FT Wilshire Climate Change Index Series
April 2023
1 Introduction

The indexes in the FT Wilshire Climate Change Indexes Series are designed to meet the requirements of EU Paris-Aligned Benchmarks as set out in Regulation (EU) 2019/2089 of the European Parliament and of the Council of 27 November 2019. The indexes that are currently available are listed in Section 3 below. All of the indexes in the FT Wilshire Climate Change Indexes Series follow the methodology in this document, however their administrators differ. The administrators of the indexes currently available are:

- FT Wilshire US Large Cap Climate Change 1.5°C Target Index: Wilshire Indexes
- Hang Seng Climate Change 1.5°C Target Index: Hang Seng Indexes Company Limited
- Nikkei 225 Climate Change 1.5°C Target Index: Nikkei Inc

Both the Hang Seng Climate Change 1.5°C Target Index and the Nikkei 225 Climate Change 1.5°C Target Index are made available in the UK in accordance with the third country transitional provisions that allow for third country administrators to provide benchmarks for use by UK Supervised Entities until 31 December 2023.

The requirements to meet the EU Paris-Aligned Benchmark designation are achieved through the targeting of specific emission intensity improvements in absolute terms and relative to their underlying benchmark indexes coupled with the sectoral allocation and company exclusion constraints set out in Commission Delegated Regulation (EU) 2020/1818. The emission intensity improvements are achieved via a tilting methodology where an initial set of index weights are multiplied by positive scores to yield a new set of index weights with the required improvements. The details of the index construction are provided below.

2 Index Construction

2.1 Data Definitions

The data definitions are in consensus with those found in the EU’s technical expert group’s report “Handbook of Climate Transition Benchmarks, Paris-Aligned Benchmark and Benchmark’s ESG Disclosures”.

2.1.1 GHG Emission Intensity

A company’s GHG Emission Intensity $E_i$ is defined as the ratio of the sum of Scope 1, Scope 2 and phased-in Scope 3 GHG emissions, in metric tons of CO2e, to enterprise value including cash (EVIC), in millions of USD. Details of reported and the modelling of un-reported carbon data are given in the document “Paris-Aligned Benchmarks - Carbon Emissions Model".  

2.1.2 Industry Factor

The industry factor is defined by the variable:

$$\delta_{iJ} = \begin{cases} 1 & \text{if } i \in J \\ 0 & \text{if } i \notin J \end{cases} \quad (1)$$

In other words, this variable takes the value of one if the stock $i$ is a member of industry $J$ and zero otherwise. The industry classification used for each index is set out in Table 1 of Section 3.

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1 Wilshire Indexes is the trading name of Wilshire OpCo UK Ltd, an FCA registered benchmark administrator
2 For universe constituents with neither reported nor modelled carbon emission data, their GHG emission intensity will comprise of; the second level classification average if there are at least three stocks with valid data in the same second level classification; otherwise, the first level classification average if there are at least three stocks with valid data in the same first level classification; otherwise, the universe average. For this purpose, the Scope 1 & 2 GHG emission intensity is treated separately from the Scope 3 GHG emission intensity.
2.1.3 High Climate Impact Sector Factor

The high climate impact sector factor is defined by the variable:

\[ \delta_{i \in H} = \begin{cases} 1 & \text{if } i \in H \\ 0 & \text{if } i \notin H \end{cases} \]  

(2)

In other words, this variable takes the value of one if the stock \( i \) is a member of the high climate impact set of stocks \( H \) and zero otherwise. The high climate impact set is the union of stocks in the high climate impact sectors given in Appendix A.

2.2 Calculation of Z-Scores and S-Scores

Emission intensities are converted to Z-Scores by subtracting their cross-sectional mean \( \mu \) from each raw value and then dividing by the cross-sectional standard deviation \( \sigma \):

\[ Z_{E,i} = \frac{E_i - \mu}{\sigma} \]  

(3)

A winsorization process is then applied to ensure that all the results lay in the range -3 to +3. Emission Z-Scores, industry factor and high climate impact sector factor are then mapped to positive “S-Scores” according to:

\[ S_{E,i} = \exp[Z_{E,i}], \quad S_{J,i} = \exp[\delta_{i \in J}] \quad \text{and} \quad S_{H,i} = \exp[\delta_{i \in H}] \]  

(4)

respectively. Stocks are therefore assigned a set of positive numbers that increase monotonically with their Z-Scores, industry factor and high climate impact sector factor.

2.3 Multiple Tilt Equation

The climate index weights are given by the multiple tilt equation:

\[ W_i = \frac{1}{\Omega} \times S_{E,i}^n \times S_{1,i}^t \times \ldots \times S_{j,i}^u \times S_{H,i}^r \times \tilde{M}_i \]  

(5)

where \( S_{E,i}^n \) is the Emission intensity tilt of strength \( n \), \( S_{J,i}^t \) is the \( t^{th} \) industry tilt of strength \( t \), \( S_{H,i}^r \) is the high climate impact sector tilt of strength \( r \), \( \tilde{M}_i \) is the set of weights obtained by removing stocks specified in the exclusion lists of Appendix B from the set of underlying benchmark weights \( M_i \) and:

\[ \Omega = \sum_{i=1}^{N} S_{E,i}^n \times S_{1,i}^t \times \ldots \times S_{J,i}^u \times S_{H,i}^r \times \tilde{M}_i \]  

(6)

Tilt strengths can take positive or negative values. Varying the tilt strengths in equation (5) give rise to different levels of emission intensity reductions, industry and sector exposures. Other tilts that control maximum weight, capacity and turnover may also be applied.

2.4 Emission Intensity, Industry and Sector Targets

At each review a range for Weighted Average Emission Intensity is specified by:

\[ 0 \leq \sum_{i=1}^{N} W_i \times E_i \leq \min \left[ (1 - P) \times \sum_{i=1}^{N} M_i \times \frac{E_B}{I_B} \times (1 - Q)^{n/2} \right] \]  

(7)
where \( E_B \) is the index Weighted Average Emission Intensity at a given decarbonization base date, \( n \) counts the number of semi-annual reviews since that decarbonization base date, \( P \) represents the point in time reduction relative to the benchmark, \( Q \) the required year-on-year reduction from that decarbonization base date and \( I_B \) is an inflation adjustment calculated as the ratio of average value of EVIC at the review to that at the decarbonization base date. See Table 1 in Section 3 for the \( P \) and \( Q \) values and Table 2 of Appendix C for the decarbonization base dates, for the Climate Change Indexes.

The active weight of stocks in the high carbon impact sectors is set to zero:

\[
\sum_{i=1}^{N} (W_i - M_i) \times \delta_{i \in H} = 0
\]  (8)

Ranges are specified for active industry weight according to:

\[
L_j \leq \sum_{i=1}^{N} (W_i - M_i) \times \delta_{i \in J} \leq U_j
\]  (9)

where \( L_j \) and \( U_j \) represent the lower and upper allowable limits for the active weight of industry \( J \).

2.5 Index Weights

Tilt strengths in equation (5) are found that satisfy equations (7), (8) and (9) along with constraints on maximum weight, minimum weight and capacity ratio (Climate Change Index weight / underlying index weight) \(^3\).

Should the solution be infeasible, a hierarchical approach to constraint relaxation will be applied:

1) Increase upper industry bound by 10bps and decrease lower industry bound by 10bps. Repeat until a solution is found or up to a maximum of 50 times.
2) Increase maximum stock weight by 10bps, reset initial industry bounds and re-apply relaxation scheme 1). Repeat until a solution is found or up to a maximum 50 times.
3) Seek a solution where neither industry nor maximum stock weight constraints are applied.

Should the relaxation process fail to yield a feasible solution, the index weights will consist of the pre-review index weights, renormalized to account for exclusion of stocks that are not members of the underlying index on the effective date.

3 Available Indexes

Table 1 sets out the various Climate Change Indexes in the series, the stock universes, sets of targets and parameters that specify them.

**Table 1: Targets and Parameters for Climate Change Indexes**

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Emission Intensity (P%, Q%)</th>
<th>Industry Classification</th>
<th>Active Indust. Const. (%)</th>
<th>High Climate Impact (%)</th>
<th>Max. Weight (%)</th>
<th>Min. Weight (bps)</th>
<th>Max. Cap. Ratio</th>
<th>Excl. List</th>
<th>Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>FT Wilshire US Large Cap</td>
<td>(50, 7)</td>
<td>GATS</td>
<td>+/-5</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>PAB</td>
<td>MS</td>
</tr>
</tbody>
</table>

\(^3\)In exceptional circumstances an additional constraint on the 2-way turnover may be applied.
4 Ongoing Review

4.1 Index Review

The FT Wilshire US Large Cap Climate Change 1.5°C Target Index will be reviewed semi-annually in March and September. The price data cutoff date is Wednesday before the first Friday of the review month. Constituent and free-float changes are updated after the close of trading on the third Friday of the review month.

The Hang Seng Climate Change 1.5°C Target Index will be reviewed semi-annually and becomes effective in March and September. The price data cutoff date and effective date will be the review announcement date and the effective date of the underlying Hang Seng Large-Mid Cap (Investable) Index as set out in “Index Operation Guide for Managing the Hang Seng Family of Indices”.

The Nikkei 225 Climate Change 1.5°C Target Index will be reviewed semi-annually in April and October. The price data cutoff date as of the close of second business day of the review month. Constituent and weight changes are updated at the open of trading on the last business day of the review month.

Emission data and exclusion lists will be updated at the end of January for March and April reviews, and the end of July for September and October reviews.

4.1 Intra-review Additions

Additions to the underlying FT Wilshire US Large Cap, Hang Seng and Nikkei 225 index will be eligible for inclusion in the FT Wilshire US Large Cap Climate Change 1.5°C Target Index, Hang Seng Climate Change 1.5°C Target Index and Nikkei 225 Climate Change 1.5°C Target Index at the next index review.

4.2 Intra-review Deletions

A constituent will be removed from a FT Wilshire US Large Cap Climate Change 1.5°C Target Index, Hang Seng Climate Change 1.5°C Target Index or Nikkei 225 Climate Change 1.5°C Target Index if it is removed from the corresponding underlying Index. The deletion will be concurrent with that from the underlying index and its weight will be distributed pro-rata amongst the remaining constituents in the FT Wilshire US Large Cap Climate Change 1.5°C Target Index, Hang Seng Climate Change 1.5°C Target Index or Nikkei 225 Climate Change 1.5°C Target Index.

In the situation where the pro-forma weight of any constituent is increased and becomes higher than the level of weight cap * 1.3 on the Tuesday of the week before the effective date, the Hang Seng Climate Change 1.5°C Target Index will be recapped.
5 Corporate Events

5.1 Corporate Action Treatment
The weight of a constituent of the FT Wilshire US large Cap Climate Change 1.5°C Target Index will remain unchanged should it undergo a stock split, stock consolidation, rights issue, bonus issue, a change in the number of shares in issue or a change in free float (with the exception of tender offers).

Corporate action treatment for the Hang Seng Climate Change 1.5°C Target Index can be found in the “Index Operation Guide for Managing the Hang Seng Family of Indices”.

Corporate action treatment for the Nikkei 225 Climate Change 1.5°C Target Index will follow the rules for the Nikkei 225.

5.2 Suspension of Dealing
Suspension of Dealing rules for the FT Wilshire US Large Cap Climate Change 1.5°C Target Indexes can be found in the “Wilshire Indexes Equity Index Calculation and Corporate Events Guide”.

Suspension of Dealing rules for the Hang Seng Climate Change 1.5°C Target Index can be found in the “Index Operation Guide for Managing the Hang Seng Family of Indices”.

Suspension of Dealing rules for the Nikkei 225 Climate Change 1.5°C Target Indexes are in accordance with those for the Nikkei 225.

5.3 Takeovers, Mergers and Spinoffs
The treatment of takeovers, mergers and spinoffs for the FT Wilshire US Large Cap Climate Change 1.5°C Target Index can be found in the “Wilshire Indexes Equity Index Calculation and Corporate Events Guide”.

The treatment of takeovers, mergers and spinoffs for the Hang Seng Climate Change 1.5°C Target Index can be found in the “Index Operation Guide for Managing the Hang Seng Family of Indices”.

The treatment of takeovers, mergers and spinoffs for Nikkei 225 Climate Change 1.5°C Target Index are in accordance with those for the Nikkei 225.
Appendix A: High Climate Impact Sectors

A.1 PAB High Climate Impact Sectors

The NACE definition of high climate impact sectors is as follows:

- Agriculture, forestry and fishing
- Mining and quarrying
- Manufacturing
- Electricity, gas, steam and air conditioning supply
- Water supply; sewerage, waste management and remediation activities
- Construction
- Wholesale and retail trade; repair of motor vehicles and motorcycles
- Transportation and storage
- Real estate activities

Each of these sectors are mapped to the equivalent sectors in the GATS, HSICS and Nikkei classifications to define the high climate impact sectors for the FT Wilshire US Large Cap Climate Change 1.5°C Target Index, Hang Seng Climate Change 1.5°C Target Index and Nikkei 225 Climate Change 1.5°C Target Index respectively.
Appendix B: Exclusions

B.1 PAB Index Exclusions

Companies involved in the following activities are excluded from the PAB Indexes:

- Controversial weapons.
- Cultivation and production of tobacco.
- UN Global Compact violations.
- OECD Guidelines for Multinational Enterprises violations.
- Exploration, mining, extraction, distribution or refining of hard coal and lignite (1% or more of revenues).
- Exploration, extraction, distribution or refining of oil fuels (10% or more of revenues).
- Exploration, extraction, manufacturing or distribution of gaseous fuels (50% or more of revenues).
- Electricity generation with a GHG intensity of more than 100 g CO2 e/kWh (50% or more of revenues).
- Significant harm to the environment.

For more details of the exclusion criteria please see “Paris-Aligned Benchmarks – Exclusion Criteria”.

5 UNGC/OECD exclusions are applied by Hang Seng to the underlying Hang Seng Large-Mid Cap (Investable) Index for the Hang Seng Climate Change 1.5°C Target Index.
Appendix C: Decarbonization Base Dates & Phased Scope 3 GHG Emissions

Table 2 displays the decarbonization base dates for year-on-year reduction of Scope 1 + Scope 2 GHG Emissions for phased Scope 3 GHG Emissions for the FT Wilshire Climate Change indexes. At the reviews corresponding to decarbonization base dates in Table 2, the review count in equation (7) is reset to zero.

**Table 2: Base dates and phased in Scope 3 emissions**

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Scope 1+ 2</th>
<th>Scope 3: Phase 1</th>
<th>Scope 3: Phase 2</th>
<th>Scope 3: Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>FT Wilshire US Large Cap Climate Change 1.5°C</td>
<td>Sep 2015</td>
<td>Sep 2020</td>
<td>Sep 2022</td>
<td>Sep 2024</td>
</tr>
<tr>
<td>Target</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hang Seng Climate Change 1.5°C Target</td>
<td>Sep 2015</td>
<td>Sep 2020</td>
<td>Sep 2022</td>
<td>Sep 2024</td>
</tr>
</tbody>
</table>

Scope 3 GHG Emission phases:

- Phase 1 - GHG Emissions data for energy and mining sectors
- Phase 2 - GHG Emissions data for transportation, construction, buildings, materials and industrial sectors
- Phase 3 - GHG Emissions data for all other sectors
In collaboration with:

**NIKKEI**

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**恒生指數**

About Hang Seng Indexes Company Limited

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Important Information

Nikkei 225 Climate Change 1.5°C Target Index is a collaboration of Nikkei Inc. and Wilshire

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