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In line with our [climate change investment strategy](#), the Guardians is reducing the NZ Super Fund's exposure to carbon. We define the Fund's carbon exposure as both current carbon emissions intensity (emissions intensity) and potential future carbon emissions from fossil fuel reserves (fossil fuel reserves).

Our short-term targets are to reduce the potential emissions from fossil fuel reserves held by the Fund by at least 80% and the carbon emission intensity of the Fund by at least 40%, by 2025. We first achieved these targets in 2020 and have made further carbon reductions in 2022. Notably, the Fund no longer has any material, long-term holdings of fossil fuel reserves.

As well as reducing the Fund's exposure to carbon, our [climate change investment 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.

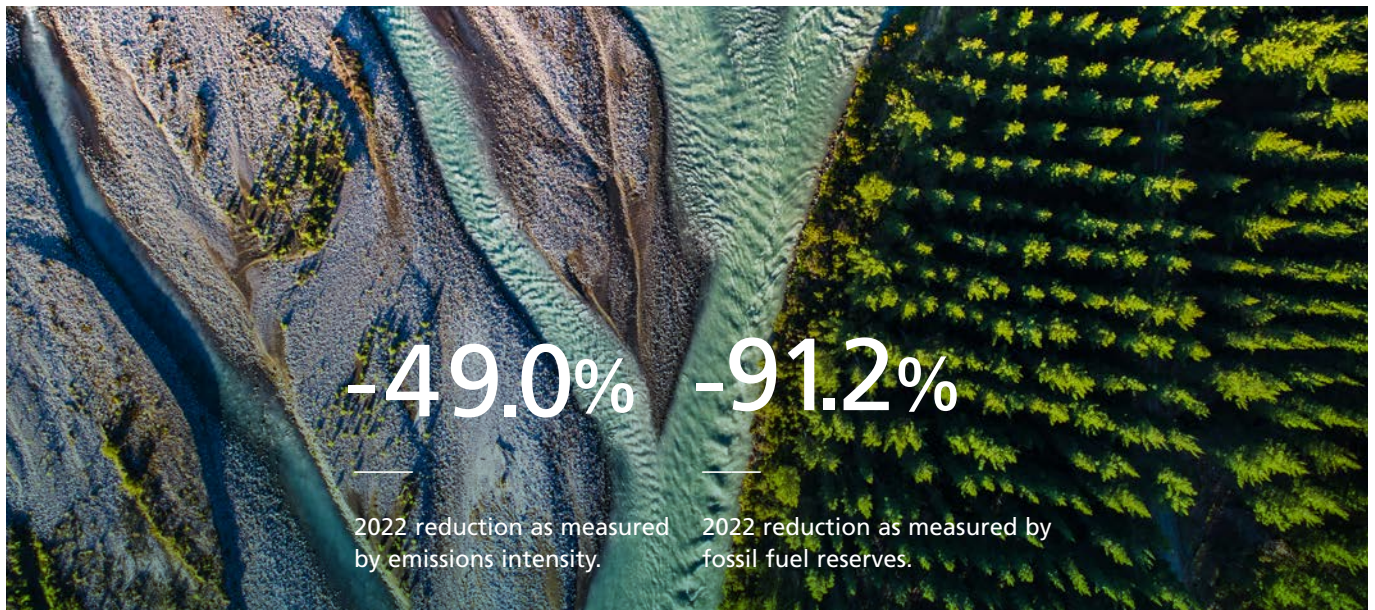
The data in this report, which has been assured by KPMG (refer to the assurance report for the full details), shows the carbon reductions we have achieved relative to our 2025 targets.

The Fund's 2022 carbon footprint is an estimated:

- -49.0% as measured by emissions intensity (target -40%); and
- -91.2% as measured by fossil fuel reserves (target -80%).

The percentage reductions are measured against the Fund's unadjusted [Reference Portfolio](#) as at 30 June 2022 (i.e. what the Fund would have owned if we hadn't implemented the carbon reductions).

We report on the Fund's carbon footprint annually in order to track our progress. The climate change strategy is a long-term one and there may be volatility in the footprint from year to year. It is the trend in the footprint relative to our targets over time that is most important.



This year, in order to provide comparable data with the other Crown Financial Institutions, we are providing the Fund’s reduction in carbon intensity and fossil fuel reserves relative to its 2019 (unadjusted) Reference Portfolio. We are using the 2019 unadjusted Reference Portfolio emissions because we do not have a measure of the Fund’s actual portfolio emissions prior to the implementation of our climate change investment strategy.

Table 1:
EMISSIONS INTENSITY AND FOSSIL FUEL RESERVES¹

	30th June 2019	30th June 2020	30th June 2021	30th June 2022
Target Footprint Metrics²				
	<i>Emissions Intensity per \$ of firms sales (tonnes of CO₂e³/\$USm Sales⁴)</i>			
Unadjusted Reference Portfolio	230.7	212.9	207.1	194.8
NZ Super Fund	131.8	127.6	109.5	99.4
% Reduction	-42.9%	-40.0%	-47.1%	-49.0%
	<i>Potential Emissions from Fossil Fuel Reserves per \$ invested (tonnes CO₂e/NAV⁵ \$USm)</i>			
Unadjusted Reference Portfolio	2,740	2,324	1,663	1,524
NZ Super Fund	1,319	233	106	134
% Reduction	-51.9%	-90.0%	-93.6%	-91.2%

¹ NZ Super Fund portfolio footprint includes active and passive listed physical equities, passive equity derivative exposures, and other unlisted assets. Further details provided in Box 2.

² Refer to Box 2 on definitions of reported metrics.

³ 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.

⁴ For the sake of clarity, we use the exchange rates as of 30 June 2022 rather than a twelve month average to convert currencies.

⁵ Net Asset Value (NAV) (including NAV of nil positions).

Table 2:

2022 EMISSIONS INTENSITY AND FOSSIL FUEL RESERVES REDUCTIONS RELATIVE 2019⁶

	Emissions Intensity per \$ of firms sales (tonnes of CO ₂ e ⁷ /\$USm Sales ⁸)
Unadjusted Reference Portfolio in 2019	230.7
NZ Super Fund's current emissions	99.4
% Reduction	-56.9%

	Potential Emissions from Fossil Fuel Reserves per \$ invested (tonnes CO ₂ e/NAV ⁹ \$USm)
Unadjusted Reference Portfolio in 2019	2,740
NZ Super Fund	134
% Reduction	-95.1%

The methodology we have used in order to reduce the Fund's carbon footprint is set out below in Box 1. Box 2 outlines the main metrics used for the calculations.

Box 1:

OUR REDUCTION METHODOLOGY – APPLIED TO PASSIVE PHYSICAL LISTED GLOBAL EQUITIES

In 2017 we created a bespoke methodology for reducing the carbon exposure of the Fund's listed portfolio based on independent third-party data on emissions intensity and fossil fuel 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 emissions intensity and stocks with fossil fuel reserves.

Emissions Intensity

Stocks with high emissions intensity that were in the top quartile of MSCI ESG Research's "Carbon Emissions" score – reflecting less risk due to better management than their peers with respect to climate issues – are retained in the Fund's portfolio. Stocks that were not in the top quartile have been eliminated from the portfolio one-by-one until a 50% reduction for the passive physical global equity portfolio has been achieved.

⁶ NZ Super Fund portfolio footprint includes active and passive listed physical equities, passive equity derivative exposures, and other unlisted assets. Further details provided in Box 2.

⁷ 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.

⁸ For the sake of clarity, we use the exchange rates as of 30 June 2022 rather than a twelve month average to convert currencies.

⁹ Net Asset Value (NAV) (including NAV of nil positions).

Box 1:

OUR REDUCTION METHODOLOGY – APPLIED TO PASSIVE PHYSICAL LISTED GLOBAL EQUITIES – *Continued*

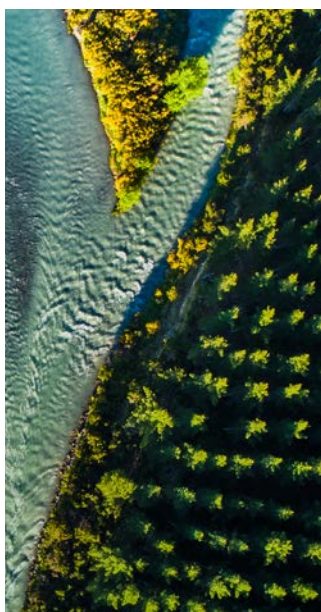
Fossil Fuel Reserves

This year we aimed for a 100% reduction in fossil fuel reserves within the Fund's global listed equity portfolio in order to exceed our Fund-wide target of an 80% reduction in reserves. We therefore removed holdings in all listed companies with fossil fuel reserves from the Fund's portfolio. For a fuller explanation of these changes please refer to the 2022 Climate Change Report.

Note: during the year we made the decision to shift to a Paris-Aligned Benchmark for the global equity component of our Reference Portfolio, effective 1 July 2022. This transition away from our bespoke methodology was underway, but not complete, as at 30 June 2022. For further information, please refer to the 2022 Climate Change Report.

Box 2:

THE FUND'S APPROACH TO CARBON FOOTPRINTING¹⁰



Listed Portfolio

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 52.1% of the Fund's holdings by asset value at 30 June 2022. Our equity derivative exposures were treated as equivalent in emissions intensity and fossil fuel reserves 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 99.1% of our listed equity holdings (by market value). MSCI is able to collect reported footprints for 89.4% (by market value) of the portfolio. Model-based estimates are used to calculate the emissions for 9.7% of the portfolio (by market value).

Treatment of Short Positions

We use the approach referred to as the Carbon Net Financial Exposure Approach to the short portfolios in the [IIGCC consultation](#) on derivatives whereby the emissions and reserves from the long and short portfolios are net off to show portfolio exposure to carbon net financial risk. We are continuing to monitor how best practice is evolving and may change our approach in the future.

Unlisted Portfolio

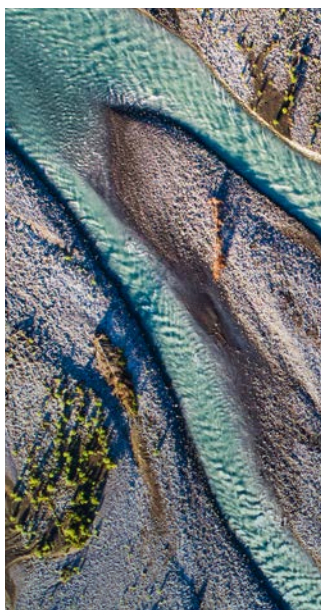
Where carbon data is available, we obtain information directly from our external managers or asset operators. This year we were able to collect data from Fidelity Life, Kaingaroa Timberlands, FarmRight, Palgrove, Asia Pacific Healthcare Group, Pioneer, Fertility Associates, BlueLab, Retire Australia, Horizon Roads, Kiwi Group Holdings (Kiwibank and Kiwiwealth), Altogether Group, Longroad, Galileo, Rubicon, KKR EIGF and KKR Flexible Mandate. These companies represent 10.9% of the Fund's holdings by asset value.

For our other forestry assets (0.7% of the Fund's holding by asset value), we proxy these based on Kaingaroa Timberland's emission profile.

¹⁰ Note that the data from MSCI and external data providers does not necessarily align to 30 June 2022 as they both use only data that is available to them at the time of the request by us.

Box 2:

THE FUND'S APPROACH TO CARBON FOOTPRINTING – Continued



For the remaining unlisted assets where no data was available (8.0% of the Fund), the emissions intensity and fossil fuel reserves have been proxied based on the general sector of activity of the asset as referenced in the Global Industry Classification Standard (GICS). MSCI provides carbon data on these sectors.

When a holding is invested in multiple assets or when the underlying assets are not known, we proxy it against the overall average emissions intensity and fossil fuel reserves.

For the purpose of risk matching, we determine the ratio of each investment to fund with equity (with the balance being funded from fixed income and cash). This calculation is performed by the Asset Allocation team. We assume that this split between equity and other assets remains the same for the purpose of attributing fossil fuel reserves, emissions and revenue.

Assets excluded or assumed to have nil emissions

Our bond investments make up approximately 11.8% of the portfolio and are considered to have no carbon footprint (and no revenue) assigned based on the market cap approach to allocating emissions. This is based on the Market Capitalisation approach where emissions are allocated based on equity ownership which is one of the approaches set out in [TCFD guidance](#). In this approach, bonds are not allocated fossil fuel reserves, emissions and revenue as there is no equity ownership.

Our equity positions taken as part of our [strategic tilting program](#) and other market neutral strategies, as well as life settlements, natural catastrophe insurance, active collateral, and 5G spectrum (16.5% of the Fund in total) have been excluded from this analysis for the purpose of calculating carbon intensity (and they are treated as having zero fossil fuel reserves for the purposes of our fossil fuel reserve calculation – see the Fossil Fuel Reserve Calculation section for further details).

Calculation

Total portfolio footprinting is a combination of our listed portfolio emissions (calculated by MSCI), obtained carbon data, and proxy-based estimates.

Data and Definitions

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.

We have followed the approach of measuring Scope 1 and Scope 2 emissions in our footprint.

Scope 1 emissions are the direct emissions from a company's own production or controlled by the company. 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 (including the transmission and distribution losses associated with some purchased entities).

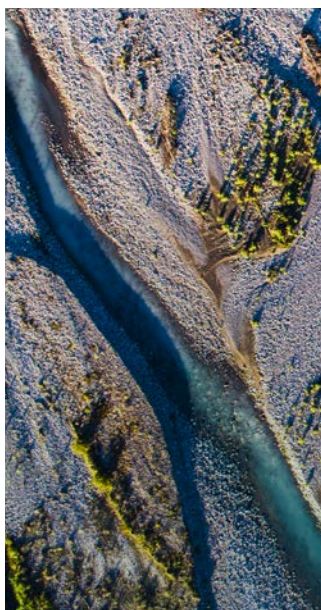
Scope 3 emissions are the indirect emissions from the production of goods and services purchased by that company or other indirect emissions that occur from sources not owned or controlled by the company. It includes the emissions of contractors and other outsourced activities, such as third party deliveries, 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 other than for fossil fuel reserves (see below) as scope 3 estimation methodology is still developing¹¹.

MSCI has used the Greenhouse Gas Protocol as the basis of their footprinting calculations <https://ghgprotocol.org/>.

¹¹ Source: MSCI ESG Research.

Box 2:

THE FUND'S APPROACH TO CARBON FOOTPRINTING – *Continued*



Footprint Target Metrics Reported:¹²

Emissions 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 not as impacted by shifts in market valuations as approaches that measure emissions per dollar invested. The emissions/sales of listed equities is derived from MSCI.

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 fossil fuel reserves were produced and used in the future, relative to dollars invested. Fossil fuel reserves include thermal coal, gas and oil. MSCI ESG Research calculates the potential emissions should all fossil fuel reserves be produced and burnt expressed as tonnes of CO₂ equivalent using the Potsdam Institute methodology. This includes proved and probable fossil fuel reserves.

Fossil Fuel Reserves Calculations

For listed holdings, fossil fuel reserves data is received from MSCI. Given our knowledge of the unlisted assets that report on their footprint, we assume that they own no fossil fuel reserves, except for KKR Shale¹³). For KKR Shale, we estimated the fossil fuel reserves by calculating the potential emissions from fossil fuel reserves per \$m invested for the GICS Energy Sector using underlying holdings carbon data from MSCI, and applying this ratio to the KKR asset.

For assets with proxy-based estimates, we assumed that a company has no fossil fuel reserves unless it is proxied against the Overall category rather than a specific category (because we have deeper knowledge of these investments). This in the latter case, fossil fuel reserves are proxied using the average fossil fuel reserves for our unadjusted Reference Portfolio, which was calculated by MSCI. We also treat life settlements, natural catastrophe insurance, active collateral, and 5G spectre, as having no fossil fuel reserves.

For our market neutral strategies, we assume that our fossil fuel reserves holdings are zero, as we expect our long term exposure to these assets to be neutral over the long run.

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

¹² Source: MSCI ESG Research.

¹³ Note: this investment is not considered financially material to the Fund and is in wind-down.