NZSUPERFUND
Te Kaitiaki Tāhua Penihana
Kaumatua o Aotearoa

NZ SUPER FUND CARBON FOOTPRINT

INTRODUCTION

This report provides a carbon exposure overview of our global passive equity and New Zealand equity portfolio. It describes where the carbon exposure lies, including how concentrated it is in certain sectors. We also provide the carbon footprint of our NZ Equities Portfolio holdings. Carbon emissions exposure informs but does not give a complete picture of the portfolio's climate change risks. Even so, it is a necessary step in understanding risks and possible responses.

Companies with higher carbon emissions are more at risk of regulatory measures, including carbon prices and taxes. We measure the Scope 1 and Scope 2 emissions of the companies in the portfolio, and report on carbon emissions per dollar invested. We also outline fossil fuel reserves as a measure of potential future emissions.

PORTFOLIO CARBON FOOTPRINT

This section analyses the carbon emissions[1] and distribution of our passive global equities in more detail, as proxied by MSCI ACWI index.[2] The total carbon footprint of the MSCI index is 259 tonnes of CO_2 per million NZ dollars invested. The global passive equity portfolio[3] makes up the majority of our emissions exposure.

NZSF Equity Portfolio	% NAV	Carbon emissions (% of total)	Carbon Emissions per NZ$M invested	Sources and assumptions
Global Passive	56%	75%	259	MSCI analysis of MSCI ACWI constituent stocks.
NZ Equities	4.7%	5.5%	231	MSCI estimates, commissioned by NZSF

Our NZ equities portfolio is about 10% less carbon intensive than global equities. The lower carbon intensity is primarily due to our active investment decisions, including identification of long-term risks to sustainability such as climate change.[4]

[1] Carbon Footprint Metric invested (based on MSCI Carbon Analytics 22 June 2015): portfolio carbon emissions (Scope 1&2) tons of CO2e/NZ$M. We may utilise **alternative** or additional carbon metrics in the future. Normalised carbon emissions measures are useful for comparing between portfolios regardless of type or size. The NZ Equities Portfolio (30 June 2016) analysed by MSCI includes our active and passive holdings. Carbon metrics are based on both company reported data and MSCI estimated carbon emissions data. "Carbon emissions" include all greenhouse gases covered by the Greenhouse Gas Protocol and measured as a CO2 equivalent for reporting. See https://www.msci.com/www/research-paper/carbon-footprinting-101-a/0229050187 for formulas for carbon metrics.

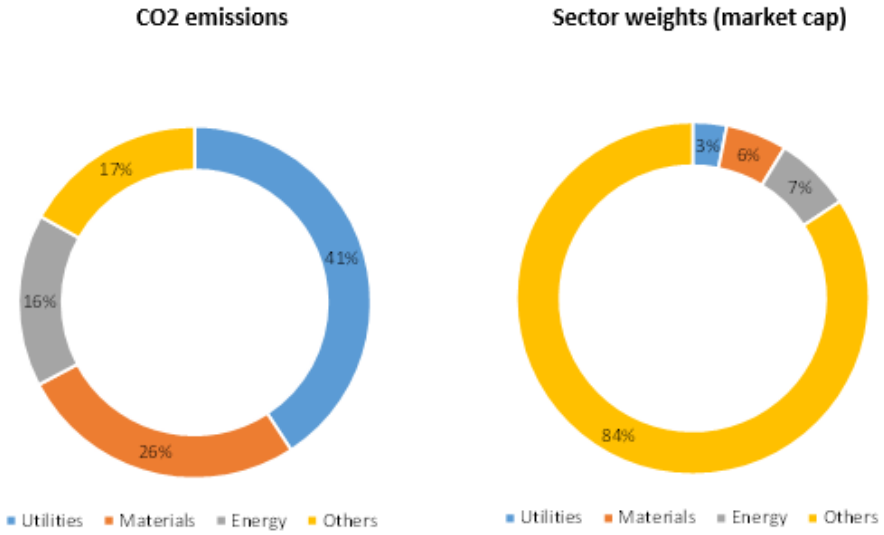
[2] The analysis here is based on the MSCI ACWI index weights rather than our actual holdings. We chose this approach for simplicity and because our passive portfolio is very close to the index weights. We chose the ACWI rather than the ACWI IMI (the latter includes small-cap companies) because full information for the IMI is not yet available and because we do not invest in emerging market small-caps (which, as a group, are likely to have a high emissions intensity). The main difference between our physical holdings and the index are tobacco stocks, which have a carbon intensity lower than the index.

[3] The portfolio is a mix of physical and synthetic exposures. For this exercise we treat the exposure as if it were all physical.

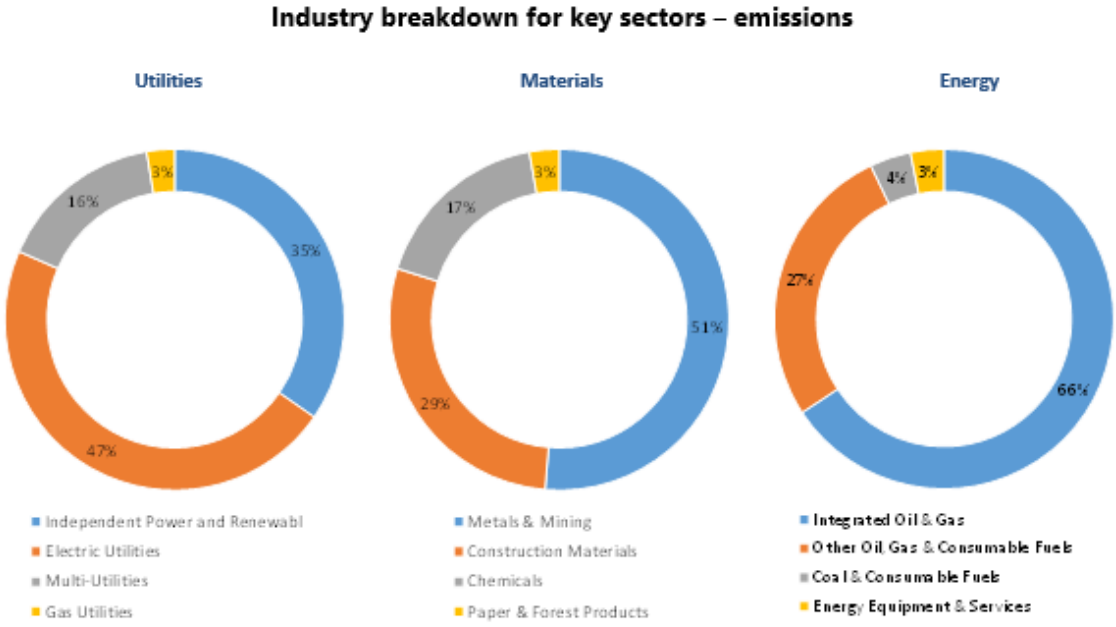
[4] We show intensity vs NZD invested; this could be affected by moves in the exchange rate through time, not just changes in emission intensity.

CONCENTRATION OF CARBON FOOTPRINT

Three sectors – Utilities, Materials, and Energy – account for 83% of Scope 1 and 2 carbon emissions, although they represent only 16% of the value of the equity portfolio.

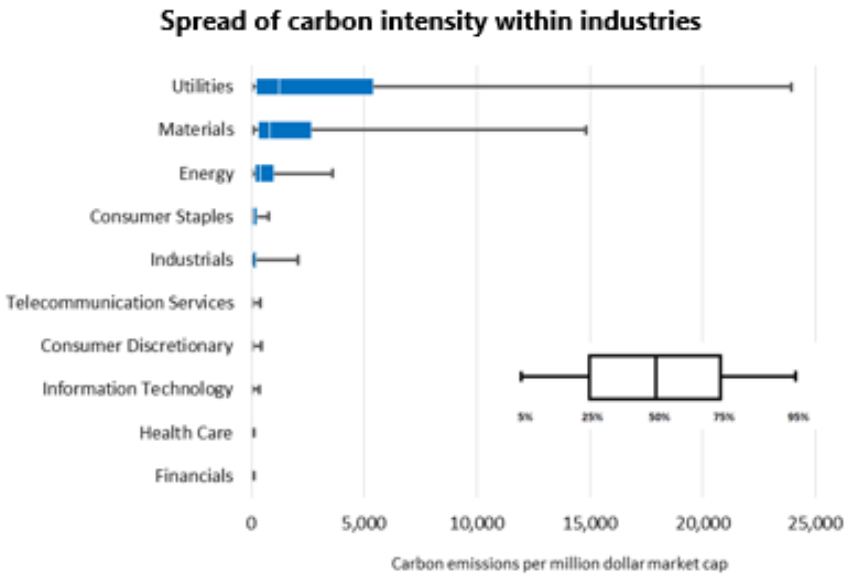


In the Utilities sector the emissions are concentrated in Electric Utilities and Independent Power plants. In Materials sector the emissions are concentrated in Metal and Mining and Construction Material companies. And in the Energy sector most of the emissions are from the Oil, Gas & Consumables sub-industry. Pure-play coal is small, as most coal is tied up in integrated companies or power utility companies.



Variation within sectors

Not only is there large variation across sectors, there are also large differences between companies within each sector. The Figure below shows the spread of carbon intensities in each of the major industries. Within utilities, for example, some companies have 15 times the emissions intensity as the median company in that sector.



Within the utilities sector, the biggest polluters tend to be coal users (especially brown coal), coal-to-oil plants and those with older, less efficient plants. Cement and steel have high carbon emissions in the materials sector, and includes mining which is energy intensive. Within the energy sector the differences are mainly due to fuel type and conventional versus unconventional sources. Targeting selected stocks within sectors to reduce exposure to carbon emissions is likely to be a more effective mechanism to address investment risk than targeting whole sectors.

It also helps guide an engagement strategy. The wide spread of performance shows it is important to engage the largest contributors with the greatest potential for change.

FOSSIL FUEL RESERVES – FUTURE POTENTIAL EMISSIONS[5]

So far the analysis has looked at the current rate of emissions. We also look at potential future emissions from burning fossil fuel reserves such as oil and coal. This gives us a broader picture of the risk of potential stranded assets.

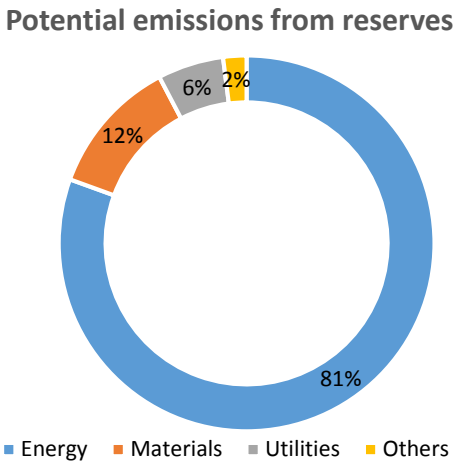
Potential emissions from reserves are generally more significant than current operational emissions in fossil fuel mining and production. Potential emissions from reserves are mostly

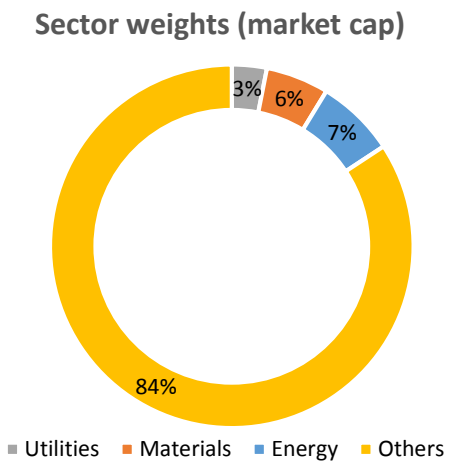
[5] MSCI calculates the potential emissions *should all* reserves be produced and burnt expressed as tons of CO2 equivalent using the Potsdam Institute methodology. The Greenhouse Gas Protocol has not yet finalised a methodology to measure potential emissions from reserves. MSCI ACWI calculation is normalised to tons CO2e/NZ$M invested.

(80%) found in the energy sector. However, mining companies in the materials sector and utilities companies can also own reserves.

Differences across companies depend on factors such as fuel type (coal vs oil or gas, conventional vs unconventional), company type (single purpose or diversified) and reserve type (1P vs 2P reserves).

NZSF Equity Portfolio	% NAV	Potential Carbon Emissons per NZ$M invested	Sources and assumptions
Global Passive (MSCI ACWI)	56%	6,357	MSCI analysis of MSCI ACWI constituent stocks.





CONCLUSION – NEXT STEPS

The carbon emissions of our global passive equity portfolio accounts for the majority of our carbon footprint across the whole portfolio. Our intial carbon footprinting exercise demonstrates that carbon measures provide a useful tool for analysing and managing climate change risk in the portfolio. Such metrics do not capture all sectors or companies facing significant risks to their business from climate change. Nevertheless, reducing the carbon footprint is an important element in reducing the portfolio's exposure to climate change investment risk.

Following this initial footprinting exercise, we will be testing the different carbon footprint metrics in more depth and determine the best method for reducing carbon risk in our portfolio and reporting on our carbon footprint over time.

Data and definitions

This paper 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 CO_2 equivalent, and for simplicity in this paper we use the word 'carbon' to refer to all these greenhouse gases.

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.

Fossil Fuel Reserves

1P Reserves = Proven Reserves are proven reserves (both proved developed reserves + proved un-developed reserves.

2P Reserves = Proved and Probable reserves (1P reserves + probable reserves)

Potential Emissions = carbon equivalent emissions stored in fossil fuel reserves that would be released if those reserves were produced and used in the future.

MSCI provides carbon data and carbon analytics for global equities. The underlying data is derived from a company's own reported bottom-up assessment, with some checking and cleaning to ensure consistency of definitions, and industry level modelling where companies do not report.