NZ SUPER FUND CARBON FOOTPRINT 2017

The Guardians is committed to reducing exposure to carbon across the whole Fund. We define carbon exposure as a combination of our portfolio's current emissions (emissions intensity) and potential future emissions (reserves). By 2020, we expect to reduce the carbon emission intensity of the Fund by at least 20%, and its carbon reserves by at least 40%.

Our focus on reducing carbon exposure is one part of our overall climate change investment strategy. This strategy also includes analysing investments for their exposure to risk from climate change, engaging with companies on their climate change strategies, and searching for new investment opportunities that arise from climate change and related policy responses.

This footprint report quantifies the Fund's carbon exposure as at 30 June 2017. This is the first measurement tracking our progress towards our 2020 carbon reduction targets. Our first action has been to reduce the carbon exposure of our physical passive global equities portfolio and these changes, in so far as they were completed by 30 June 2017, are included in this report. In calculating the carbon footprint, we have also estimated the carbon intensity of all remaining assets in the Fund, giving an overall carbon footprint for the whole portfolio.

Following our June 2017 transition to our new, lower-carbon[1] passive global equity portfolio, the carbon footprint of the Fund is:

- an estimated 19.6% lower as measured by emissions intensity; and
- 21.5% lower as measured by potential emissions from reserves

compared to if the carbon reduction changes had not been made.

We will report on the Fund's footprint annually in order to track our progress. The climate change strategy is a long-term one and while there may be volatility in the footprint from year to year, it is most important to focus on longer-term trends in the footprint relative to our targets.

The carbon footprint resulting from the new approach, relative to our targets, is set out in Table 1 below. Box 1 and 2 in this document outline our carbon reduction methodology and the main metrics used for the calculations respectively. We measure the improvement in the Fund's footprint against what we would have owned if we had not implemented the carbon reductions to the passive global equity portfolio – i.e. the unadjusted Reference Portfolio.

[1] https://www.nzsuperfund.co.nz/news-media

2017 Carbon Footprint of the NZ Super Fund

Table 1: Carbon Footprinting

	30 June 2015	30 June 2016	30 June 2017	30 June 2020 Targets
Target Footprint Metrics[2]				
	Emissions Intensity per $ of firms sales (tonnes of CO_2e[3]/$USm Sales)			
Unadjusted Reference Portfolio	253.6	251.1	246.7	
NZ Superfund[4]	-	-	198.3	
% Reduction			**-19.6%**	-20%
	Potential Emissions from Fossil Reserves per $ invested (tonnes CO_2e/NAV $USm)			
Unadjusted Reference Portfolio	3,458	3,141	2,760	
NZ Superfund	-	-	2,166	
% Reduction			**-21.5%**	-40%
Other Footprint Metrics				
	Emissions per $ of Fund's investment (tonnes of CO_2e /$USm)			
Unadjusted Reference Portfolio	134.2	132.2	126.7	
NZ Superfund	-	-	102.6	
% Reduction			**-19.0%**	

Box 1: Our reduction methodology – applied to passive physical global equities

We created a bespoke methodology for reducing our carbon exposure based on independent third-party data on carbon emissions and reserves provided by MSCI ESG Research. Our focus was on stocks with high carbon footprints without regard to sector. The methodology identifies stocks that exceed thresholds for either carbon intensity or for carbon reserves, and which are not considered to be standout performers. Specifically, stocks in the top quartile of MSCI ESG Research's "Carbon Emissions" score – reflecting less risk and better management than their peers with respect to climate issues have been retained in the portfolio. Stocks that were not in the top quartile have been eliminated from the portfolio one-by-one until we met specific reduction targets for the passive physical global equity portfolio. These targets were set at -70% carbon reserves and -50% carbon intensity compared to the unadjusted Reference Portfolio. This is the first step in meeting our whole of Fund targets which include active and unlisted assets.

We will continue to refine this methodology over time and will reapply it annually to the portfolio.

[2] Refer to box 2 on definitions of reported metrics
[3] Greenhouse gases are usually measured as a CO2 equivalent (CO_2e)
[4] NZ Superfund portfolio footprint includes active and passive listed physical equities, passive equity derivative exposures, bonds, and other unlisted assets.

Carbon Reduction Analysis

The application of our carbon reduction methodology has changed the composition and carbon footprint of the Fund's portfolio. The Fund's exposure to the worst emitters in high-emission sectors has been reduced, and the overall weight allocated to those sectors reduced, and capital has been reallocated across the remaining index constituents. Table 2 provides further detail on the effect of this shift on the Fund's *Actual Fund Equities*[5].

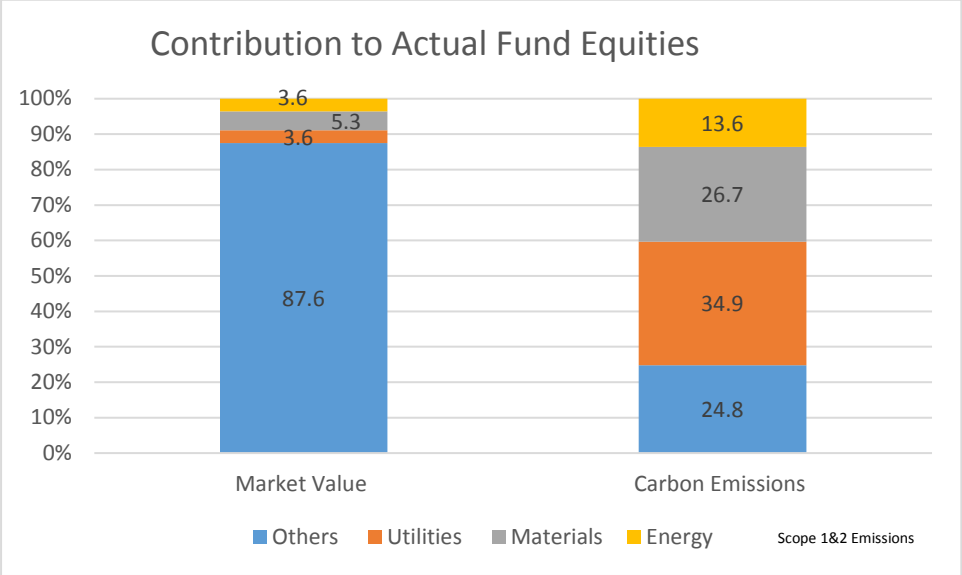
Table 2: Carbon Intensity by sector (June 30th 2017)[6]

	Unadjusted Reference Portfolio (Equities)		Actual Fund Equities			
	Portfolio Weight	Emissions Intensity	Portfolio Weight	Emissions Intensity	Change in sector Portfolio Weight	% Change in sector Emissions Intensity
Utilities	3.8%	2,030.5	3.6%	1,688.7	-0.2	-16.8
Materials	5.7%	862.1	5.3%	733.8	-0.4	-14.9
Energy	5.7%	454.6	3.6%	419.8	-2.1	-7.7
Industrials	11.8%	151.5	11.4%	152.4	-0.4	0.6
Consumer Staples	8.5%	60.3	8.0%	62.6	-0.5	3.8
Telecommunication Services	3.5%	52.2	3.7%	57.1	+0.2	9.4
Consumer Discretionary	12.2%	43.5	12.7%	44.0	+0.5	1.1
Information Technology	16.0%	41.6	17.3%	39.7	+1.3	-4.6
Health Care	11.3%	23.1	12.0%	22.7	+0.7	-1.7
Financials[7]	21.5%	21.5	22.5%	15.4	+1	-28.4

The carbon emission profile of the Fund remains heavily concentrated in a few sectors that make up a relatively small share of the Fund's assets. Three sectors – Utilities, Materials, and Energy account for 75% of the remaining Scope 1 and 2 carbon emissions, but represent only 12% of the value of the *Actual Fund Equities*.[8]

[5] Actual Fund Equities includes active and passive listed physical equities, and passive equity derivative exposures, which accounts for 71% of the Fund's holdings by asset value at 30 June 2017
[6] Source: MSCI ESG Research Carbon Portfolio Analytics 2017 (Scope 1 & 2 emissions)
[7] The Financials sector can include conglomerates that own other companies with emissions or reserves.
[8] Source: MSCI ESG Research Carbon Portfolio Analytics 2017

Chart 1: Sector carbon exposure (Scope 1&2 emissions) [9]



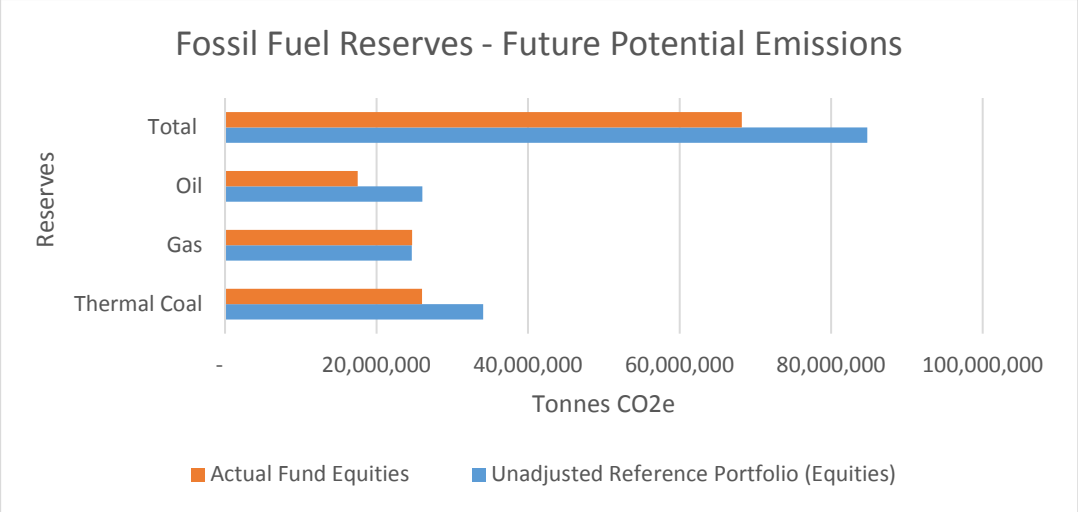
Within the Fund's holdings of NZ equities, we estimate the Fund's carbon intensity to be 177 tonnes CO_2e/$M sales, compared to the carbon intensity of the S&P/NZX50 index of 201 tonnes CO_2e/$M sales, a 12% reduction as at 30 June 2017.

Fossil Fuel Reserves – Future Potential Emissions

Potential emissions from fossil fuel reserves are mostly found in the energy sector. However, mining companies in the materials sector and utilities companies can also own reserves. The following chart splits out the Fund's fossil fuel reduction by reserve type for our *Actual Fund Equities* holdings.

Chart 2: Exposure to fossil fuel reserves by type [10]

[9] Source: MSCI Carbon Portfolio Analytics 2017
[10] Source: MSCI Carbon Portfolio Analytics 2017



BOX 2: Our Carbon Footprint Methodology

Measurement
We obtained MSCI ESG Research's footprint calculations for our Actual Fund Equities (this includes active and passive listed physical equities, and passive equity derivative exposures), which accounts for 71% of the Fund's holdings by asset value at 30 June 2017. Our equity derivative exposures were treated as equivalent in carbon-intensity as their underlying physical equities equivalents, even though there is not necessarily any underlying holding of physical equities.

The MSCI ESG Research data used covered 98% of our portfolio companies with a mixture of reported figures and model-based estimates. The MSCI ESG Research estimates have then been combined with internally-obtained carbon estimates of the Fund's private asset holdings. Where no estimates were available, the carbon intensity of private assets has been measured using equivalent listed market exposures. Our bond investments are considered to have no carbon footprint at this stage - in line with current industry practice.

Our equity positions taken as part of our strategic tilting program have been excluded from this analysis. These positions change frequently and, on average and over time, are not expected to change our net equity position.

Portfolio footprints have been reported in USD terms to facilitate easier comparison both over time and to other international funds.

Data and Definitions[11]
The carbon intensity data deals with the six greenhouse gases covered by the Kyoto Protocol, including carbon dioxide, methane, nitrous oxide, and three others. Greenhouse gases are usually measured as a CO2 equivalent (CO2e), and for simplicity in this paper we use the word 'carbon' to refer to all these greenhouse gases. See https://www.msci.com/www/research-paper/carbon-footprinting-101-a/0229050187 for formulas for carbon metrics.

Companies with higher carbon emissions are more at risk of regulatory measures, including carbon prices and taxes. We have followed the approach of measuring Scope 1 and Scope 2 emissions only.

Scope 1 emissions are the direct emissions from a company's own production. It includes emissions from combustion in the company's own boilers, furnaces and vehicles, as well as fugitive emissions.
Scope 2 emissions are the emissions from the production of electricity, heat or steam used by that company.
Scope 3 emissions are the indirect emissions from the production of goods and services purchased by that company. It includes the emissions of contractors and other outsourced activities, such as third party deliveries, business travel and the ultimate use of the product or service. Thus, it covers upstream and downstream emissions. We did not include scope 3 in our footprint calculations as scope 3 estimation methodology remains in its infancy.

Footprint Metrics Reported on[12]
Target Metrics:

[11] Source: MSCI ESG Research
[12] Source: MSCI ESG Research

Carbon Intensity: measured tonnes CO2e/$m sales = Tonnes of carbon emissions divided by $million of company sales. This measures the portfolio in terms of carbon emissions per unit of output and provides a measure of the overall efficiency of the portfolio by comparing emissions to the economic activity that produces them. This metric is robust to movements in market valuations.

Potential Emissions: measures tonnes CO2e/$m invested = Tonnes of carbon emissions divided by $million invested. This measures the carbon equivalent emissions stored in fossil fuel reserves that would be released if those reserves were produced and used in the future, relative to dollars invested. MSCI ESG Research calculates the potential emissions should all reserves be produced and burnt expressed as tonnes of CO2 equivalent using the Potsdam Institute methodology. This includes proved and probable reserves.

Other Metrics:
Carbon Emissions: measured tonnes CO2e/$m invested = Tonnes of carbon emissions divided by $million invested. This measures portfolio emissions normalized per million dollars invested. A widely used measure, provided to facilitate comparison across portfolios regardless of asset type or investment size.