

## **ITEM 1(A) ESG PROFILE – ANALYTICAL NOTE**

**Paper type:** *For information*

**Presented by:** *EIP, RI, AA, PC*

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### **1 Purpose and context**

1.1 To accompany the RI Compass final report, scheduled to be discussed at the 22 June 2022 meeting of the Guardians' board, this paper presents analysis on:

- An evaluation and reporting methodology for the Fund's ESG Profile;
- Index solutions that improve the Fund's ESG profile;
- Suitability of these solutions as Reference Portfolio benchmarks.

1.2 The analysis and recommendations are drafted in the context of previous RI Compass papers considered by the various internal committees and the Board. We note:

- The Board's approval of Sustainable Finance at the June 2021 meeting: The sustainable finance goal is defined as: "*The Guardians incorporates sustainability considerations into investment decision-making and supports the development of a sustainable financial system*". This means:
  - (i) supporting the development of a sustainable financial system
  - (ii) incorporation of ESG into investment decisions, with the intention of advancing sustainability whilst fulfilling our financial purpose
  - (iii) considering the impact of ESG on our investments and the impact of our investments on society and the environment
- The Board's endorsement of the two-part ESG Profile problem statement at the April 2022 meeting, being:
  - (i) A replacement portfolio of passive equities must closely resemble our existing Reference Portfolio equities in material ways, ensuring that we collect beta or the market risk premium, without unintended risk factors, biases or other tilts;
  - (ii) The replacement portfolio must deliver measurable, multi-dimensional, improvements in ESG content.
- Board feedback following the April 2022 meeting, and as discussed with the CEO and CIO, that ESG Profile improvements be implemented in the Reference Portfolio as a matter of preference, unless there are good, practical, reasons to not do so.

### **2 Evaluation and Reporting**

3.1 Before considering solutions to the problem statement identified previously (and summarised in 1.3(b)), a decision framework is required. How will we know that we have, indeed, achieved our objectives? How will we measure and report on progress? What is the basis for deciding between alternatives? How should we account for the various

ends that our solutions must answer to and the various perspectives that different decision-makers and stakeholders will take to considering the issue?

- 3.2 We propose a two-part Evaluation and Reporting Framework (ERF) that aims to be transparent, robust, relevant to the problem at hand, and balanced between completeness and complexity. This Framework serves two purposes: (1) it allows us to choose between alternative solutions and (2) it serves as a consistent reporting guide, forming an important part of our governance arrangements.
- 3.3 As previously discussed, the first part of the ERF is straightforward: we would like to collect the market risk premium and generally achieve market exposure that has the same “look and feel” of our existing portfolio of passive equities, thereby ensuring that we are not unknowingly taking on risk premia that we have not acknowledged and accepted. We refer to this first part of the evaluation framework as “financial characteristics”. This is largely for internal consumption—an aide to decision-making, and an ongoing monitoring tool.
- 3.4 Therefore, for each risk premium (or factor) that we attempt to avoid loading on, we propose three of the most widely used metrics<sup>1</sup>. Additionally, we add two standard measures of diversification as well as predicted beta and tracking error to the MSCI ACWI IMI, which is the parent index for our current customized RP equities<sup>2</sup>.

*Table 1(a): Evaluation and Reporting Framework – Financial Characteristics*

| <b>Financial characteristics</b> |                                     |  |                               |
|----------------------------------|-------------------------------------|--|-------------------------------|
| <b>Risk Premia</b>               |                                     |  |                               |
| Value                            | Volatility                          | Momentum   | Quality                       |
| Price/Book<br>[10%]              | Portfolio Beta<br>[0.97-1.03]       | Momentum 3M<br>(%) [20%]                         | LT Debt to<br>Capital [10%]   |
| Price/Earnings<br>[10%]          | Portfolio<br>Volatility (%)<br>[5%] | Momentum 6M<br>(%) [20%]                         | ROA [10%]                     |
| Dividend Yield<br>[10%]          |                                     | Momentum<br>12M (%) [20%]                        | ROE [10%]                     |
| <b>Other characteristics</b>     |                                     |  |                               |
| Num. securities<br>[na]          | Med. Market<br>cap [na]             | Predicted<br>Tracking Error<br>[<1.5%]           | Predicted beta<br>[0.99-1.01] |
| <b>Diversification</b>           |                                     |  |                               |
| Active share [<50]               |                                     | Portfolio concentration coefficient <sup>3</sup> |                               |

- 3.5 The goal is that a proposed solution should differ from the MSCI ACWI IMI as little as possible in these portfolio characteristics. Therefore, in parentheses, we have also proposed suggested tolerances or targets for potential solutions. Decision-makers may wish to come to their own view on “good enough” or “close enough”.
- 3.6 An important exception is the predicted beta for a candidate solution where a value that is appreciably different to 1 must be separately motivated and accepted. We have

<sup>1</sup> Note that these factors are the same as those included in our DM Equity Multifactor opportunity. For the programme committee, we have included additional metrics beyond those listed in Table 1(a).

<sup>2</sup> Ideally, we would have preferred to calculate the tracking error to our custom index directly. However, the latter has a limited history and is not useful for this purpose.

<sup>3</sup> The portfolio concentration coefficient is also known as the Herfindahl-Hirschmann index, a standard measure of portfolio concentration (or market competitiveness). It is the sum of squared portfolio weights, and therefore has a minimum value of 1 indicating that the portfolio essentially comprises a single name.

previously discussed that a tracking error limit of 1.5% against the ACWI IMI (which is roughly equivalent to 75bps at the Fund level) may be appropriate for this exercise.

- 3.7 The second part of the decision framework considers ESG—specifically, what do we mean when we refer to the “ESG Profile” of our equities? Through the course of the project, both the usefulness and limitations of a bottom-line ESG rating (or score) have become apparent. A lack of consistency, remaining questions around objectivity, and the general difficulty of attaching real world meaning to a unit-free, number, lead us to favour and recommend a more holistic suite of ESG measures. We also note again the protection against this shortcoming being that a rating simply reflects how well a company is managing its material ESG risks compared to sector peers (Appendix 1).
- 3.8 A suite offers a multi-dimensional perspective on a complex problem, is not overly reductive, and can be usefully responsive in a rapidly evolving space. It also allows for specific, objective, and easily communicated measures to be included. We propose the following groupings for ESG metrics, acknowledging that not all categories need to be included or adopted initially. Further, we note the “must haves” below (for discussion), which include: ESG ratings, carbon/climate metrics, controversial products/exclusions and controversies re practices.
- *Category A.* These metrics include those used directly in portfolio construction. Metrics in this category must be material. It must be reasonable to target these measures, and we must have high confidence that the targets can be achievable. Guardians is externally accountable for the achievement of targeted metrics.
  - *Category B.* These are memorandum items that internal stakeholders (management, Board, Treasury) wish to track. Reputational issues/impact and the management of controversies is important. This category covers everything that helps us achieve a more straightforward portfolio (in the sense of limiting costs of ownership).
  - *Category C.* These metrics include those for which there is strong societal or stakeholder interest, but where there is reasonable doubt about materiality and therefore their incorporation into portfolio construction. Metrics in this category will generally be objective, straightforward to understand and communicate. We will expect to see an ‘upward’ or ‘improvement’ trend in these metrics over time. Management is internally accountable for these metrics, but perhaps in a contextualised, qualitative, sense. These could also be development items, where data quality is suspect but where items are of internal research interest. The metrics could be helpful for specific projects or items. Internal committees such as the IC or RC may wish to track them.
- 3.9 We propose to use the following *classes* of measures to assess the ESG profile of various indices.
- *ESG scores (must have).* This is the headline ESG score that data providers create by aggregating a large number of underlying metrics. It represents a very broad measure of the ESG profile of a portfolio, and is useful as a summary metric. We see this score as a necessary, but not sufficient, metric for measuring the Fund’s ESG Profile.
  - *ESG momentum.* This measures the net change in ESG ratings between assessments, i.e. positive minus negative changes, and is therefore an indication of trend. We have previously evaluated evidence that ESG momentum tends to persist and is a predictor of future returns.
  - *Carbon and other ESG KPIs (outcome measures, must have).* These are objective ESG metrics that easily translate to the “real world” and are straightforward for

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general observers and non-experts to understand. They provide a transparent way of verifying that our ESG-enhanced portfolio is actually delivering real world ESG impacts. We have selected the impact outcomes presented in Table 1(b) because of their importance to the New Zealand context and for the relatively high coverage we have for these metrics.

- *Revenue analysis and products (beneficial/harmful impacts)*. This helps identify portfolios that derive value from positive/negative impact activities. We have chosen revenue analysis rather than an impact score or SDG score on the grounds of simplicity, transparency and to reduce dependence on a particular data provider. We propose to report on a range of high environmental and social impact products and services (both positive and negative) as per Table 1(b) below.
  - *Stakeholder concerns (must have)*. These are a range of metrics which assess the risk that we will hold companies that are controversial or raise concerns from our stakeholders. These refer to our general license to operate. We also evaluate and report on the things we already do in the Reference Portfolio terms of exposures to our restricted lists, fossil fuel reserves and carbon intensity.
- 3.10 At a later date, we also propose including *Net Zero Climate Metrics*. We have signed the Net Zero Asset Owners Commitment and these metrics will provide additional insight on how well our activities support and align with the required climate transition. However, suitable metrics are being revised at the moment, and so we defer decision on these.
- 3.11 Precise metrics for the classes in 3.9 are identified in Table 1(b). Unlike financial characteristics, there is more choice and less agreement between various data sources that can be deployed. For evaluating potential solutions (and as a robustness check), decision-makers may wish to consider more than one source for the same metric.

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9(2)(g)(i)

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**Table 1(b): Evaluation and Reporting Framework – ESG Profile**

|   |   |  | <b>Possible Category<br/>(for discussion)</b> |
|---|---|--|---|
| <b>ESG score</b>                        |   |  |   |
| Score                                   | % improvement in ESG Score relative to benchmark        | MSCI   | Must have                                     |
|   |   | S&P  |   |
|   |   | ISS  |   |
|   |   | Sustainalytics   |   |
| <b>ESG momentum</b>                     |   |  |   |
| Momentum                                | Net ESG Trend = Positive ESG Trend – Negative ESG Trend | MSCI, represents the percentage of a portfolio’s MV coming from holdings that have had an ESG Ratings upgrade, and those with a downgrade since their previous assessment. |   |
| <b>Carbon and other ESG KPIs</b>        |   |  |   |
| Carbon intensity (Scope 1 + 2)          | tCO2e/\$m sales   | MSCI Carbon Report   | Must have                                     |
| Carbon intensity (Scope 3 – Upstream)   |   |  |   |
| Carbon intensity (Scope 3 – Downstream) |   |  |   |
| All Scope Carbon Intensity              |   |  |   |
| Example KPI: Freshwater withdrawal      | % improvement relative to benchmark                     | MSCI, Freshwater withdrawal measured as Cubic metres/\$m sales   |   |
| Example KPI: Female Rep. 30% Directors  |   | MSCI, % of portfolio’s market value exposed to companies where women comprise at least 30% of the board of directors   |   |
| <b>Revenue analysis</b>                 |   |  |   |
| Alternative Energy                      | % improvement relative to benchmark                     | MSCI Sustainable Impact Exposure. Portfolio weighted average of each constituent’s % of revenue generated from given metric  |   |
| Energy Efficiency                       |   |  |   |
| Major Diseases Treatment                |   |  |   |
| Education                               |   |  |   |
| Gambling                                |   |  |   |
| Weapons                                 |   |  |   |
| Fossil Fuels                            |   |  |   |
| <b>Stakeholder concerns</b>             |   |  |   |
| Exposure to Very Severe Controversies   | Reduction, relative to benchmark                        | MSCI   | Must have                                     |
| Exposure to restricted list             | Number and % of stocks                                  | NZSF calculations based on RI exclusion list   |   |
| Exposure to Global Focus List           | Number and % of stocks                                  | NZSF calculations where we are considering application of our engage/exclude process<br>NZSF aggregation of 3 <sup>rd</sup> party lists;                                   |   |
| Exposure to recent controversies        | Number and % of stocks                                  | not a list of companies we believe are problematic, instead a list of companies that feature in controversies meaningful to constituents                                   |   |

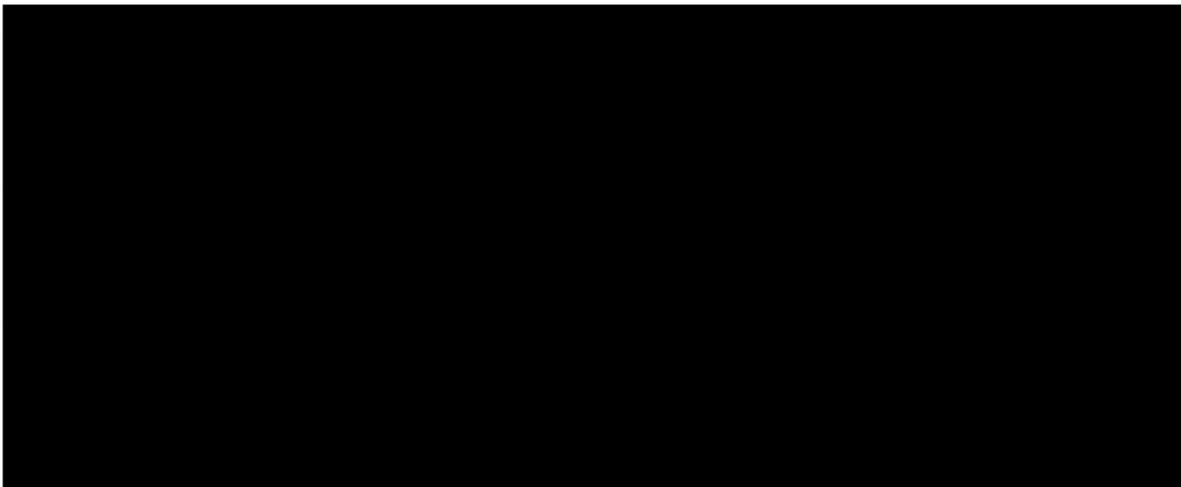
*Other tools*

3.14 We have also investigated two other tools that we do not propose to investigate further or incorporate into the ERF at this time. However, they may either be useful for specialist purposes or for later ERF incorporation.

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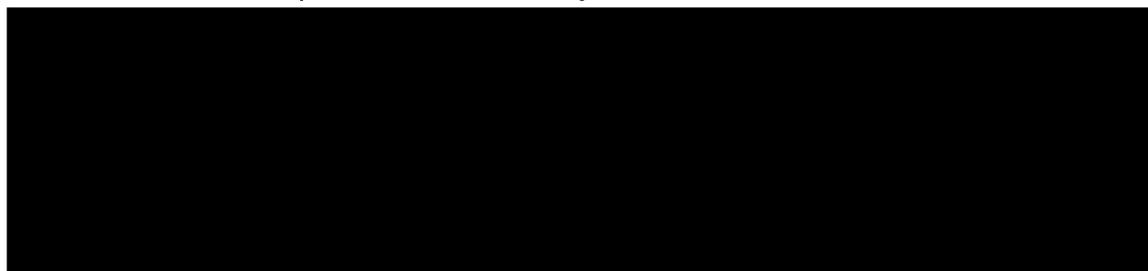
**3 ESG Solutions**

4.1 We have investigated two types of solutions to our problem through this project: customized solutions that speak comprehensively to specified criteria, and off-the-shelf indices. We focus on analysis and recommendations on preferred index solutions, we also include one custom solution (from Robeco) for comparative purposes.

4.2 We highlight our process below, including some observations, limitations and caveats:

- The distinction between an off-the-shelf index and a custom portfolio can be elastic: any custom portfolio can be converted into an index via the services of a calculation agent and this index can then be either shared with investment managers for replication via physical instruments or with banks for derivative-based implementation.
- There is a very wide variety of off-the-shelf indices available, grouped into families, but many with rather limited market take-up. When presented with a wishlist, providers have offered to tweak an existing index to better meet requirements.
- Most indices we have considered offer limited histories, under five years or 10 years at best. Backtest comparisons are limited by the shortest available index.

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4.3 We break down our analytical conclusions in three buckets: financial characteristics, which look extensively at point-in-time data (generally as at 31 March 2022); ESG Profiles, which also considers holdings-based information at the same date; and

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<sup>4</sup> Morningstar were very keen to work with us. So even though there were not able to offer a ready solution, after some extra research and development, have offered an index solution to us for consideration on 5 May 2022. We are currently evaluating this.

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backtests which attempt to study the longest possible histories, and therefore go back to about 2014. (This means that backtests for all indices are not available.)

- 4.4 ESG indices have tended to be slightly more expensive than our benchmark (see Value ratios in Table 2). This is because they tend to load slightly more heavily on information technology stocks and less heavily on industrials (see Table 5). We do not believe that this discrepancy is material or something that will persist through a cycle; however, it does support sector-neutral stances on both measurement and index construction.
- 4.5 Other factor tilts are generally not consistently evident, [REDACTED]. Importantly, both beta and volatility estimates are in line with the benchmark. The indexes achieve good diversification, including across the capitalization spectrum, with a much smaller number of constituents and, in some cases, explicit small cap exclusions. [REDACTED]
- 4.6 Most indices do not take on appreciable regional mis-weights. [REDACTED]
- 4.7 Our scenario-based stress tests (Table 4) show that the indices perform in line with the broad market cap-weighted benchmark during (simulated) general equity market selloffs, again with the exception of [REDACTED]. However, when actual events are modelled, such as the GFC or the recent Covid shocks, some of the indices perform better than the ACWI IMI.
- 4.8 Table 7 presents the ESG profiles of several indices in line with the format motivated in Section 3. This again highlights the usefulness of a multi-dimensional framework. For example, if one were to consider only an ESG Score, then, regardless of the provider of that score, it is not clear that one would prefer one of these ESG indices for the Score improvements on offer. The financial compromises (see Tables 2 to 6) may be considered to be not worthwhile.

9(2)(g)(i) /  
9(2)(i) / 9(k)9(2)(i) /  
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9(2)(k)

**Table 2: Financial characteristics (select indices and Robeco custom portfolio for comparison)**

|                           | Ro-<br>beco<br>Custo<br>m | Sol-<br>active<br>ESG | S&P<br>Paris<br>Align | MSCI<br>ESG<br>Focu<br>s | MSCI<br>Paris<br>Align | MSCI<br>Custo<br>m | Qonti<br>go<br>Paris<br>Align | Morni<br>ngsta<br>r | NZSF<br>Custo<br>m<br>Index |
|---------------------------|---------------------------|-----------------------|-----------------------|--------------------------|------------------------|--------------------|-------------------------------|---------------------|-----------------------------|
| <b>Value</b>              |                           |                       |                       |                          |                        |                    |                               |                     |                             |
| <b>Price/Book</b>         |                           |                       |                       | 3.0                      | 3.3                    |                    |                               |                     | 2.9                         |
| <b>Dividend Yield</b>     |                           |                       |                       | 1.8                      | 1.6                    |                    |                               |                     | 1.7                         |
| <b>Price/Cash Flow</b>    |                           |                       |                       | 12.2                     | 14.9                   |                    |                               |                     | 12.4                        |
| <b>Price/Sales</b>        |                           |                       |                       | 2.2                      | 2.9                    |                    |                               |                     | 2.1                         |
| <b>Price/Earnings</b>     |                           |                       |                       | 19.1                     | 21.1                   |                    |                               |                     | 18.7                        |
| <b>P/E using FY1 Est</b>  |                           |                       |                       | 17.9                     | 19.9                   |                    |                               |                     | 17.9                        |
| <b>P/E using FY2 Est</b>  |                           |                       |                       | 16.6                     | 18.3                   |                    |                               |                     | 16.6                        |
| <b>Momentum</b>           |                           |                       |                       |                          |                        |                    |                               |                     |                             |
| <b>Momentum 3M</b>        |                           |                       |                       | 0.08                     | -1.25                  |                    |                               |                     | -0.64                       |
| <b>Momentum 6M</b>        |                           |                       |                       | 7.83                     | 6.64                   |                    |                               |                     | 6.77                        |
| <b>Momentum 12M</b>       |                           |                       |                       | 21.51                    | 22.24                  |                    |                               |                     | 20.94                       |
| <b>Quality</b>            |                           |                       |                       |                          |                        |                    |                               |                     |                             |
| <b>LT Debt to Capital</b> |                           |                       |                       | 40.22                    | 39.43                  |                    |                               |                     | 40.20                       |

9(2)(i) /  
9(2)(k)

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|                                 |  |       |       |  |       |
|---------------------------------|--|-------|-------|--|-------|
| ROE                             |  | 21.55 | 21.15 |  | 20.39 |
| ROA                             |  | 9.02  | 9.06  |  | 8.69  |
| <b>Volatility</b>               |  |       |       |  |       |
| Port. MPT Beta                  |  | 0.98  | 1.00  |  | 1.00  |
| Port. MPT Volatility            |  | 11.01 | 11.26 |  | 11.15 |
| <b>Size</b>                     |  |       |       |  |       |
| # of Securities                 |  | 577   | 961   |  | 8,811 |
| Market Capitalization (\$b)     |  | 544   | 565   |  | 501   |
| Active Share                    |  | 42.5  | 40.6  |  | --    |
| Port. Concentration Coefficient |  | 168   | 151   |  | 217   |
| <b>Growth</b>                   |  |       |       |  |       |
| Est 3-5 Yr EPS Growth           |  | 16.8  | 17.3  |  | 16.0  |
| Hist 3Yr EPS Growth             |  | 3.3   | 3.4   |  | 3.3   |
| Hist 3Yr Sales Growth           |  | 8.8   | 9.9   |  | 9.7   |

**Table 3: Scenario stress-tests (select indices, Robeco for comparison)**

|                                       | Robeco | Solactive ESG | S&P PA | MSCI ESG Focus | MSCI PA |
|---------------------------------------|--------|---------------|--------|----------------|---------|
| <b>Factor Shocks</b>                  |        |               |        |                |         |
| <b>S&amp;P 500 30% Decline</b>        |        |               |        |                |         |
| Percent Return                        |        |               |        | -18.51         | -18.90  |
| Active Return                         |        |               |        | 0.28           | -0.11   |
| <b>FTSE World 30% Decline</b>         |        |               |        |                |         |
| Percent Return                        |        |               |        | -24.82         | -25.19  |
| Active Return                         |        |               |        | 0.23           | -0.14   |
| <b>NASDAQ 30% Decline</b>             |        |               |        |                |         |
| Percent Return                        |        |               |        | -16.94         | -17.38  |
| Active Return                         |        |               |        | 0.30           | -0.14   |
| <b>Russell 2000 30% Decline</b>       |        |               |        |                |         |
| Percent Return                        |        |               |        | -17.17         | -17.62  |
| Active Return                         |        |               |        | 0.34           | -0.11   |
| <b>S&amp;P 500 Energy -20%</b>        |        |               |        |                |         |
| Percent Return                        |        |               |        | -9.32          | -9.42   |
| Active Return                         |        |               |        | 0.04           | -0.06   |
| <b>Extreme Events</b>                 |        |               |        |                |         |
| <b>Credit Crisis (10/08)</b>          |        |               |        |                |         |
| Percent Return (Event)                |        |               |        | -20.19         | -20.67  |
| Active Return (Event)                 |        |               |        | 0.50           | 0.02    |
| <b>COVID-19 Selloff (2/20 - 3/20)</b> |        |               |        |                |         |
| Percent Return (Event)                |        |               |        | -35.59         | -35.10  |

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|                           |  |       |       |
|---------------------------|--|-------|-------|
| Active Return (Event)     |  | 0.13  | 0.63  |
| 2021 Tsy Rate Rise (Q121) |  |       |       |
| Percent Return (Event)    |  | 4.02  | 3.67  |
| Active Return (Event)     |  | -0.55 | -0.90 |

**Table 4: Regional active weights (select indices, Robeco for comparison)**

| Active wts (vs NZSF custom) | Robeco | Solactive ESG | S&P Paris Aligned | MSCI ESG Focus | MSCI Paris Aligned | MSCI Custom | Qontigo Paris Aligned | Morningstar |
|-----------------------------|--------|---------------|-------------------|----------------|--------------------|-------------|-----------------------|-------------|
| North America               |        |               |                   | -2.74          | -3.32              |             |                       |             |
| Europe                      |        |               |                   | 0.76           | 0.96               |             |                       |             |
| Asia/Pacific Ex Japan       |        |               |                   | 1.45           | 1.07               |             |                       |             |
| Japan                       |        |               |                   | 0.53           | 0.01               |             |                       |             |
| Africa/Mideast              |        |               |                   | -0.43          | 0.28               |             |                       |             |
| Latin America               |        |               |                   | -0.11          | 0.66               |             |                       |             |

**Table 5: Active sector weights**

|                        | Robeco | Solactive ESG | S&P PA | MSCI ESG | MSCI PA | MSCI Custom | Qontigo PA | Morningstar |
|------------------------|--------|---------------|--------|----------|---------|-------------|------------|-------------|
| Communication Services |        |               |        | 0.57     | -0.08   |             |            |             |
| Consumer Discretionary |        |               |        | -0.64    | -2.38   |             |            |             |
| Consumer Staples       |        |               |        | -0.08    | -2.51   |             |            |             |
| Energy                 |        |               |        | 2.09     | -1.10   |             |            |             |
| Financials             |        |               |        | -1.17    | -0.22   |             |            |             |
| Health Care            |        |               |        | -0.54    | 0.59    |             |            |             |
| Industrials            |        |               |        | -1.01    | 2.48    |             |            |             |
| Information Technology |        |               |        | -1.23    | 2.07    |             |            |             |
| Materials              |        |               |        | 1.03     | -2.77   |             |            |             |
| Real Estate            |        |               |        | -1.20    | 1.21    |             |            |             |
| Utilities              |        |               |        | 1.52     | 1.74    |             |            |             |

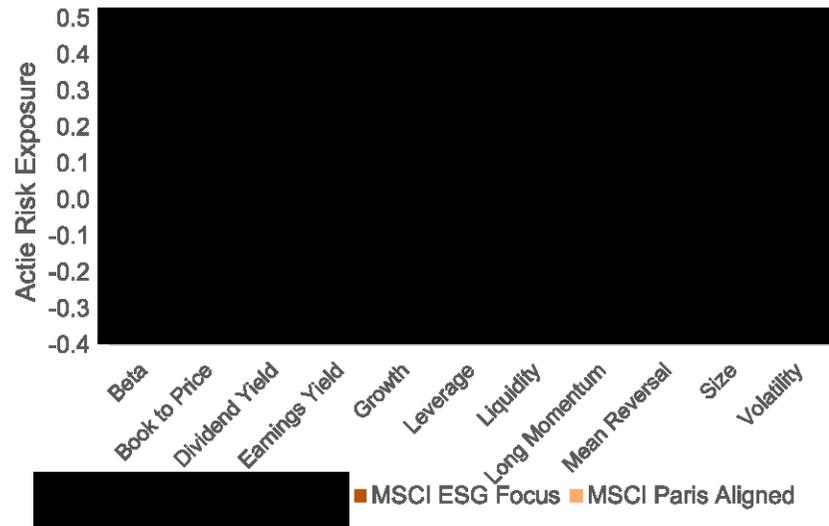
**Table 6: Risk exposures (select indices, Robeco for comparison)**

|                             | Robeco | Solactive ESG | S&P Paris Aligned | MSCI ESG Focus | MSCI Paris Aligned | MSCI Custom | Qontigo PA | Morningstar |
|-----------------------------|--------|---------------|-------------------|----------------|--------------------|-------------|------------|-------------|
| <b>Risk Characteristics</b> |        |               |                   |                |                    |             |            |             |
| Total Risk                  |        |               |                   | 12.34          | 12.81              |             |            |             |
| Benchmark Risk              |        |               |                   | 12.61          | 12.61              |             |            |             |
| Predicted Beta              |        |               |                   | 0.98           | 1.01               |             |            |             |

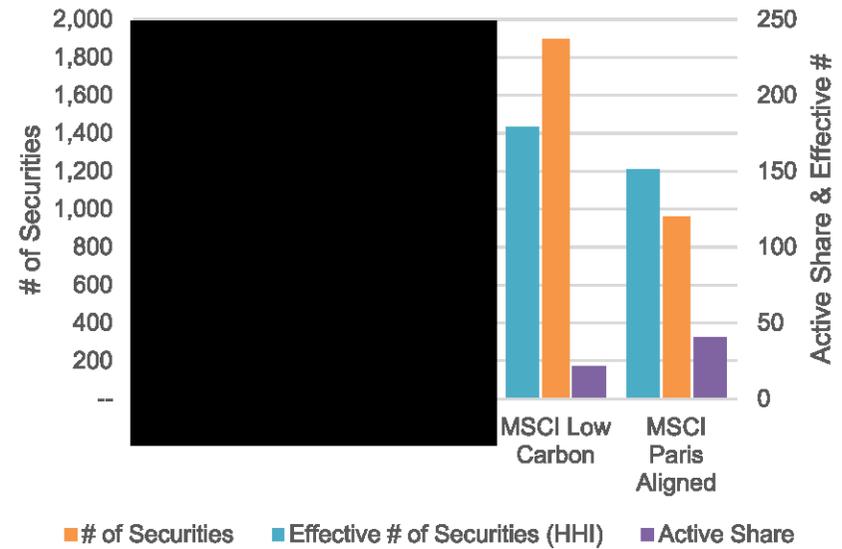
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|                                 |  |       |       |  |
|---------------------------------|--|-------|-------|--|
| <b>Predicted Tracking Error</b> |  | 1.08  | 1.18  |  |
| <b>Risk (%)</b>                 |  |       |       |  |
| <b>% Asset Specific Risk</b>    |  | 29.96 | 34.05 |  |
| <b>% Factor Risk</b>            |  | 70.04 | 65.95 |  |
| <b>% of Variance</b>            |  |       |       |  |
| <b>Market</b>                   |  | 0.05  | -0.01 |  |
| <b>Beta</b>                     |  | 1.65  | 3.54  |  |
| <b>Book to Price</b>            |  | -1.03 | 5.23  |  |
| <b>Dividend Yield</b>           |  | 3.36  | 0.33  |  |
| <b>Earnings Yield</b>           |  | 3.52  | 0.75  |  |
| <b>Growth</b>                   |  | 0.12  | -0.29 |  |
| <b>Leverage</b>                 |  | -0.19 | 0.53  |  |
| <b>Liquidity</b>                |  | -0.03 | 0.31  |  |
| <b>Long Momentum</b>            |  | -0.12 | 2.20  |  |
| <b>Mean Reversal</b>            |  | 10.67 | 0.00  |  |
| <b>Size</b>                     |  | 15.71 | 10.73 |  |
| <b>Volatility</b>               |  | 10.80 | -1.40 |  |
| <b>Industry</b>                 |  | 22.31 | 32.36 |  |
| <b>Country</b>                  |  | 2.90  | 12.25 |  |
| <b>Currency</b>                 |  | 0.31  | -0.57 |  |
| <b>Active Exposure</b>          |  |       |       |  |
| <b>Beta</b>                     |  | -0.03 | -0.03 |  |
| <b>Book to Price</b>            |  | -0.03 | -0.07 |  |
| <b>Dividend Yield</b>           |  | 0.09  | -0.01 |  |
| <b>Earnings Yield</b>           |  | 0.08  | -0.03 |  |
| <b>Growth</b>                   |  | -0.00 | -0.01 |  |
| <b>Leverage</b>                 |  | -0.01 | -0.03 |  |
| <b>Liquidity</b>                |  | 0.00  | -0.03 |  |
| <b>Long Momentum</b>            |  | -0.00 | 0.03  |  |
| <b>Mean Reversal</b>            |  | -0.08 | 0.02  |  |
| <b>Size</b>                     |  | 0.23  | 0.17  |  |
| <b>Volatility</b>               |  | -0.07 | -0.04 |  |
| <b>Industry</b>                 |  | -0.00 | -0.00 |  |
| <b>Country</b>                  |  | -0.00 | -0.00 |  |
| <b>Currency</b>                 |  | 0.00  | 0.00  |  |

### Active Style Exposures



### Actual vs. Effective # of Securities



9(2)(i) / 9(2)(k)

### Climate Change VaR



### Carbon Intensity



Table 7: ESG Profiles

| ESG Score  | Robeco | Solactive PA | Solactive ESG Prim | S&P PA | S&P ESG | MSCI ESG | MSCI PA | Qontigo ESG | Qontigo PAB | MSCI Custom | Morningstar Custom |
|--|--------|--------------|--------------------|--------|---------|----------|---------|-------------|-------------|-------------|--------------------|
| <b>MSCI</b>  |        |              |                    |        |         | 19%      | 6%      |             |             |             |                    |
| <b>S&amp;P</b>   |        |              |                    |        |         |          |         |             |             |             |                    |
| <b>ISS</b>   |        |              |                    |        |         |          |         |             |             |             |                    |
| <b>Sustainalytics</b>  |        |              |                    |        |         |          |         |             |             |             |                    |
| <b>ESG Momentum</b>  |        |              |                    |        |         |          |         |             |             |             |                    |
| <b>MSCI</b>  |        |              |                    |        |         | 1%       | -1%     |             |             |             |                    |
| <b>Revenue analysis</b>  |        |              |                    |        |         |          |         |             |             |             |                    |
| <b>Alternative Energy (%)</b>  |        |              |                    |        |         | 0.0%     | 2.2%    |             |             |             |                    |
| <b>Energy Efficiency (%)</b>   |        |              |                    |        |         | 1.0%     | 2.5%    |             |             |             |                    |
| <b>Major Diseases Treatment (%)</b>  |        |              |                    |        |         | 0.5%     | 0.5%    |             |             |             |                    |
| <b>Education (%)</b>   |        |              |                    |        |         | 0.0%     | 0.0%    |             |             |             |                    |
| <b>Gambling (%)</b>  |        |              |                    |        |         | 0.1%     | -0.8%   |             |             |             |                    |
| <b>Weapons (%)</b>   |        |              |                    |        |         | 0.2%     | -0.3%   |             |             |             |                    |
| <b>Fossil Fuel (%)</b>   |        |              |                    |        |         | -1.0%    | -5.4%   |             |             |             |                    |
| <b>Carbon and ESG KPIs</b>   |        |              |                    |        |         |          |         |             |             |             |                    |
| <b>Scope 1 + 2 Carbon Intensity</b>  |        |              |                    |        |         | 36%      | 83%     |             |             |             |                    |
| <b>Scope 3 - Upstream Carbon Intensity</b>                                 |        |              |                    |        |         | 3%       | 26%     |             |             |             |                    |
| <b>Scope 3 - Downstream Carbon Intensity</b>                               |        |              |                    |        |         | 1%       | 59%     |             |             |             |                    |
| <b>All Scope Carbon Intensity</b>  |        |              |                    |        |         | 8%       | 55%     |             |             |             |                    |
| <b>Fresh water withdrawal Intensity</b>                                    |        |              |                    |        |         | -        | 310.1%  |             |             |             |                    |
| <b>Female Rep. 30% of Directors (%)</b>                                    |        |              |                    |        |         | 6.2%     | 5.6%    |             |             |             |                    |
| <b>Stakeholder concerns/controversial holdings</b>                         |        |              |                    |        |         |          |         |             |             |             |                    |
| <b>MSCI measurement</b>  |        |              |                    |        |         | -        | -       |             |             |             |                    |
| <b>Count of companies on the Global Focus List</b>                         |        |              |                    |        |         | 5        | 6       |             |             |             |                    |
| <b>Proportion of portfolio invested in Global Focus List</b>               |        |              |                    |        |         | 1.6%     | 1.2%    |             |             |             |                    |
| <b>Count of companies involved in recent controversies</b>                 |        |              |                    |        |         | 19       | 16      |             |             |             |                    |
| <b>Proportion of portfolio invested in companies recent controversies</b>  |        |              |                    |        |         | 8.9%     | 8.2%    |             |             |             |                    |
| <b>Count of companies on our exclusion list</b>                            |        |              |                    |        |         | 28       | 9       |             |             |             |                    |
| <b>Proportion of portfolio invested in companies on our exclusion list</b> |        |              |                    |        |         | 4.6%     | 1.1%    |             |             |             |                    |

9(2)(g)(i)?

- 4.9 However, many of these indices perform substantially better when considered alongside other dimensions of ESG such as on Carbon and ESG KPIs, exposure to more 'desirable' revenue streams, and to severe controversies.
- 4.10 Turning to backtests, which date back to 2014 for the longest data series available to us, we note that ESG Enhanced portfolios have been found to have a lower beta on the downside than on the upside. This suggests that we might want to prefer downside measures to consider risk like the Sortino rather than the Sharpe ratio.
- 4.11 Table 8 shows that the two MSCI indices under consideration have higher Sharpe ratios than the ACWI IMI, which mostly comes from the higher return over the period. Volatilities are roughly the same as the ACWI IMI. The two MSCI indices also exhibit the highest information ratios at acceptable tracking errors to the ACWI IMI.

**Table 8: Historical risk and return profiles (selected indices)**

| Metric                    | MSCI.PAB | MSCI.ESG.Focus | ACWI.IMI |
|---------------------------|----------|----------------|----------|
| Annualized Return         | 10.1500  | 9.9200         | 9.0000   |
| Annualized Std Dev        | 14.0200  | 14.1000        | 14.1600  |
| Annualized Sharpe (Rf=0%) | 0.7238   | 0.7034         | 0.6356   |

**Table 9: Historical tracking errors and information ration (selected indices)**

|                           | Solactive.PAB | MSCI.PAB | MSCI.ESG.Focus | SP.ESG | FTSE.TPI |
|---------------------------|---------------|----------|----------------|--------|----------|
| Annualised Tracking Error |               | 1.2000   | 0.9600         |        |          |
| Information Ratio         |               | 0.9633   | 0.9584         |        |          |

9(2)(i) / 9(2)(k)

**Table 10: Downside risk indicators (selected indices)<sup>5</sup>**

**Downside Risk**

These figures are using monthly returns.

|                              | MSCI.PAB | MSCI.ESG.Focus | ACWI.IMI | Solactive.PAB | SP.ESG | FTSE.TPI |
|------------------------------|----------|----------------|----------|---------------|--------|----------|
| Semi Deviation               | 0.0298   | 0.0300         | 0.0306   |               |        |          |
| Gain Deviation               | 0.0249   | 0.0249         | 0.0251   |               |        |          |
| Loss Deviation               | 0.0310   | 0.0312         | 0.0327   |               |        |          |
| Downside Deviation (MAR=10%) | 0.0295   | 0.0297         | 0.0306   |               |        |          |
| Downside Deviation (Rf=0%)   | 0.0258   | 0.0260         | 0.0269   |               |        |          |
| Downside Deviation (0%)      | 0.0258   | 0.0260         | 0.0269   |               |        |          |
| Maximum Drawdown             | 0.2305   | 0.2318         | 0.2493   |               |        |          |
| Historical VaR (95%)         | -0.0638  | -0.0618        | -0.0610  |               |        |          |
| Historical ES (95%)          | -0.0888  | -0.0908        | -0.0937  |               |        |          |
| Modified VaR (95%)           | -0.0606  | -0.0608        | -0.0631  |               |        |          |
| Modified ES (95%)            | -0.1008  | -0.1013        | -0.1110  |               |        |          |

<sup>5</sup> *Semi Deviation* is the standard deviation of returns over a time period only where returns were below the average return. *Gain Deviation* measures the deviation of negative returns. It is related to Downside Deviation, which uses investment minus benchmark to determine "loss" periods. *Loss Deviation* measures the deviation of negative returns. It is related to Downside Deviation, which uses investment minus benchmark to determine "loss" periods. *Downside deviation* is a measure of downside risk that focuses on returns that fall below a minimum threshold or minimum acceptable return (MAR).

4.12 The two MSCI indices have slightly lower maximum drawdowns than the ACWI IMI benchmark. They have comparable values-at-risk at the 95% level, but much better Sortino ratios. The overall level downside risk is better as per these (limited) historical backtests.

**Table 11: Downside risk ratios (selected indices)<sup>6</sup>**

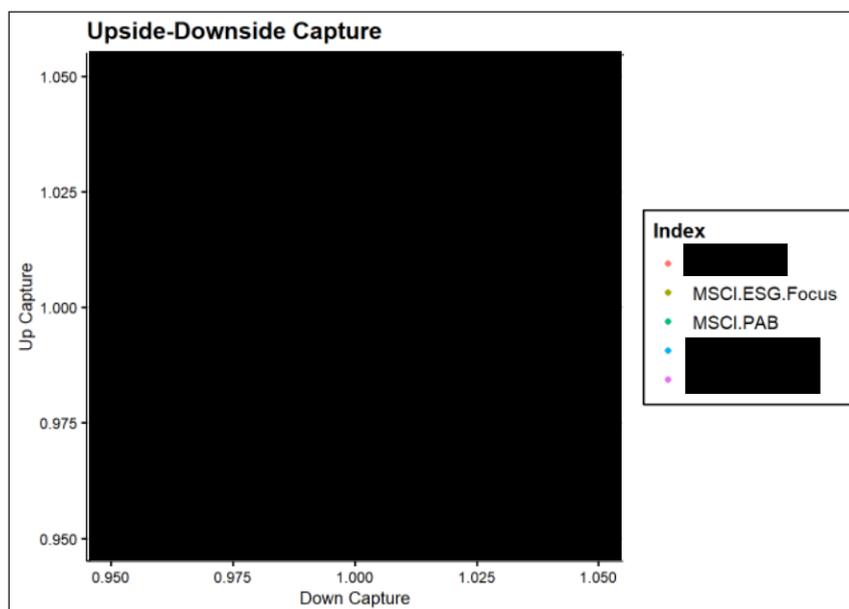
Downside Risk Ratios

|                          | MSCI.PAB | MSCI.ESG.Focus | ACWI.IMI | Solactive.PAB | SP.ESG | FTSE.TPI |
|--------------------------|----------|----------------|----------|---------------|--------|----------|
| Annualised downside risk | 0.0893   | 0.0900         | 0.0933   |               |        |          |
| Downside potential       | 0.0108   | 0.0110         | 0.0112   |               |        |          |
| Omega                    | 1.8391   | 1.8130         | 1.7322   |               |        |          |
| Sortino ratio            | 0.3525   | 0.3429         | 0.3048   |               |        |          |
| Upside potential         | 0.0199   | 0.0199         | 0.0194   |               |        |          |
| Upside potential ratio   | 0.6356   | 0.6690         | 0.5933   |               |        |          |
| Omega-sharpe ratio       | 0.8391   | 0.8130         | 0.7322   |               |        |          |

4.13 Figure 2 below summarises the information. As we would like to enhance upside capture and limit downside capture, indices that deliver on the upper left of the chart below perform best.

**Figure 2a: Upside-downside analysis (2014-2022)**

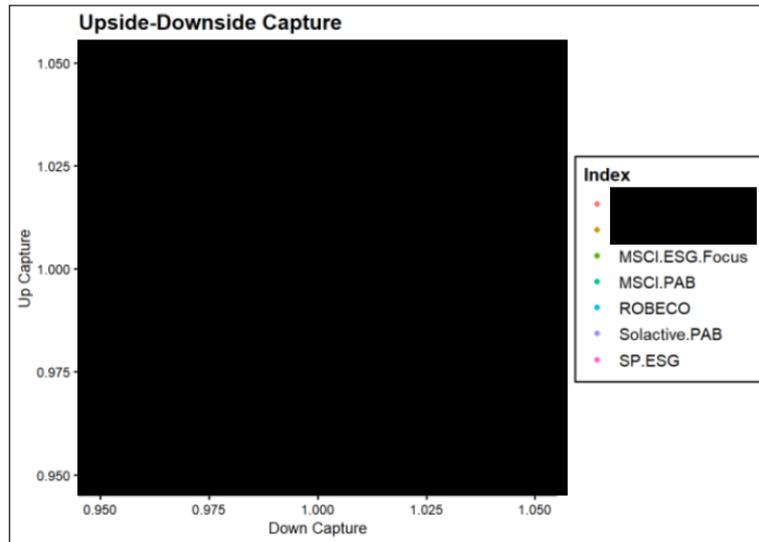
Upside-Downside Analysis



9(2)(i) / 9(2)(k)

<sup>6</sup> The *Omega ratio* is defined as the probability weighted ratio of gains versus losses for some threshold return target (0% here). Omega is calculated by creating a partition in the cumulative return distribution in order to create an area of losses and an area for gains relative to this threshold.

**Figure 2b: Upside-downside analysis (2017-2022)**

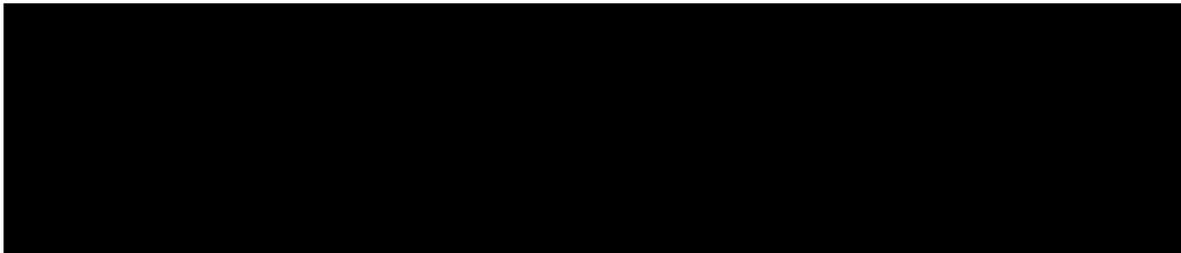


9(2)(i) / 9(2)(k)

**Conclusions**

4.14 Our overall conclusion on the basis of analysis of financial characteristics, ESG Profiles and backtests is that one of the two MSCI indices, the ESG Focus and the Paris Aligned are likely most suitable for our purpose.

4.15



9(2)(i) / 9(2)(k)

**New Zealand names**

4.16 The program board has requested information on the New Zealand (NZX 50) names held in our preferred solutions. Please see the table below.

| 31-MAR-2022               |                    |                |  |
|---------------------------|--------------------|----------------|--|
| Index weights             | MSCI Paris Aligned | MSCI ESG Focus |  |
| <b>New Zealand, Total</b> | <b>0.15</b>        |                |  |
| Chorus Limited            | --                 | --             |  |
| Contact Energy Limited    | --                 | --             |  |
| Fletcher Building Limited | --                 | --             |  |
| Mercury NZ Ltd.           | 0.07               | --             |  |
| Meridian Energy Limited   | 0.08               | --             |  |
| Spark New Zealand Limited | --                 | --             |  |

## **4 ESG Solutions and the Reference Portfolio**

- 5.1 In section 3 we set up a decision framework for the problem statement specified in 1.3(b), and in section 4 we identified preferred solutions to this problem. We now revisit the question of whether a solution is best housed in or out of the Reference Portfolio. The section presents only a summary of the context, background, views and findings. Readers are referred to [#3339472](#) which sets out the issues and [#3400582](#) for a fuller AA perspective.
- 5.2 The Investment Committee has previously considered this question. It has debated the multiple uses and interpretations of the Reference Portfolio over the years: as a sufficient portfolio capable of meeting the Fund's objectives over time; as an expression of the Board's risk appetite; as a benchmark for the performance of our actual portfolio; as a useful communications device.
- 5.3 Meanwhile, ESG Profile-motivated portfolio improvements have been linked to our mandate as follows: it is increasingly seen as best practice; evidence shows it need not compromise risk-adjusted returns; and it better ensures we do not prejudice NZ's reputation as a responsible member of the world community.<sup>7</sup> Therefore, a central question is raised on whether we bake ESG adjustments into the Reference Portfolio (as we have done with CCIS-Reduce and RI category exclusions<sup>8</sup>) or whether the future passive portfolio consistent with improved ESG should sit outside the Reference Portfolio, with agreement on the treatment of active risk/tracking error so generated.
- 5.1 The IC eventually reached the conclusion that our interpretation of our mandate has, and will likely continue to, evolve over time. This means that if we require the Reference Portfolio to meet our mandate, then the Reference Portfolio will also evolve and become more complex over time. This was viewed as being undesirable as it will force us to abandon the key design principle that the Reference Portfolio be 'simple'. On that basis, the IC's preference was (a) to keep ESG Profile-related changes simple—in line with Reference Portfolio design principles, thereby favouring an index solution; and (b) to house the solution outside the Reference Portfolio.
- 5.2 The Board agrees with the IC's preference for simplicity. It will be useful to explicitly receive Board guidance on the matter of the sufficiency of the Reference Portfolio. More immediately, the Board has also indicated a greater willingness for substituting an ESG solution into the Reference Portfolio. To that end, the Board has requested additional analysis on the suitability, usability and practicality of an ESG solution as a Reference Portfolio benchmark. We now turn to these.

### Design principles

- 5.3 The RP is underpinned by a number of key design principles:
- *A simple, low-cost portfolio that could be implemented passively.*
  - *Diversified.* We achieve this by using broad indices to represent asset classes. \
  - *Appropriate in risk and return terms for the Fund, given its purpose and mandate, and taking the Fund's endowments and relevant beliefs into account.*
  - *Relevant to a NZ-based investor; and*

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<sup>7</sup> It may also be useful to recall that the motivations for improving the Fund's ESG Profile do not include an expectation of excess return.

<sup>8</sup> Board decisions regarding mandate-driven RI exclusion categories in RP based on "avoid prejudice..." and carbon reduce targets in RP based on "...undue risk" of climate change.

- An *equilibrium* construct. That is, we take a very long-term perspective where investors are appropriately compensated for the systematic risk they bear.
- 5.4 Of these, the preferred ESG indices have been evaluated to conform with most of the design principles with crucial limiting exceptions as follows:
- *Appropriateness in risk and return.* The long histories for traditional asset classes and indices noted above are important inputs into the model used to simulate the portfolio's performance over the long-run, which helps inform the Board's decision of the appropriate level of risk and returns for the Fund. The Board may not be able to decide on the appropriate asset allocation and currency hedging with the same level of confidence using an ESG-adjusted equity index.
  - *Simplicity.* ESG indices are constructed by selecting constituents of a market capitalisation weighted index through an optimisation process that aims to maximise a specified ESG objective under certain constraints and exclusion criteria. Adding an ESG index to the RP would introduce more complexity into the benchmark, which would come at the cost of reduced understanding and transparency.
- 5.5 We highlight two other design principles where conclusions are more circumspect.
- *Diversification.*
    - (i) The AA perspective is as follows: An ESG index may very well be as diversified as our existing passive equity index (as shown above), but the short history naturally reduces confidence. Also, previous work in 2016 has shown that concentrated portfolios are not able to replicate the existing reference portfolio passive equities well.<sup>9</sup>
    - (ii) Against this, and as previously discussed at the IC, we note that the previous research in 2016 on this topic was focused on addressing a different question: the use of a concentrated portfolio to implement the Fund's passive allocation.
    - (iii) We ultimately decided not to do so for the following reasons: concentrated portfolios generated tracking error (from 100bp for a 200 constituent portfolio to 30 bp for a 1000 constituent portfolio), were less efficient per unit of risk, one-off transaction costs were high, securities lending revenues were lost. Meanwhile, the benefits were framed only in terms of custody costs, and potential FTE savings in the RI team from reduced administrative burden.
    - (iv) Following discussions with the Board over 2021 and then the approval of Sustainable Finance, the context is very different, and so is the question. The context is defined by an evolving view of global best practice, the changing regulatory and legal landscape, and several other things. The question has changed to evaluating whether we can deliver on our beta goals and also achieve improvements in our ESG profiles. Further: our understanding of what constitutes the benefit from a narrower portfolio and the RI and Comms burden of a large portfolio etc. has expanded dramatically. With all of this in mind, we are solving for a different problem, with different motivations, and a different context in 2022 vs 2016/17, so decision-makers may or may not wish to treat the two situations, questions and contexts similarly.
  - *Low-cost.* We are waiting for confirmation from MSCI on the cost of the indices under consideration. [REDACTED]

<sup>9</sup> See # [2201750](#).

Index choice

- 5.6 It is necessary to choose specific benchmark indices to represent and operationalise the Reference Portfolio. When choosing between the available indices, we believe that there are five key desirable characteristics that should be considered:
- Objective selection criteria
  - Representativeness
  - Relevance
  - Investability
  - Acceptance by investors.<sup>10</sup>
- 5.7 The MSCI indexes under consideration have well-defined rules that are published and subject to a transparent governance structure. This ensures that we have a good understanding of the construction methodology, that we can trust it to be consistently constructed through time and that it can be independently replicated. Importantly, these indexes should not create any issues with our ability to complete the portfolio partly synthetically. With respect to acceptance, the MSCI ESG indexes appear to be well-recognised and widely accepted by market participants.

Future Reference Portfolio reviews

- 5.8 Replacing our passive equity benchmark index with an ESG index would result in issues and challenges for future reference portfolio reviews. This stems from lower-confidence equilibrium assumptions (as a result of shorter available histories), and less reliable model inputs, calibrated features and outputs. Further, proxy calculations (which rely on 10-year histories of index earnings) and, in turn, the construction of hurdles for active investments will be less reliable.

Conclusion

- 5.9 Analysis from Asset Allocation concludes that ESG indices, in general, satisfy desirable characteristics. Where they fall short is with respect to certain design principles that define the idea of a Reference Portfolio itself. When coupled with the reduced histories available for these indices, the upshot is that one has lower confidence in important decisions relating to asset allocation and risk appetite.

## **5 Implementation considerations**

- 6.1 We have showcased the ESG Profile problem widely across the Guardians, including with investment operations, portfolio risk, enterprise risk, data technology, and the NIGEL group. All groups have indicated that an index solution to the ESG Profile problem is not likely to present significant issues for their business units or functional areas. Documents, records and processes will need to be updated, custodian informed and arrangements double-checked, manager benchmarks re-considered, and so on. Heads of these various teams are of the view such changes are procedural rather than wholesale, and can be reasonably accomplished over 3 to 6 months given current resourcing. They also note that MSCI solutions are easier to implement with an incumbency advantage.
- 6.2 Portfolio Completion offer four additional implementation-related considerations:
- **Cost.** A benchmark index that has wide market adoption will increase the number of market participants and counterparties we could rely on to price swaps on the

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<sup>10</sup> See definitions in #3400582.

index, therefore creating pricing tension and lowering financing costs. A liquid derivatives market would help facilitate the speed, operational complexity and cost of replication.

- *Adoption.* Wide market adoption of the chosen index will help facilitate derivative market liquidity and expand the set of participants with whom we can trade. Using a recognised index provider such as MSCI will help with market acceptance. Portfolio Completion feel Guardians have an obligation to improve and influence market adoption through our use of these indices.
- *Construction.* A recognised index provider which has clear and accepted construction rules will enable external managers of equities to replicate and manage a mandated portfolio. The ability to slice the index into market segments (Large Cap, Midcap and Emerging Markets) and also in regions (Americas, EMEA and Asia Pacific) creates flexibility to either internalise or externalise implementation of specific segments of our portfolio.
- *NZSF exclusions.* The fewer in house exclusions we need to implement by a short exclusion swap overlay, the less tracking error, complexity and cost we incur.

6.3 The MSCI ACWI Climate Paris Aligned and the MSCI ACWI ESG Focus indices satisfy the majority of the above considerations.

6.4 Adoption and market acceptance is currently the biggest hurdle with very few market participants currently using these indices as a benchmark. This means there is no liquid derivative market, impacting the speed and ease of equitizing our portfolio. However it is our belief after discussions with counterparties, peers and clearing participants that the adoption of ESG indices is a fast growing space. This is evidenced by the CME recently listing MSCI ACWI Climate Paris Aligned Index Futures and Options on its exchange and NZSF can also help facilitate liquidity by being an active participant. 9(2)(j)

6.5 In terms of choosing between the two indices, it appears that US banks and market participants generally prefer and offer greater product coverage linked to the Paris Aligned index, whilst European participants appear to favour the ESG Focus index. Given the dominance of US institutions in market-making, this might lead to a preference for the Paris-Aligned index over the ESG Focus index. On the other hand, the higher number of exclusions required to implement the Paris Aligned index is likely to increase cost.

6.6

6.7 In summary, Portfolio Completion echoes the preference for an index solution, and believes that ESG Profile is important to Guardians' purpose such that most obvious difficulties and costs that are apparent at this stage can be managed. There are no deal-breakers.