Parent Index by excluding Real Estate Investment Trusts (REITs)[4] securities and other exclusion criteria described below.

2.3 Defining the Exclusion Criteria

2.3.1 Controversy-Based Exclusion Criteria

Securities of companies involved in “Very Severe” business controversies as defined by the MSCI ESG Controversies Methodology are not eligible for inclusion in the Indexes. This is implemented by excluding constituents of the Parent Index with ESG Controversy Score = 0 (‘Red Flag’ companies).

[3] Please refer to Section 4 for further information regarding the ESG and climate data used in the Index / 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 and MSCI Deutschland GmbH are the benchmark administrators for the MSCI indexes.

[4] Equity Real Estate Investment Trusts and Mortgage Real Estate Investment Trusts as defined by GICS®, the Global Industry Classification Standard, jointly developed by MSCI Inc. and S&P Global.

2.3.2 Business Exclusion Criteria

Companies that are involved in specific businesses which have high potential for negative social and/or environmental impact are ineligible for inclusion in the Indexes.

- Controversial Weapons
- Nuclear Weapons
- Tobacco
- Weapons
- Thermal Coal
- Unconventional Oil and Gas
- Arctic Oil and Gas

Please refer to Appendix II for more details on these criteria.

2.3.3 Other Exclusion Criteria

Missing Controversy Score – Companies not assessed by MSCI ESG Research's MSCI ESG Controversy Scores are excluded from the Indexes.

2.4 Dividend Yield-Related Screens

2.4.1 Dividend Sustainability Screening

Securities with zero or negative payout ratios[5] are not considered for inclusion in the Indexes. Additionally, securities with an extremely high payout ratio, are also not considered for inclusion in the Indexes. Under this screen, securities with an extremely high payout ratio defined to be the top 5% of securities by number within the universe of securities with positive payout, are not considered eligible for inclusion in the Indexes.

2.4.2 Dividend Persistence Screening

Securities with a negative 5-year dividend per share (5Y DPS) growth rate[6] are also excluded from the Indexes. Securities which have insufficient data to calculate a 5Y DPS growth rate are not excluded from the Indexes.

[5] Please refer to Appendix of MSCI High Dividend Yield Indexes Methodology for definition of Payout Ratio and 5Y DPS growth and their calculation.

[6] Please refer to Appendix of MSCI High Dividend Yield Indexes Methodology for definition of 5Y DPS growth and its calculation.

2.4.3 Quality Screening

Securities with negative Quality z-score are not considered for inclusion in the Indexes.

The Quality z-score for each security is calculated using the formulae defined in Appendix III.

2.4.4 Price Performance Screening

Securities ranked in the bottom 5% of the universe of securities with negative 1-year price performance are excluded from the Indexes.

2.5 Defining the Security Level Carbon Exposure

The carbon exposure of a security is measured in terms of its greenhouse gas emissions. The Indexes uses MSCI Climate Change Metrics data from MSCI ESG Research.

2.5.1 Greenhouse Gas Emissions

MSCI ESG Research collects company-specific direct (Scope 1) and indirect (Scope 2) greenhouse gas (GHG) emissions data from company public documents and/or the Carbon Disclosure Project. If a company does not report GHG emissions, then MSCI ESG Research uses its proprietary methodology to estimate Scope 1 and Scope 2 GHG emissions.

MSCI ESG Research estimates company-specific indirect (Scope 3) GHG emissions from the Scope 3 Carbon Emissions Estimation Model. The data is generally updated on an annual basis.

2.6 Defining the Optimization Setup

The optimization objective is to maximize the sector-relative gross dividend yield z-score of the index, while controlling the ex-ante Tracking Error relative to the Parent Index at the time of rebalancing. The Common Factor Risk Aversion and Specific Risk Aversion factors in the optimization is set to 0.0015 and 0.015 respectively.

The optimization is performed from a base currency perspective and does not allow short selling of securities. The default currency is the US Dollar.

Please refer to Appendix I for more details.

2.6.1 Calculation of the Sector Relative Grossed-Up Dividend Yield Z-Score

The sector-relative grossed-up dividend yield z-score for each security is calculated using grossed-up Dividend Yield as defined in Appendix III.

2.6.2 Optimization Constraints

At each semi-annual Index Review, the following optimization constraints are employed, which aim to ensure replicability and investability:

- The weighted-average dividend yield[7] of the Index will be at least 50% more than the weighted-average dividend yield of the Parent Index at the time of rebalancing.
- 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 be the higher of the (weight of the security in the Parent Index - 2%) and 0. The minimum weight of an index constituent will be restricted to 0.05%.
- The ex-ante Tracking Error of the Index, relative to the Parent Index will be constrained to be equal to or less than 5%.
- The sector weights of Index will not deviate more than +/-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 not deviate more than +/-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 above country weight constraint will also apply on China A Stock Connect listings as a group separately in addition to the usual country weight constraint on China.
- The weighted-average industry-adjusted ESG score of the Index will be at least 10% more than the weighted-average industry-adjusted ESG score of the Parent Index at the time of rebalancing.
- The minimum reduction in the Weighted Average Carbon Emission Intensity[8] relative to the Parent Index will be 30%.
- The minimum number of constituents of the Index will be 150 at the time of rebalancing.

[7] Weighted-average sector-relative gross dividend yield z- score of the Index.

[8] Carbon Intensity = Scope 1+2 & 3 Emission / Enterprise Value Including Cash (EVIC). Prior to the May 2020 Index Review of the Indexes, the Weighted Average Carbon Emissions Intensity relative to EVIC has been calculated based on Scope 1+2 Emissions.

- The one-way turnover of the Index is constrained to a maximum of 20% at each Index Review.

The Weighted Average Carbon Intensity is calculated using the formulae defined in Appendix V.

2.7 Determining the Optimized Index

The Indexes are constructed using the Barra Open Optimizer in combination with the relevant Barra Equity Model[9]. The optimization uses the Eligible Universe as the universe of eligible securities and the specified optimization objective and constraints to determine the Index. Infeasible optimizations are handled as explained in Appendix IV.

[9] Please refer to Appendix VI for the detailed information on model usage

3 Maintaining the Index

3.1 Semi-Annual Index Reviews

The Indexes are rebalanced on a semi-annual basis, usually as of the close of the last business day of May and November, coinciding with the May and November Index Reviews of the MSCI Global Investable Market Indexes. Fundamental variables as of the end of April and October are used respectively. The Barra Equity Model data as of the day before the rebalancing day is used.

In general, MSCI uses MSCI ESG Research data[10] (including MSCI ESG Controversies, MSCI ESG 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 Indexes are in general announced nine business days before the effective date.

During each semi-annual Index Review, the constituents of the underlying Parent Index are screened for potential inclusion in the Index according to the screening process described in Section 2.

Existing constituents of the current Index will also be evaluated for continued inclusion using the following screening process:

- If a security is already an Index constituent, it will still be allowed to remain in Eligible Universe until it reaches the top 2%, by decreasing order of Dividend Payout. If it is within the top 2% limit, it will be excluded from the Index.
- If a security is already an Index constituent but its 5Y DPS growth rate turns negative, it will still be allowed to remain in the eligible universe, provided that the 1-year dividend per share (1Y DPS) growth rate[11] of that security is non-negative. Securities which do not have sufficient data to calculate a 5Y DPS growth rate or 1Y DPS growth rate would still be eligible to remain in the Index.
- If a security is already an Index constituent, it will still be allowed to remain in the eligible universe as long as its Quality z-score is higher than or equal to -0.5.

[10] See section 4 for details of data sourced from MSCI ESG Research used in the Indexes.

[11] Please refer to Appendix of MSCI High Dividend Yield Indexes Methodology for definition of 1Y DPS growth and its calculation.

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.

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

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

EVENT TYPE	EVENT DETAILS
New additions to the Parent Index	A new security added to the Parent Index (such as IPO and other early inclusion) 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/latest/CE

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 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 in: https://www.msci.com/esg-and-climate-methodologies

4.2 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

4.3 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-change-solutions

Appendix I: The Parent Index and the Base Currency for Optimization

High Dividend Yield Select ESG Low Carbon Target Index	Parent Index	Base Currency for Optimization
MSCI World High Dividend Yield Select ESG Low Carbon Target Index	MSCI World Index	USD

Appendix II: Business Exclusion Criteria

- **Controversial Weapons**
  - All companies with any tie to Controversial Weapons (cluster munitions, landmines, depleted uranium weapons, biological/chemical weapons, blinding lasers, non-detectable fragments and incendiary weapons), as defined by the methodology of the MSCI Ex-Controversial Weapons Indexes available at https://www.msci.com/index/methodology/latest/XCW.
- **Nuclear Weapons**
  - 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).
  - 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 for nuclear-exclusive delivery platforms.
- **Tobacco**
  - All companies classified as a “Producer”.
  - All companies deriving 5% or more aggregate revenue from the production, distribution, retail and supply of tobacco-related products.
- **Weapons**
  - All companies deriving 10% or more aggregate revenue from weapons systems, components, and support systems and services.
- **Thermal Coal**
  - All companies deriving 5% 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.
  - All companies deriving 5% or more revenue (either reported or estimated) from the thermal coal-based power generation.
  - All companies generating 50% or more power from thermal coal.
  - All companies that own thermal coal reserves.

- **Unconventional Oil & Gas Extraction**
  - All companies deriving 5% or more revenues from oil sands, oil shale (kerogen-rich deposits), shale gas, shale oil, coal-seam gas, coal-bed methane as well as Arctic onshore/offshore reserves.

- **Arctic Oil & Gas**
  - All companies deriving 5% or more revenue from Arctic Oil.
  - All companies deriving 5% or more revenue from Arctic Gas.

Appendix III: Calculation of the grossed-up sector-relative Dividend Yield z-Score and Quality z-score

Calculation of the Grossed-Up Sector Relative Dividend Yield z-Score:

Within each sector, the grossed-up dividend yield z-score for each security within the sector is first computed as described:

$$z = \frac{(\mathrm{x} - \mu)}{\sigma}$$

Where:

- z is the sector-relative grossed-up Dividend Yield z-score of security
- x is the grossed-up Dividend Yield for a given security
- μ is the equal weighted mean of the grossed-up Dividend Yield within the sector
- σ is the equal weighted standard deviation of the grossed-up Dividend Yield within the sector

Calculation of the Quality z-score:

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 GEMLTL model. A Quality z-score is derived by standardizing (z-score) the combined Quality score.

$$\begin{aligned}\mathrm{Quality_i} = (0.2) * \mathrm{Profitability_i} + (0.2) * \mathrm{Investment\ Quality_i} + (0.2) * \mathrm{Earnings\ Quality_i} \\ + (-1) * (0.2) * \mathrm{Earnings\ Variabilty_i} + (-1) * (0.2) * \mathrm{Leverage_i}\end{aligned}$$

Appendix IV: Handling Infeasible Optimizations

During Review, in the event that there is no optimal solution that satisfies all the optimization constraints defined in Section 2.6, the following constraints are relaxed, until an optimal solution is found:

- Relax the turnover constraint in steps of 2%, up to a maximum of 30%.
- Relax the maximum weight multiple in steps of 2 up to a maximum of 5 iterations (up to a maximum of 20 times the weight of the security in the Parent Index).
- The maximum turnover and the maximum active weight multiple constraint 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	Maximum Asset Weight Multiple
1	22%	10 times the weight of the security in the Parent Index
2	22%	12 times the weight of the security in the Parent Index
3	24%	12 times the weight of the security in the Parent Index
4	24%	14 times the weight of the security in the Parent Index

In the event that no optimal solution is found after all the above constraints have been relaxed, the Index will not be rebalanced for that semi-annual Index Review.

Appendix V: Calculation of Carbon Exposure Metrics

Calculation of GHG Intensity relative to EVIC

Carbon emissions of a company are normalized for size by dividing annual carbon emissions by Enterprise Value including Cash (EVIC). The Carbon Emissions Intensity is calculated using the latest Scope 1+2 carbon emissions, Scope 3 carbon emissions and EVIC of a company.

Security Level GHG Intensity (Scope 1+2+3) relative to EVIC =

$$Security\ Level\ GHG\ Intensity\ (Scope\ 1+2\ )\ relative\ to\ EVIC \\ +\ Security\ Level\ GHG\ Intensity\ (Scope\ 3) relative\ to\ EVIC$$

Security Level GHG Intensity (Scope 1+2) relative to EVIC =

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

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. In case there are still some constituents with missing Scope 1+2 Emission Intensity is not available, the average Scope 1+2 intensity of all the constituents of the MSCI ACWI in the same GICS Sector in which the security belongs is used.

Security Level GHG Intensity (Scope 3) relative to EVIC =

$$\frac{Scope\ 3\ Carbon\ Emissions}{Enterprise\ Value + Cash(in\ M\$)}$$

If Scope 3 carbon emissions and/or EVIC are not available, the average Scope 3 intensity of all the constituents of the MSCI ACWI in the same GICS Industry Group in which the security belongs is used. In case there are still some constituents with missing Scope 3 Emission Intensity is not available, the average Scope 3 intensity of all the constituents of the MSCI ACWI in the same GICS Sector in which the security belongs is used.

Weighted Average GHG Intensity relative to EVIC of the Parent Index =

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

Weighted Average GHG Intensity relative to EVIC of the Optimized Index =

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

Appendix VI: 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 VII: Methodology Set

The Index is governed by a set of methodology and policy documents ("Methodology Set"), including the present index methodology document as mentioned below:

- Description of methodology set – www.msci.com/index/methodology/latest/ReadMe
- MSCI Corporate Events Methodology – www.msci.com/index/methodology/latest/CE
- MSCI Fundamental Data Methodology – www.msci.com/index/methodology/latest/FundData
- MSCI Index Calculation Methodology – www.msci.com/index/methodology/latest/IndexCalc
- MSCI Index Glossary of Terms – www.msci.com/index/methodology/latest/IndexGlossary
- MSCI Index Policies – www.msci.com/index/methodology/latest/IndexPolicy
- MSCI Global Industry Classification Standard (GICS) Methodology – www.msci.com/index/methodology/latest/GICS
- MSCI Global Investable Market Indexes Methodology – www.msci.com/index/methodology/latest/GIMI
- MSCI Global ex Controversial Weapons Indexes Methodology – http://www.msci.com/index/methodology/latest/XCW
- MSCI High Dividend Yield Indexes Methodology – www.msci.com/index-methodology
- 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.

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