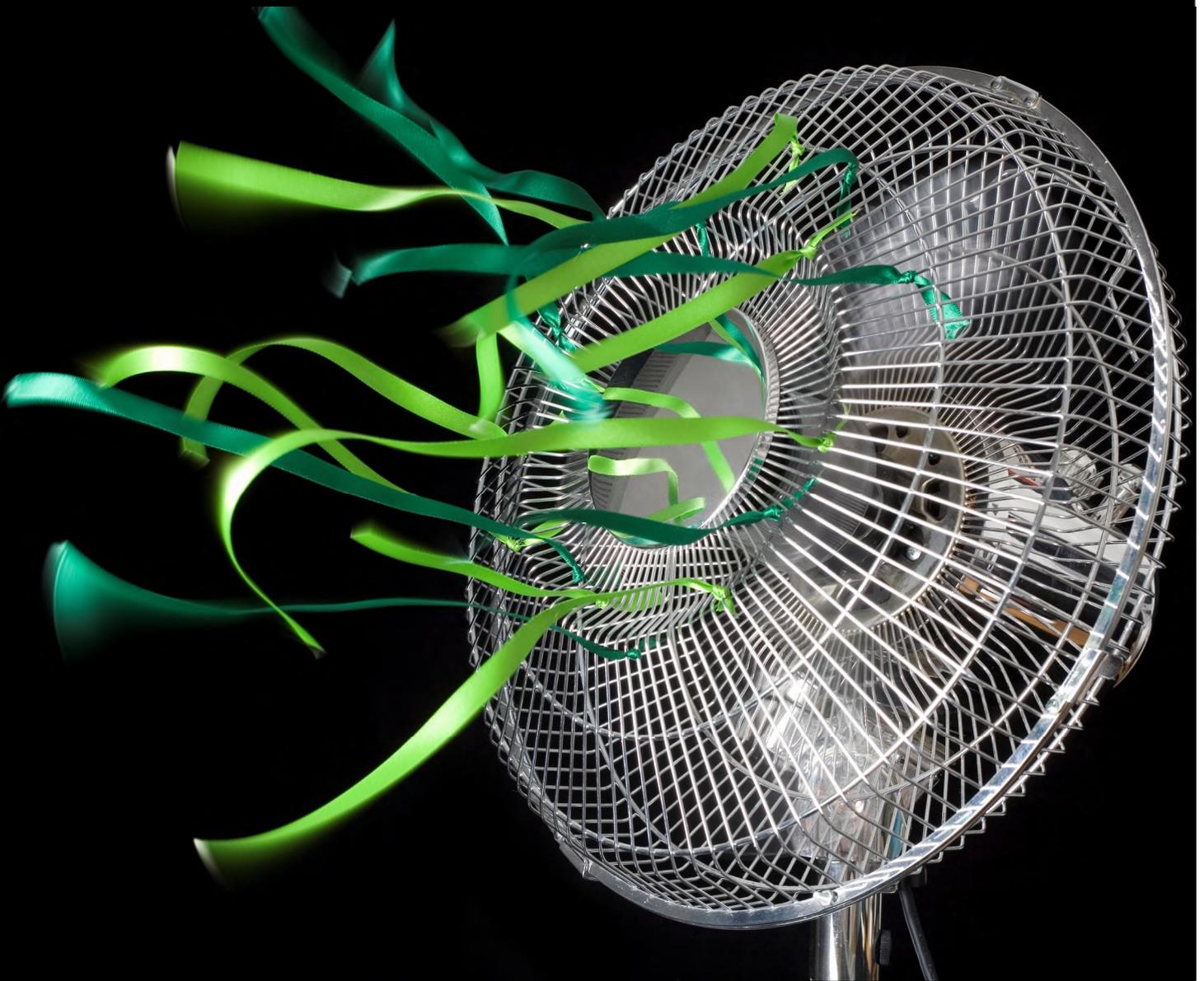


Portfolio carbon footprint: A low carbon solution



Our objective is to help investors align portfolios with the transition to a low carbon economy without changing the return profile or introducing unintentional risks.

EXECUTIVE SUMMARY

In this document, we explain our investment process for our decarbonisation strategy through which investors can manage the potential investment implications of a transition to a low carbon economy, without introducing significant investment risk. This solution also avoids some of the pitfalls prevalent in existing strategies and will continue to evolve as the nascent carbon management sector develops.

Going beyond reduction of carbon footprint alone, the portfolio is designed to have both a higher aggregate Environmental, Social and Governance (ESG) score as well as higher exposure to renewables relative to the benchmark. In doing so, the solution tilts a global equity portfolio away from those companies with the greatest exposure to carbon related risks and towards those companies expected to contribute to, and benefit from, the energy transition.

Strategy overview

Launched in 2015, the objective of the Russell Investments Decarbonisation strategy is to reduce the carbon exposure of a universe by a specified percentage while minimising the active risk. Specifically, the strategy achieves a 50% reduction in relative carbon footprint and 50% reduction in the carbon reserves while targeting a tracking error of less than 1%. A direct response to the initiatives outlined by the United Nations supported Principles for Responsible Investment (PRI), the strategy was designed as a means for investors to reduce the carbon footprint of their equity portfolios without dramatically changing the risk and return characteristics.

Garnering increased attention more recently is the potential for portfolios to be exposed to risk associated with the varying global responses to climate change. As a first step, measuring this risk has been encouraged through initiatives such as the development of the Montréal Carbon Pledge. Launched in 2014 by the Principles for Responsible Investment (PRI), it requires signatories to both measure and disclose the carbon footprint of either part or all of their equity portfolios. This attracted 120 signatories, representing over US\$10 trillion in assets under management¹.

Based on the insight gained from our research into decarbonisation strategies², we have developed a novel, rules-based solution which goes beyond simple exclusions of sectors or companies. It is designed to reduce exposure meaningfully to carbon-intensive holdings, but also to invest more in climate-resilient and renewable energy opportunities, without materially impacting performance. There are four primary inputs to our model: carbon footprint, carbon reserves, energy production and ESG scores.

“Our research has found that a standard decarbonisation approach can unintentionally lead to reduced exposure to renewable energy and a reduction in the aggregate ESG profile of a portfolio.**”**

¹ Source: montrealpledge.org; as at 15 August 2016

² “The Russell Investments Decarbonisation Strategy: Investigating different approaches to reducing the carbon footprint of an equity portfolio without materially impacting performance”, Sean Smith, Scott Bennett and Pradeep Velvadapu – April 2016

Investment approach and objectives

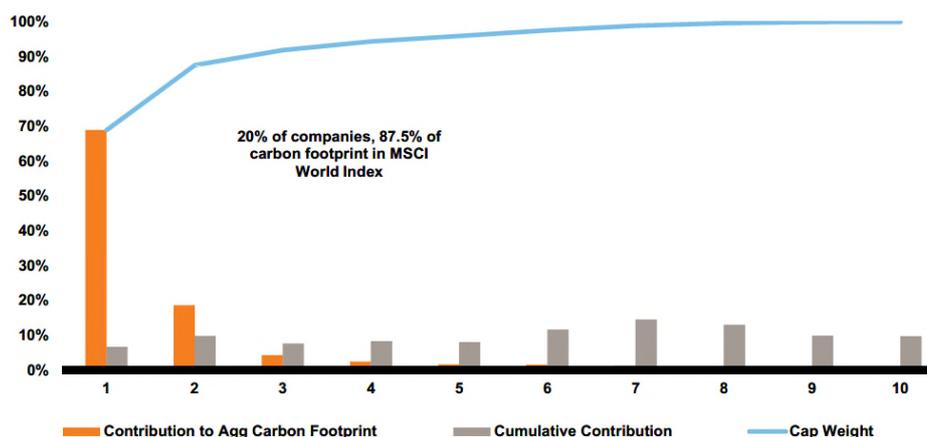
Our approach uses the market-cap benchmark as a starting point and incorporates the following objectives:

1. Reduce carbon footprint by at least 50%
2. Reduce exposure to carbon reserves by at least 50%
3. Exclude companies with more than 10% of revenue from coal-related activities (unless carbon capture and storage procedures are used)
4. Invest in companies expected to contribute positively to the transition to renewable ('green') energy sources
5. Ensure the aggregate portfolio has positive bias towards companies with high environmental, social and governance (ESG) characteristics
6. Maintain active risk of no more than 1%

1. Carbon footprint

We define the carbon intensity for each security in the portfolio in terms of greenhouse gas CO₂ emissions per million USD of revenue. In a global equity benchmark (MSCI World), approximately 20% of the securities account for 87.5% of the total portfolio's carbon footprint (see Figure 1). Also, 79% of the carbon intensity is concentrated in Energy, Materials and Utilities. These concentrations mean that simply targeting the highest carbon emitters can increase the tracking error risk significantly, relative to the original portfolio. However, we take this concentration as an advantage as we only need to tilt away from a small number of stocks to achieve a significant carbon footprint reduction.

Figure 1: The aggregate carbon footprint of the MSCI World by decile



Source: Russell Investments, MSCI as at Dec 31 2018.

2. Carbon reserves and stranded assets

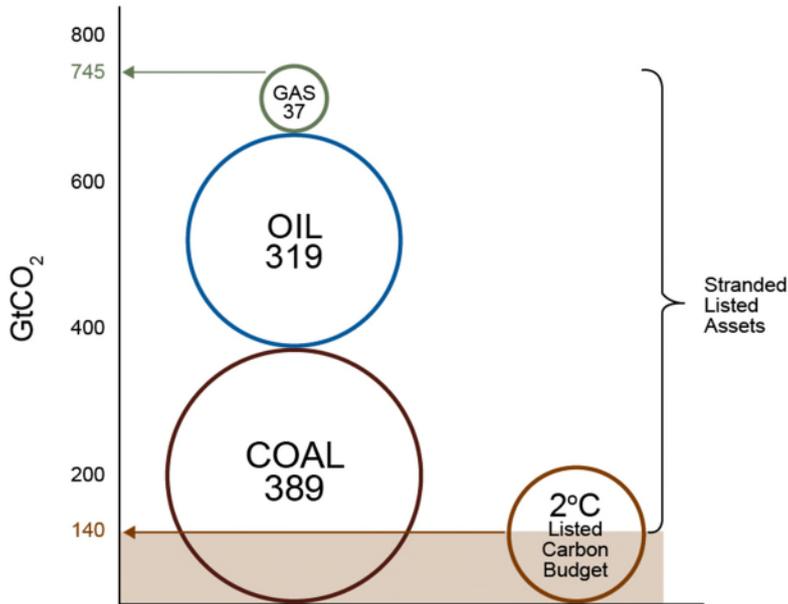
The strategy aims to achieve a 50% reduction in carbon reserves relative to the benchmark as one of its optimised tilts. Carbon reserves are often considered stranded assets.

Stranded assets are those which suffer unanticipated or premature write-offs on the balance sheet, downward valuations or may incur future liability (e.g. carbon tax). Assets may become stranded by one-off transformational shifts in valuation, or over time, as a result of appropriate risks not being analysed and priced into the anticipated future value of the assets.

In the case of carbon reserves, the concept of asset stranding first came to light in 2011 when Carbon Tracker released its 'Unburnable Carbon' report.³ The report developed the investment thesis that, should we wish to avoid catastrophic climate change, and thus limit global atmospheric temperature rise to 2°C, the majority (80%) of carbon reserves listed on global stock markets should not be burnt, leaving these fossil fuel reserve assets 'stranded'.

80% of the fossil fuel reserves owned by the top 100 listed coal and oil & gas companies are vulnerable to becoming stranded assets.

Figure 2: Carbon dioxide emissions potential of listed fossil fuel reserves



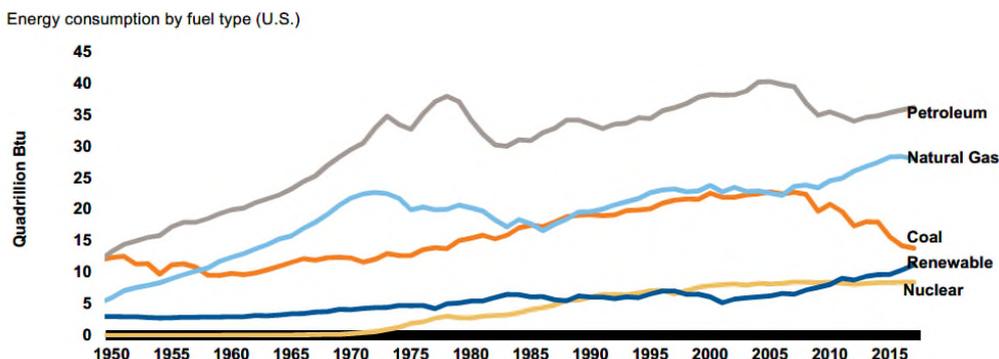
Source: The Carbon Tracker Initiative, <http://www.carbontracker.org/report/carbon-bubble/>

3. Coal exclusions

Coal has the highest carbon content of all fossil fuels and produces the highest CO₂ emissions per heating unit produced. Worldwide, coal supplies 30% of energy use and is responsible for 44% of global CO₂ emissions⁴.

In the US, coal usage is already declining in its share of energy mix and projections extend this decline even more precipitously. Coal production is projected to decline by about 26% between 2015 and 2040⁵, as illustrated in Figure 3. In recognition that coal contributes disproportionately to climate change, our strategy excludes companies with substantial coal-related activities.

Figure 3: Energy consumption by fuel type (U.S.)



Source: Energy Information Administration from Annual Energy Outlook 2016.

³ <http://www.carbontracker.org/report/carbon-bubble/>

⁴ <https://www.eia.gov/tools/faqs/faq.php?id=79&t=11>

⁵ Energy Information Administration Annual Energy Outlook 2016 <https://www.eia.gov/tools/faqs/faq.cfm?id=73&t=11>

4. Renewable energy sources

Following the Paris Climate Agreement of 2015, consensus has coalesced around a global warming target of less than 2° celsius. Achieving this proposal will require a shift in energy production away from traditional sources of energy such as coal and oil to more renewable sources, such as wind and solar energy. The green energy score metric was developed to ensure that in the process of reducing exposure to high carbon emitters, utility and energy companies that are investing in renewable technologies are not inadvertently excluded from the portfolio.

This type of information is potentially relevant to positioning for the energy transition and goes beyond looking at carbon footprint and reserves metrics. Our analysis highlights that some of the companies with the highest carbon footprints also have high green energy scores, making them targets for exclusion in standard decarbonisation.

The green energy score looks at energy producers and calculates the percentage of total energy produced from green energy sources (see below for classification of energy sources). The green energy ratio ranges from a maximum score of 1 (entirely green sourced energy) to a minimum of 0 (no exposure to green energy sources). Specifically, the green energy score calculates the percentage of total energy produced from renewable energy sources. Classification of different energy sources is defined in the table below.

$$\text{Green energy score} = \frac{\text{Green power generation (GWh)}}{\text{Total power generation (GWh)}}$$

In our process we calculate the green energy score for all applicable companies in the universe and calculate an aggregate score for the universe. The optimisation constrains the final portfolio to have a green energy score that is equal to or greater than the parent universe score. This additional piece of information allows us to distinguish between two otherwise similar companies, one of which has invested in renewable power generation and is positively exposed to the energy transition. This ensures that our strategy is targeting those firms that are positively exposed to the energy transition.

The green energy score helps ensure that our portfolio is well positioned should the world become focused on meeting the 2° Celsius target.

Energy sources classification

GREEN (GWH)	BROWN (GWH)	GREY(GWH)
Wind	Coal	Nuclear Power
Solar	Natural Gas	Landfill Gas
Biomass	LPG	Other Power
Geothermal	Petroleum	
Wave & Tidal	LNG Power	
Hydroelectric		

Source: Russell Investments. GWH is a unit of electrical energy equal to one billion watt hours, one thousand megawatt hours.

We calculate the green energy ratio for all applicable companies in the benchmark and create an aggregate score for the portfolio. Our portfolio construction targets a green energy ratio that is equal to or greater than the parent universe. This ensures that our strategy is targeting those firms that are positively exposed and contributing to a transition to a “greener” energy regime.

Our goal is to not only maintain an aggregate reduction in carbon but to also use renewable energy as another consideration in evaluating which companies to underweight.

5. Environmental, social and governance

We have also integrated Environmental, Social and Governance (ESG) scores into the strategy to ensure that the portfolio has a positive bias towards companies with high ESG characteristics. The explicit incorporation of ESG characteristics into the process ensures that we take a broader view of a company's activities and policies which may not be fully captured by looking just at the standard CO2 metrics. Within our strategy we utilise ESG data provided by Sustainalytics. The ESG ratings reflect three dimensions: Preparedness, Disclosure and Performance.

When building the portfolio, we look to achieve an aggregate ESG profile that is at a minimum matching the benchmark but on average greater than the benchmark through time. We find this is an appropriate measure to ensure the portfolio is investing, on average, more in companies with positive ESG characteristics.

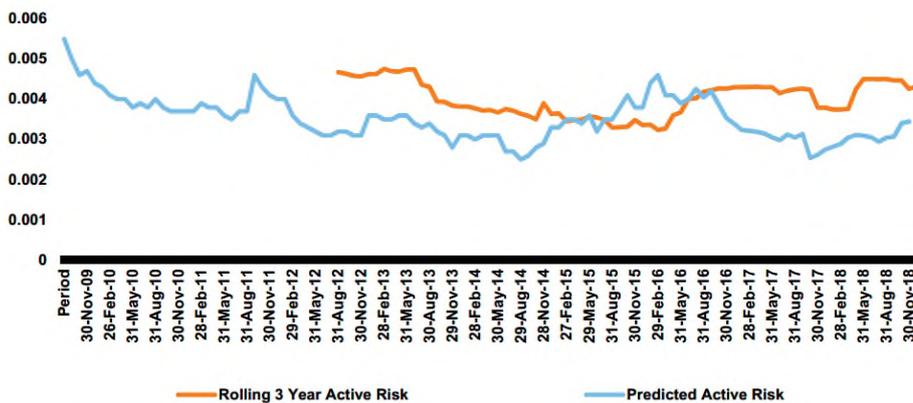
In addition, certain sectors are excluded from our portfolio, based on ESG considerations. Currently, these are producers of cluster munitions, anti-personnel mines, nuclear weapons (and key systems and componentry) and tobacco.

Our fund has a built-in tilt towards companies with high ESG scores.

6. Active risk

Unlike other optimised decarbonisation solutions, our strategy explicitly minimises active share rather than tracking error. Figure 4 below illustrates both the realised and predicted tracking error of the decarbonisation strategy, relative to the MSCI World Index universe. As Figure 4 highlights, an implication of this approach is that realised tracking error does not systematically overshoot predicted tracking error. We see that the active share targeting is successful in keeping tracking error within the range of a tracking error optimisation even though it is not explicitly targeted.

Figure 4: Active Risk: predicted vs three-year rolling realised (MSCI World Index example)



Source: Russell Investments, MSCI, Axioma, as at Dec 31 2018.

7. Methodology and results

The goal of the portfolio construction process is to select securities that have lower carbon footprints, carbon reserves, higher ESG scores and greater green energy scores, whilst controlling for active risk. We control for these constraints using a rules based optimisation strategy.

Our strategy solves for the combination of securities that achieves the portfolio profile targets with the minimum amount of active share and transaction costs. We also use several risk related constraints including maximum asset, country, sector and industry deviations. The portfolio risk constraints will differ depending on the starting universe, however the carbon and ESG criteria do not.

The following two tables summarise these parameters when applied to the MSCI World Index universe.

Portfolio ESG and carbon constraints:

PARAMETER	ABSOLUTE/BENCHMARK RELATIVE	MIN ALLOCATION	MAX ALLOCATION
Carbon footprint	Benchmark relative (portfolio level)		50%
Carbon reserves	Benchmark relative (portfolio level)		50%
Coal exclusion	Absolute	0%	0%
ESG	Benchmark relative (portfolio level)	>100%	
Green energy ratio	Benchmark relative (portfolio level)	>100%	

Portfolio risk constraints (MSCI World example):

PARAMETER	ABSOLUTE/BENCHMARK RELATIVE	MIN ALLOCATION	MAX ALLOCATION
Industry exposure	Benchmark relative	-0.5%	0.3%
Sector exposure	Benchmark relative	-0.5%	0.3%
Country exposure	Benchmark relative	-0.2%	0.2%
Company exposure	Benchmark relative	-0.5%	0.2%

We evaluate the strategy on its ability to meet the carbon and ESG objectives while keeping active risk low. Historical results are summarised in the table below.

Objectives vs results: Aug 2009 – Dec 2018

FACTOR	OBJECTIVE	RESULTS VS MSCI WORLD
Carbon emissions	50% reduction	Average carbon footprint reduction of 57%
Carbon reserves	50% reduction	Average carbon reserves reduction of 54%
Active risk	Less than 1%	Annualised tracking error over the period was 0.42%
Coal related exclusions	Zero holding of companies with significant involvement in coal	No holdings of excluded stocks
Energy transition	Positive exposure	Green energy power generation is 65% higher than MSCI World
ESG	Greater than benchmark	Average ESG score 64 (vs 63 for MSCI World)

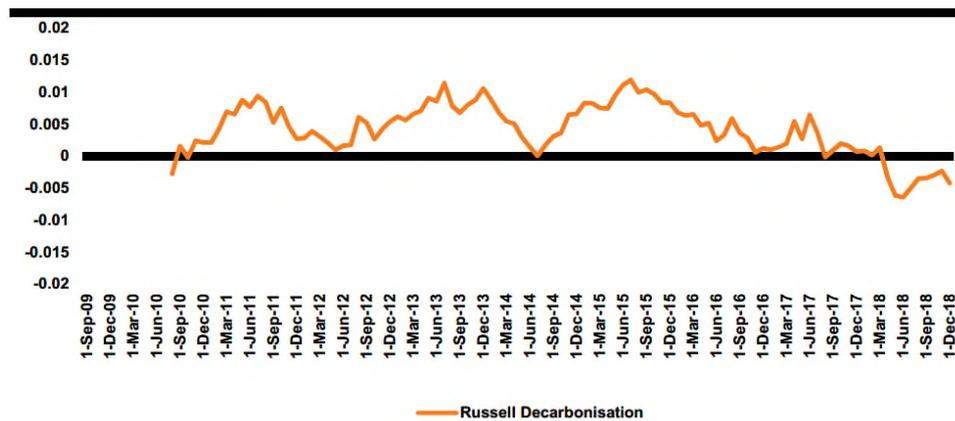
Source: Russell Investments.

Over the period the strategy displayed low levels of active risk with tracking error well below 1%. Given a goal of replicating the return profile of the underlying strategy, we do not have excess return expectations for the strategy. During the period Sept 2009 – Dec 2018, the annualised return was higher than the benchmark, likely due to the small underweight to the energy sector, which underperformed during this period. Despite the outperformance observed during this period, we do not hold a return expectation or target for this strategy.

8. Active return

The objective of the strategy is to offer a return profile similar to the underlying benchmark. We report the rolling one-year active return of the strategy (measured as the difference between benchmark and actual return) relative to the MSCI World Index in figure 2. The strategy is effective in matching the return pattern of the underlying portfolio.

Figure 5: Rolling one-year active return of the strategy vs MSCI World Index



Source: Russell Investments, MSCI, as at Dec 31 2018.

Summary of our decarbonisation strategy

Negative tilts

Our approach looks to mitigate the risk that performance of carbon-intensive securities will lag behind the broad market in a transition to a low-carbon economy. We also look to protect against the potential future risk of sudden write-downs of those fossil fuel reserve assets that may never be extracted or burned⁶.

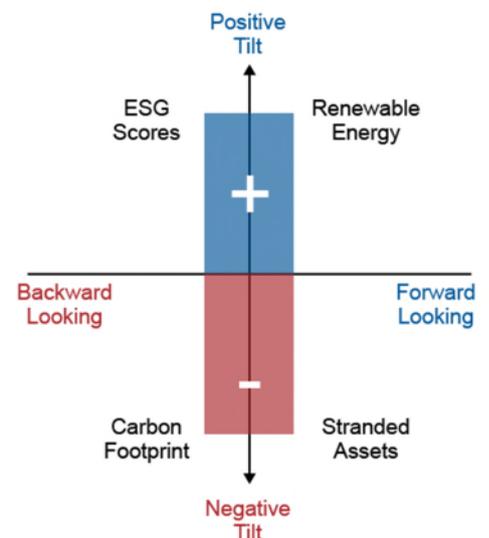
Positive tilts

Once we have allocated capital away from these sources of climate change risk, we look to reallocate towards companies that demonstrate positive ESG characteristics and/or are expected to contribute positively to the energy transition through development of renewable energy sources.

Minimise active risk

We recognise that in the near term the carbon exposure of those stocks from which we've tilted away could have very little negative impact on their performance. Therefore, we want to minimise the variation from our starting investment strategy, preserving as much as possible the underlying factor, sector, country and currency exposures. We do this by applying modest constraints on the stock, sector and country weights to minimise unintended risks.

To avoid the pitfalls of using a risk model/covariance matrix (see boxout) but still obtain the desired low tracking error risk, we have focused on maximising the commonality (minimising active share) between the portfolio and its benchmark.



⁶ This is referred to as the risk of stranded assets if these fossil fuel reserves can never be burned or extracted in order to try to avoid a significant rise in global average temperature.

A unique solution for investors

Our solution offers three benefits relative to many other index or quantitative solutions:

- 1. Lower carbon footprints and better ESG characteristics**
Our approach tilts the portfolio away from those companies with high exposure to carbon-intensive activities and increases weight in those companies with positive environmental, social and governance (ESG) characteristics and/or involved in the development of renewable energy sources.
- 2. Intuitive and transparent approach**
We believe it is extremely important for a low carbon strategy to display a direct relationship between a company's carbon footprint and its subsequent weight in the portfolio. The use of an optimisation model which targets low tracking error can compromise this direct relationship and result in unintuitive outcomes. For example, holding two securities with the same CO2 emissions in opposing active positions in the portfolio.
- 3. Proactive evolution**
The risks of carbon exposure are currently unknown and unquantifiable and will evolve. This highlights the importance of adapting the strategy as new opportunities and risks become apparent in the market. We are committed to actively evolving this solution for you.

Conclusion

We are committed to helping our clients implement sound ESG practices within their portfolios. Where clients express strong investment beliefs relating to the importance and impact of a transition to a low carbon economy, a more focused solution may be appropriate. Going beyond carbon reduction alone, this global equity solution helps clients systematically overweight stocks that they believe will benefit from a transition to green energy. Our methodology helps clients to reduce their risk related to exposure to carbon-intensive securities with limited investment risk relative to the original portfolio. This results in index-like performance with lower exposure to carbon, a positive ESG skew, and the exclusion of specific industry sectors. Finally, we are committed to proactively evolving our process as the carbon management sector continues to develop.

FUND	DOMICILE	INCEPTION	BENCHMARK	AUM (\$NZD) AS AT 30/10/19	MANAGEMENT EXPENSE RATIO
Russell Investments Low Carbon Global Shares	AUS	10/10/2017	MSCI ACWI ex Australia Index Net	658.9M	0.474%
Russell Investments Low Carbon Australian Shares	AUS	08/02/2019	S&P/ASX 300 Accumulation Index	145.6M	0.393%

About Russell Investments

Russell Investments recognises the importance of environmental, social, and corporate governance (ESG) issues to our clients and is committed to continual capability enhancement in partnership with our clients and other industry organisations. Russell Investments has more than \$443 billion in assets under management (as of 30 June 2019) and works with 1,800 clients, independent distribution partners and individual investors in over 32 countries globally. Russell Investments invest approximately \$75 billion in sustainable investment solutions. In 2018, Russell Investments received an "A/A+" grade from the PRI, in the categories for which the firm reports data, encompassing strategy, governance, direct active management, manager selection, manager appointment, and manager monitoring.



A UNPRI Signatory since 2009, Russell Investments aims to integrate each of the UN-supported principles into our investment processes and decision-making.

As a member of both the Institutional Investors Group on Climate Change and the Investor Group on Climate Change Australia/New Zealand, Russell Investments collaborates with investors to encourage public policies, investment practices, and corporate behaviour that address long-term risks and opportunities associated with climate change.

Russell Investments has also been a signatory of Carbon Disclosure Project (CDP) since 2010, which includes CDP Climate Change, CDP Forest, and CDP Water.

For more information

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