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ENVIRONMENT AGENCY PENSION FUND

CLIMATE CHANGE SCENARIO ANALYSIS 2019

INVESTING IN A TIME OF CLIMATE CHANGE – THE SEQUEL

ACKNOWLEDGMENTS

Mercer is grateful for the contributions and support provided by the Environment Agency Pension Fund team, particularly Craig Martin, Marion Maloney and Martin Parsons, throughout this project.

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MARSH & McLENNAN COMPANIES

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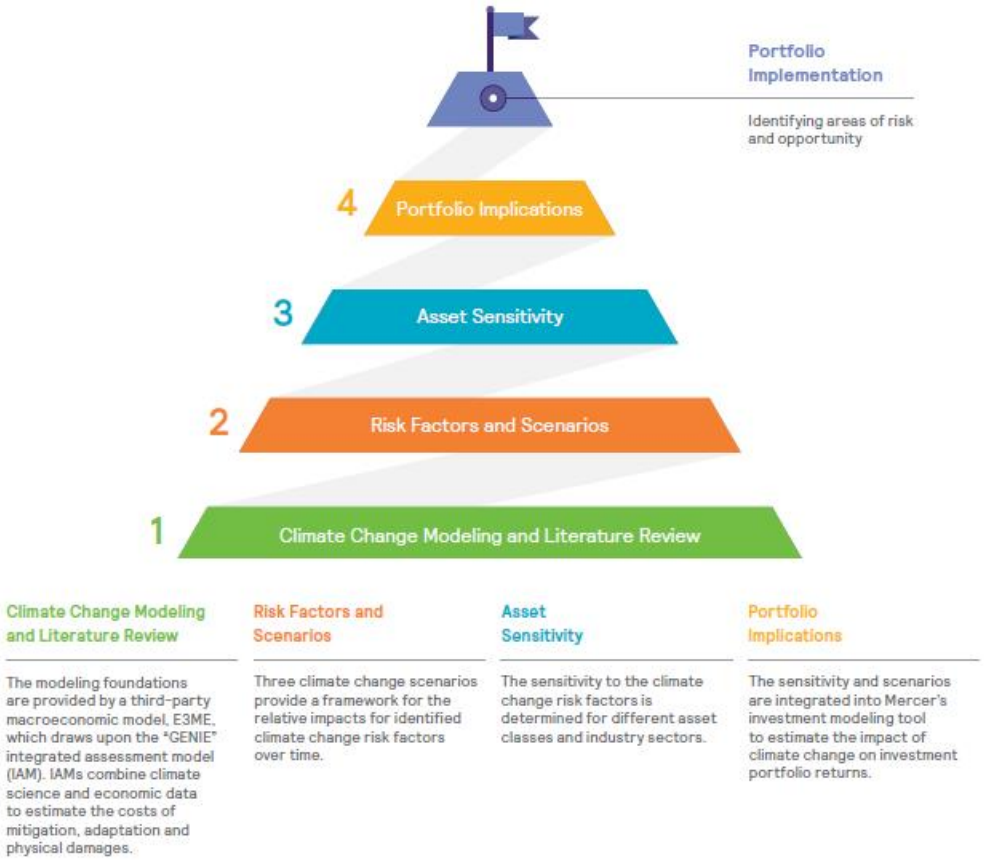
Executive Summary

Globally, we are already experiencing an additional 1ºC in the earth's mean surface temperature above pre-industrial levels and extraordinary weather events with significant financial and human consequences increasing in frequency. The current trajectory of over 3ºC by 2100 puts us beyond the realm of human experience in the next 30 years.

Against this backdrop, the Environment Agency Active Pension Fund ("EAPF") recently re-partnered with Mercer and other leading investment industry participants for Mercer's latest research study to gain further insight into the investment implications of climate change: "*Investing in a Time of Climate Change – The Sequel*".

Mercer's latest climate change scenario model helps investors analyse the impact of climate change-related physical damages (physical risks) and the transition to a low carbon economy (transition risks) on their expected investment return outlook.

The diagram below shows the methodology used to identify areas of risk and opportunity for EAPF. This uses the same methodology underpinning Mercer's "Investing in a Time of Climate Change – The Sequel" public report. The study has been updated to reflect recent climate change developments and the model is expressed through four climate change risk factors and three climate change scenarios. The EAPF's strategic asset allocation (SAA) is analysed in the context of these risk factors and scenarios to draw out portfolio implications and provide insights on climate change risks and opportunities.



Key Findings

A key conclusion from the study is that investing for a 2ºC scenario is both an imperative and an opportunity:

- An imperative, since, for nearly all asset classes and timeframes, a 2ºC scenario leads to enhanced projected returns versus 3ºC or 4ºC and therefore a better investment outcome.
- An opportunity, since, although incumbent industries can suffer losses in a 2ºC scenario, there are many notable investment opportunities enabled in a low carbon transition.

Overall, EAPF is a recognised global leader in terms of the actions it has already taken to integrate the risks and opportunities posed by climate change into its investment philosophy and processes. The analysis of the Fund indicates that it is strategically well positioned for the shift to a low carbon economy and supports the decisions to introduce a number of sustainable allocations in equities (private and listed) and real assets over time. Mercer would categorise EAPF as a "Climate Aware Future Maker". EAPF already engages comprehensively with policymakers and other key industry stakeholders, as well as portfolio companies, in order to help create the investment conditions that support a "well-below 2ºC scenario" (in line with the Paris Climate Change Agreement).

Key findings can be summarised as follows:

1. **Overall the Fund's investment strategy is robust under different climate change scenarios considered by capturing upside in a 2ºC scenario and limiting downside under 3ºC and 4ºC scenarios.** This supports EAPF's decision to act as a leader in repositioning its portfolio for the shift to a low carbon economy.

   The results highlight these findings by demonstrating the EAPF investment strategy is well positioned through its sustainable allocations to take advantage of opportunities in the near-term (over the next 10 years) under a 2ºC scenario. At the same time the c.40% allocation to fixed income shows little sensitivity to climate change modelling and acts as a hedge against climate change risk under the 3ºC and 4ºC scenarios, which are expected to see increased physical risks impacting overall returns.

ANNUAL CLIMATE CHANGE IMPACT ON PORTFOLIO RETURNS – OVER 10 YEARS AND TO 2100

		SAA with no sustainability allocations (%)	SAA (%)
2ºC	10 years	0.23	0.66
	2100	-0.05	0.08
3ºC	10 years	-0.01	0.03
	2100	-0.11	-0.06
4ºC	10 years	-0.07	-0.06
	2100	-0.19	-0.16

≤ -10 bps > -10 bps, < 10bps ≥ 10 bps

2. **EAPF is well positioned to capture the "low carbon transition premium" through explicit sustainable asset class allocations but should be mindful of physical risks for these same allocations.** Under a 2ºC scenario EAPF is well positioned to capture the "low carbon transition premium" through explicit sustainable (including low carbon) allocations within:
   - Listed equities
   - Private equity
   - Sustainable infrastructure

   Over the next 10 years, under a 2ºC scenario, sustainability tilting within these allocations present the strongest upside opportunities in the near-term, when compared to the other asset classes held by the Fund.

   To 2100, these same asset classes as well as property, regardless of whether they are sustainable or not, demonstrate the strongest negative impacts under the high physical risk assumptions of a 4ºC scenario. These should therefore be considered a key focus for building portfolio resilience (see the box overleaf on "Understanding climate change adaptation and resilience" for a definition).

3. **The global equity portfolio is relatively well-positioned to avoid transition risks although it remains exposed to physical risks.** In particular, the equity portfolio is underweight to the energy sector, which is expected to suffer negative returns from transition risks under a 2ºC scenario. However, the equity portfolio is overweight to industrials, expected to suffer negative returns from physical risks under 3ºC and 4ºC scenarios.

   The sector findings support EAPF's efforts to date, to:
   - Allocate to sustainable and environmentally themed equity managers who integrate ESG considerations within their investment process.
   - Switch the benchmark for its index tracking equity, from market cap to a low carbon approach, further increasing the robustness of the equities portfolio.
   - Undertake annual carbon and environmental footprinting analysis which enhances wider engagement with fossil fuel companies and other high carbon companies such as utilities.

   EAPF should continue to focus on aligning its equities portfolio with mitigation and adaptation solutions, such as renewables and infrastructure investments that integrate climate change resiliency considerations. It should also seek to better understand the physical risks faced by companies within the portfolio, particularly for sectors, such as industrials, which are exposed to physical risks.

UNDERSTANDING CLIMATE CHANGE ADAPTATION AND RESILIENCE

The United Nations Framework on Climate Change (UNFCCC) agreed the global Paris Climate Change Agreement in 2015 that included a target of:

Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development
UNFCCC "*Paris Agreement"*

In the context of climate change, resilience is largely referred to as part of building adaptation capacity. In human systems, adaptation is a process of adjusting to moderate harm or exploit beneficial opportunities from climate change and its effects (*paraphrased*, IPCC, "DDC Glossary"). Adaptation requires consideration of vulnerability to the adverse effects of climate change, which can in turn be considered both from the perspective of the likelihood of experiencing adverse impacts and from the perspective of capacity to respond to such adverse impacts (see the UNFCCC *"Paris Agreement"* for an exploration of these themes).

The Intergovernmental Panel on Climate Change (IPCC), the world's leading body on climate change science, further defines resilience as:

The ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions.
IPCC "*Glossary of terms. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation"*

Investors have begun to progressively engage with climate change mitigation, with mitigation efforts strengthening on a year-on-year basis, although much remains to be done on this front. Mitigation is the human intervention to reduce the sources of greenhouse gas emissions or enhance the sinks (or the absorption) of greenhouse gas emissions (note: it can also include interventions concerning other non-greenhouse gas substances with climate change effects; see IPCC, "DDC Glossary").

In contrast one could argue that adaption, and by extension resilience, has been less well considered by investors. However, investors, including EAPF, are increasingly focused on the resilience of their portfolios and we have sought to highlight key findings in respect of resilience/adaptation throughout this report. This focus on resilience is extremely important to the Environment Agency, with projects such as the Thames Tideway Scheme demonstrating the need to adapt to a changing climate.

Complementarities exist between mitigation and adaptation, with increasing efforts being diverted into mitigation – or delivering the low carbon transition – providing added benefits for adaptation and resiliency – by reducing the scale of physical risks anticipated this century (and beyond) as compared with a business as usual pathway. Therefore, whilst the focus on mitigation has been fruitful, the momentum now needs to also begin incorporating resiliency discussions to ensure a holistic consideration of climate change by investors.

Recommendations

EAPF is spending its governance budget wisely in terms of its Responsible Investment (RI) strategy but there are a number of suggested actions which are consistent with being a "Climate Aware Future Maker". We recommend that:

- EAPF continues to explore the **creation of sustainable allocations** for strategies that play a role in the strategic direction of the Fund. This would include exploring the creation of a sustainable Multi-Asset Credit fund, by investigating best practice ESG integration and sustainable opportunities across relevant fixed income sleeves in collaboration with Brunel Pension Partnership.
- EAPF strives to be a **market leader in reporting the positive environmental (and climate change) impact of the Fund's investment**s, particularly in relation to its specialist mandates and sustainability focused investments. EAPF could develop a standardised measurement and reporting framework that could focus on member engagement and education to help demonstrate the climate change 'impact' of the Fund.
- The Fund continues to explore **educational projects that look to improve investors understanding of climate change risks and opportunities and make the findings public**. This would support undertaking bottom up analysis to better understand if the portfolio companies within the listed equity portfolio were aligned with 2ºC, 3ºC or 4ºC scenarios. Another option would be to undertake a climate change resiliency project to identify assets within the Fund, particularly real assets, that are vulnerable to physical risks and then setting targets to improve the resiliency of the portfolio over time.

2

Introduction

What is the purpose of this study?

EAPF has recently re-partnered with Mercer and other leading investment industry participants for Mercer's latest research study to gain further insight into the investment implications of climate change: "*Investing in a Time of Climate Change – The Sequel*". Understanding the investment implications of climate change remains as critical as ever with the UK Government declaring a climate change emergency in May of this year.

Following the publication of the 2015 "*Investing in a Time of Climate Change*" report, 2015 saw a major development with the adoption of the Paris Climate Change Agreement. The Paris Agreement reflects a collective mitigation goal to hold the increase in the earth's global mean surface temperature to "well below 2ºC above preindustrial levels and to pursue efforts to limit the temperature increase to 1.5ºC." The agreement also set out the adaptation goal of "increasing the ability to adapt to the adverse impacts of climate change and foster climate change resilience and low greenhouse gas emissions development".

Four years on from the last report, there remains a strong need to demystify climate change science for investors. The world is already experiencing a 1ºC warming, which in short is a world in which humans have never lived. Even aiming towards a better 2ºC low carbon future, under the Paris Agreement, would result in meaningful physical risks that society and nature would need to adapt to. Looking towards the higher carbon futures (of 3ºC or 4ºC), this level of warming has not been seen for millions of years and would create extreme physical risks that would become increasingly difficult to adapt to, including irreversible climate change tipping points (e.g. the permanent melting of arctic permafrost). Currently, we are heading towards a warming greater than a 3ºC pathway, which would bring the world towards the higher end of the physical risks being explored in today's climate change modelling efforts. More remains to be done by governments and investors to tackle climate change.

In this report, Mercer presents an updated understanding of climate change and the implications for EAPF. Mercer's most recent report draws from the rapidly evolving landscape of environmental science, and climate change-related political and technology developments. The updated model now integrates stress testing functionality to capture the impact of short-term events, which are deemed to be more likely than longer-term averaged impacts. In addition, there is an updated understanding of climate change scenarios, climate change risks, and the introduction of new asset classes within the model.

"Our objective is to ensure that our Fund's investment portfolio and processes are compatible with keeping the global average temperature increase to below 2ºC relative to pre-industrial levels, in line with international government agreements."
EAPF "*Policy to address the impacts of climate change*"

Against this backdrop, this report sets out background on EAPF's climate change journey, provides the results of bespoke investment modelling undertaken for EAPF and highlights practical recommendations to EAPF as a long-term investor in a time of climate change. A public report highlighting the findings of the Mercer study has been released and further detailed commentary on the study and the modelling approach has been provided to EAPF, as a partner in the study.

Why incorporate climate change into investment strategy modelling?

While global warming as a result of climate change caused by human activities is an established scientific fact, there remains a great deal of uncertainty around how climate change will develop and many questions prevail for investors, including:

- **Physical Risk**: To what extent is the portfolio at risk from climate change-related physical damages and resource scarcity?
- **Transition Risk**: To what extent is the portfolio at risk from the transition to a low carbon economy?
- **Opportunities**: To what extent is the portfolio positioned to benefit from the transition to a low carbon economy (mitigation) and the solutions designed to build resilience to physical damages (adaptation)?

The complex interlinkages between climate change and finance create a difficult landscape for investors to navigate. With a growing understanding of the potential impacts of climate change on investment performance, it has become increasingly important for investors to better understand the climate change risks and opportunities they face in their portfolios, in the short to long-term.

To help we have used scenario analysis and adapted Mercer's investment modelling toolkit to consider some of the potential future climate change pathways, the impact these may have from an economic perspective, including what happens if there are short term re-pricing events, and the potential implications for investors.

Investors often use scenario analysis to support Strategic Asset Allocation (SAA) and portfolio construction decisions, as it helps to model potential risks and returns under different future climate change scenarios and ultimately build more resilient portfolios. Mercer believes it is valuable to ensure climate change considerations are integrated into every stage of the investment process.

TOP FIVE RISKS IN TERMS OF LIKELIHOOD

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1st	Asset price collapse	Storms and cyclones	Income disparity	Income disparity	Income disparity	Interstate conflict	Involuntary migration	Extreme weather	Extreme weather	Extreme weather
2nd	Slowing Chinese economy	Flooding	Fiscal imbalances	Fiscal imbalances	Extreme weather	Extreme weather	Extreme weather	Involuntary migration	Natural catastrophes	Climate change adaptation failure
3rd	Chronic disease	Corruption	Greenhouse gas emissions	Greenhouse gas emissions	Unemployment or underemployment	Nat. governance failures	Climate change adaption failure	Natural catastrophes	Cyber attack	Natural catastrophes
4th	Fiscal crises	Biodiversity loss	Cyber attacks	Water supply crises	Climate change	State collapse	Interstate conflict	Terrorist attack	Data fraud	Data fraud or theft
5th	Global governance gaps	Climate change	Water supply crises	Ageing population	Cyber attacks	High unemployment	Natural catastrophes	Data fraud	Climate change adaptation failure	Cyber attack

Source: World Economic Forum, Global Risks Report 2019

How can we reconcile climate change and investment timescales?

One of the key challenges for investors is considering the risks and opportunities posed by climate change over both the near term and timeframes that extend all the way to the end of this century and beyond.

In this report, we adopt a timeframe of analysis to 2100 (where the 2015 model considered only the period to 2050). Although we acknowledge this is very long term from an investment perspective; typically, strategic investment advice is based on a modelling period of 10 years and investment managers take investment decisions on a 3-5 year time-frame, or less. However, even 10 years is short-term from a climate change perspective with climate change impacts become increasingly apparent post-2050. This led us to extend our timeframe out to 2100. In order to build portfolio resilience to climate change, investors will increasingly need to begin considering the impacts of their investments beyond traditional investment timeframes.

In particular, in modelling the physical impacts of climate change extreme weather events and sea level rises are expected to be less extensive over the period to 2050 and start to scale up more strongly to 2100. As such, we believe the implications to 2100 should be an areas of focus. Given the EAPF remains open to both new entrants and future accrual, it is expected to have liabilities stretching out well beyond 2050 and possibly to 2100.

While there is notable timeframe disconnect between an investors time horizon and climate change impacts, there are nearer-term actions that investors can take and signposts that investors can monitor to better understand future climate change-related developments.

In the following section, we provide an overview of EAPF’s climate change journey, to date.

3

EAPF's Climate Change Journey

EAPF is a recognised leader in responsible investment and has been at the forefront of considering environmental, social and corporate governance (ESG) issues, including climate change, within its investment processes for over 10 years.

EAPF has previously partnered with Mercer in the seminal report "Climate Change Implications for Strategic Asset Allocation", which was released in 2010 and the "Investing in a Time of Climate Change Report" report published in 2015. These studies have supported several strategic decisions including the introduction of sustainable real assets and an allocation to low carbon passive equities.

As part of this review, EAPF has again considered the impacts of climate change through participation in this latest study, which builds on previous work but reflects recent developments.

Mercer views EAPF as a "Climate Aware Future Maker", in recognition of the work undertaken to integrate climate change considerations throughout the investment decision making process, but also its leadership in engaging comprehensively with policymakers and other key industry stakeholders as well as portfolio companies, in order to help create the investment conditions that support a Paris-aligned "well-below 2ºC scenario".

More specifically, EAPF has already demonstrated leadership in its approach to managing investment risks posed by climate change by:

- Having a clear and publicly available climate change policy. This outlines its overall approach. It also lays out a commitment to:
  - target a 17% allocation to low carbon, energy efficient and other climate change opportunities.
  - maintain at least 33% of the Fund in clean technology and strongly sustainable investments across equities, bonds and alternatives.
- Co-founding the Transition Pathway Initiative ('TPI') which is a global, asset-owner led initiative which assesses companies' preparedness for the transition to a low carbon economy.
- Actively supporting and reporting in line with the Financial Stability Board's Task Force on Climate-related Financial Disclosure (TCFD).
- Collaborating with other investors through its membership of groups such as the Principles for Responsible Investment (PRI), the Institutional Investors Group on Climate Change (IIGCC), the Portfolio Decarbonization Coalition and the UK Sustainable Investment and Finance Association (UKSIF).
- Undertaking carbon and environmental footprinting analysis of its investment portfolios for many years and using this analysis to identify companies with which to engage in partnership with its investment managers.
- Considering and publicly reporting on the exposure of its investment portfolio at risk of "stranded assets".
- Supporting shareholder resolutions for increased transparency from energy companies at risk from asset stranding due to climate change.

Consistent with Mercer's Pathway to Responsible Investment Framework shown below, EAPF considers climate change risks at all stages of the investment process from beliefs to policy and processes through to the portfolio. This ensures climate change is considered from the setting of strategic objectives and strategic asset allocation of the Fund to ongoing monitoring of its investment portfolios.

RESPONSIBLE INVESTMENT PATHWAY FRAMEWORK

Asset owners cannot solely rely on delegating the consideration of the long-term risks posed by climate change to their investment managers. Rather asset owners should adopt a policy outlining their approach to managing climate change risks throughout the investment decision-making process and therefore be in an informed position when setting strategic investment objectives, selecting investment managers and monitoring investment managers.

This study has enabled EAPF to consider climate change at the strategic level as well as drilling down into portfolio construction and implementation considerations.

In the following section, we briefly outline the methodology, with the full methodology to be found in the appendix.

4

Mercer's Climate Change Scenario Model: Methodology

What has changed since Mercer's 2015 model?

Mercer's previous climate change model was released in 2015. Major developments in the 2019 model, as compared with the previous iteration, include:

- **Stress testing**: to demonstrate sudden climate change-related onset events, which occur over a period of less than one year
- **Time horizon**: extended to 2100 to better capture physical risks (the 2015 model considered the period to 2050 only)
- **Climate change scenarios**: an updated understanding of climate change futures, incorporating evolutions in understanding within the climate change space
- **Climate change risk approach**: an updated approach to climate change risks, the STIR factors – Spending, Transition (including policy and technology), Impacts and Resources – to enable stronger interaction between policy and technology (the 2015 model used the 'TRIP' factors of Technology, Resource Availability, Impacts, and Policy)
- **Asset classes**: new asset classes, to represent regions and sustainable assets, and provide stronger nuances in the modelling data

It should also be noted that whilst the 2015 model created two different views on the 4ºC scenario, with higher and lower physical risks, respectively, in the 2019 model we adopt a single view for the 4ºC scenario. We capture different assumptions of the level of physical impacts instead in the stress testing function.

We outline the methodology in further detail below.

Methodology – overview

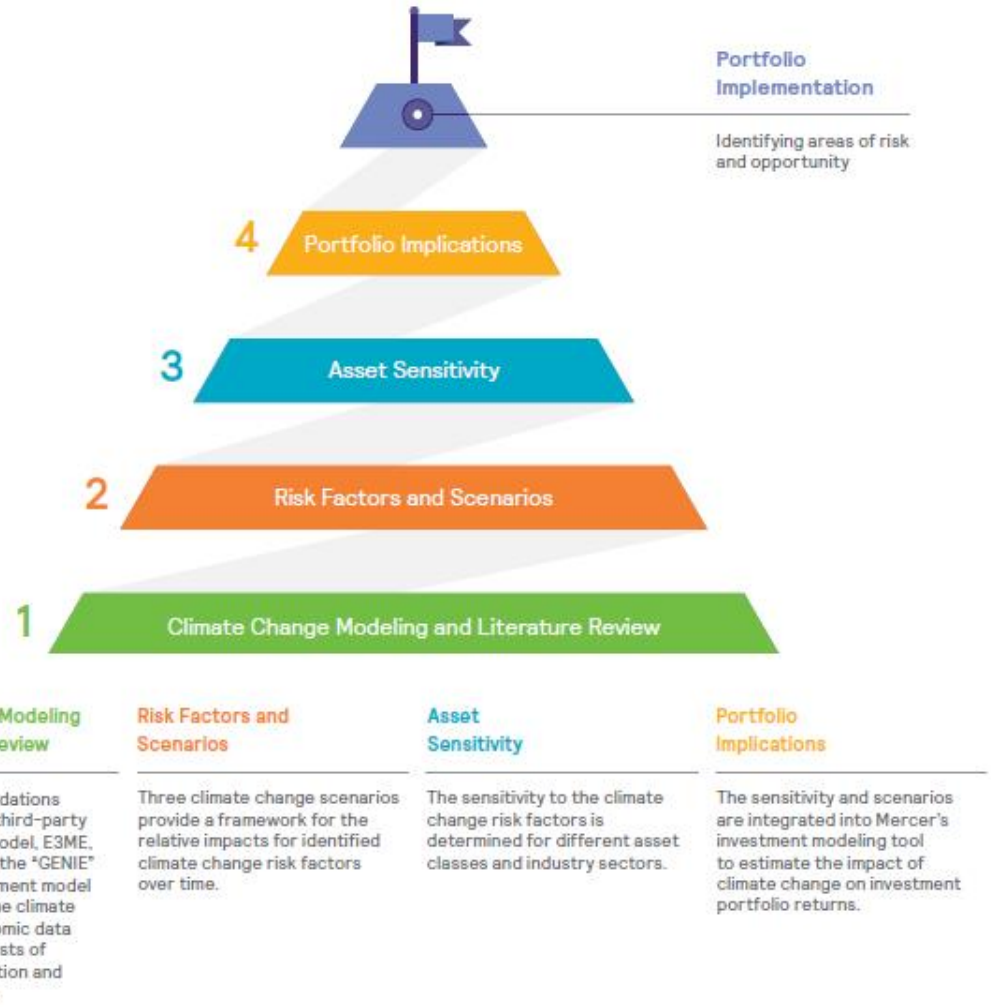
The methodological approach is summarised in the diagram overleaf and shows how this study progressed to identify areas of risk and opportunity for EAPF.

1. The climate change landscape is rapidly evolving and Mercer's 2019 climate change model captures developments in collective understanding of environmental science, and climate change-related political and technology developments, since 2015. This draws on Cambridge Econometric's global E3ME model, with comprehensive data for regions and sectors.

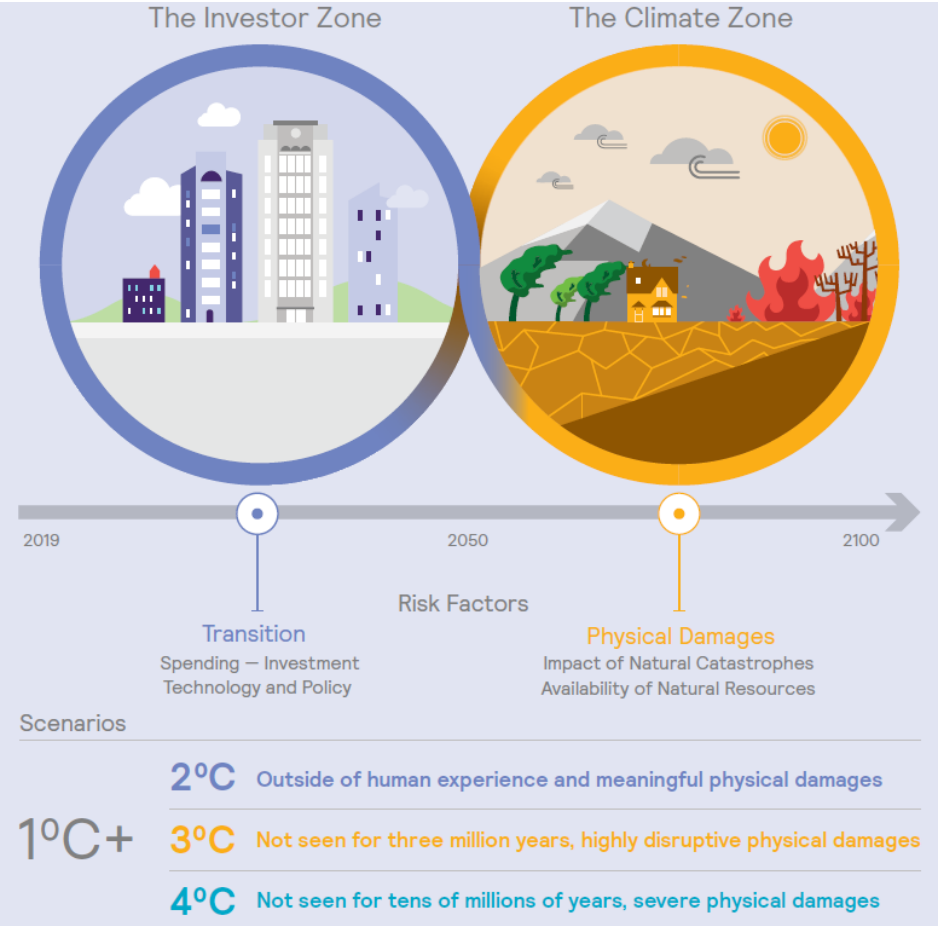
2. This updated understanding has been summarised within the 2019 model as four climate change risk factors (including transition and physical risk factors – the so-called 'STIR' factors – Spending, Transition (including policy and technology), Impacts, and Resources and three climate change scenarios (2ºC, 3ºC and 4ºC). The model maps the relative impact of these risk factors under the three climate change scenarios.

3. The Mercer climate change scenario modelling estimates a 'climate change impact on return', which is in addition to the traditional investment returns currently expected for asset classes and sectors in the future.

4. The findings are used to provide commentary on the portfolio implications of climate change for EAPF, and in particular the climate change risks and opportunities that EAPF faces.



A brief overview of the model's timeframe, scenarios and risk factors is captured in the diagram overleaf.



A fuller scenario model methodology overview is provided in the appendix.

4

Mercer's Climate Change Scenario Model: Results

Key findings

1. **Overall the Fund's investment strategy is robust under the different climate change scenarios considered, by capturing upside in a 2ºC scenario and limiting downside under 3ºC and 4ºC scenarios.** This supports EAPF's decision to act as a leader in repositioning its portfolio for the shift to a low carbon economy by including sustainable allocations.

   Under the low carbon transition (or 2ºC scenario) stress test, and consistent with the total portfolio findings, the results show significant upside exposure to climate change opportunities within existing sustainable allocations. Under the physical risks stress test, the portfolio shows resilience of returns, with limited downside (regardless of the scale of physical damages assumed in the model).

   At the same time, the c.40% allocation to fixed income shows little sensitivity to climate change modelling and acts as a hedge against climate change risk under the 3ºC and 4ºC scenarios, which are expected to see increased physical risks impacting overall returns.

2. **EAPF is well positioned to capture the "low carbon transition premium" through explicit sustainable asset class allocations, but should be mindful of physical damages for these same allocations.** Under a 2ºC scenario EAPF is well positioned to capture the "low carbon transition premium" through explicit sustainable (including low carbon) allocations within:
   - Listed equities
   - Private equity
   - Sustainable infrastructure

   Over the next 10 years, under a 2ºC scenario, sustainability tilting within these allocations present the strongest upside opportunities in the near-term, when compared to the other asset classes held by the Fund.

   However, to 2100, these same asset classes, as well as property, regardless of whether they are sustainable or not, demonstrate the strongest negative impacts under the high physical risk assumptions of a 4ºC scenario. These should therefore be considered a key focus for building portfolio resilience. In particular, the physical impacts of climate change on the infrastructure and property portfolios should be carefully monitored.

3. **The global equity portfolio is relatively well-positioned to avoid transition risks although it remains exposed to physical risks.** In particular, the equity portfolio is underweight to the energy sector, which is expected to suffer negative returns from transition risks under a 2ºC scenario. However, this portfolio is overweight to industrials, expected to suffer negative returns from physical risks under 3ºC and 4ºC scenarios.

The sector findings support EAPF's efforts to date, to:

- Allocate to sustainable and environmentally themed equity managers who integrate ESG considerations within their investment process.
- Switch the benchmark for its index tracking equity, from market cap to a low carbon approach, further increasing the robustness of the equities portfolio.
- Undertake annual carbon and environmental footprinting analysis which enhances wider engagement with fossil fuel companies and other high carbon companies such as utilities.

EAPF should continue to focus on aligning its equities portfolio with mitigation and adaptation solutions, such as renewables and infrastructure investments that integrate climate change resiliency considerations. It should also seek to better understand the physical risks faced by companies within the portfolio, particularly for sectors, such as industrials, which are exposed to higher physical damages risks.

These findings are presented in further detail below, and are used to inform the recommendations, presented in the following section. We encourage these findings to be considered alongside the "*Investing in a Time of Climate Change – The Sequel*" public report.

Please note, for brevity we have focused on the results over the next 10 years and to 2100, and on the 2ºC and 4ºC scenarios, as together these illustrate our key findings.

Portfolio analysis

Two portfolios have been analysed in this report. The first is the EAPF's strategic asset allocation (SAA). The second is an illustrative equivalent without sustainable allocations, to help demonstrate the benefits of EAPF's sustainable tilting within the portfolio. A breakdown is shown in the table below.

PORTFOLIOS ANALYSED IN THIS REPORT

ASSET CATEGORY	CURRENT SAA (%)	ILLUSTRATIVE SAA WITH NO SUSTAINABILITY ALLOCATIONS (%)
GLOBAL EQUITY		33.4
LOW VOLATILITY EQUITY	6.6	6.6
SUSTAINABLE GLOBAL EQUITY	22.5	
LOW CARBON EQUITY	10.9	
GROWTH FIXED INCOME/MULTI-ASSET CREDIT	5.0	5.0
STERLING CORPORATE BONDS	20.0	20.0
PASSIVE INDEX LINKED GILTS	7.5	7.5
GLOBAL PROPERTY	3.0	3.0
UK PROPERTY	3.0	3.0
INFRASTRUCTURE		9.0
SUSTAINABLE INFRASTRUCTURE	7.0	
AGRICULTURE AND TIMBERLAND	2.0	
PRIVATE DEBT	7.0	7.0
PRIVATE EQUITY		5.0
SUSTAINABLE PRIVATE EQUITY	5.0	
CASH	0.5	0.5
TOTAL	**100**	**100**

Note: figures may not sum due to rounding.

Total portfolio return impacts

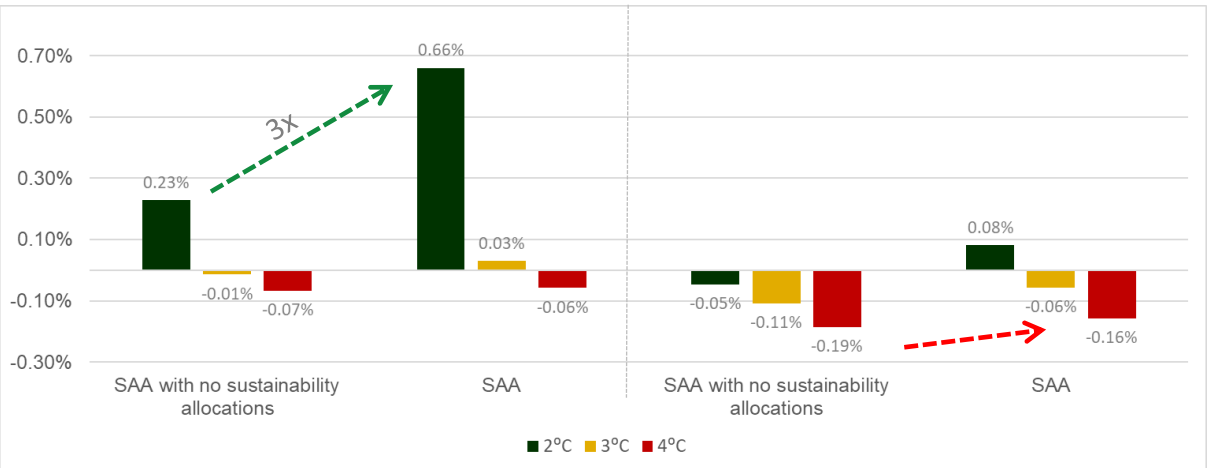
A 2ºC scenario is most beneficial for the EAPF portfolio across both timeframes, over the next 10 years and to 2100.

EAPF is expected to benefit from sustainable allocations under a 2ºC scenario with upside most pronounced in the next 10 years. Over the next 10 years, sustainability tilting in the SAA provides an approximate threefold upside (c.0.4% p.a. or c.4% on a cumulative basis), under a 2ºC scenario, as compared with the illustrative SAA with no sustainability allocations. This demonstrates EAPF is well positioned to take advantage of the "low carbon transition premium" in the near-term.

Under the high carbon (3ºC and 4ºC) scenarios, physical risks worsen to 2100, causing negative outcomes in aggregate for the EAPF portfolio (and the illustrative portfolio with no sustainability allocations). Portfolio resilience becomes an important consideration should the 2ºC scenario not be achieved. Over this timeframe the physical risks are particularly pronounced for the 4ºC scenario. Portfolio resilience is tested further in the stress testing presented later in this section.

Returns deteriorate in the higher carbon (3ºC and 4ºC) scenarios, regardless of the level of sustainability tilting, suggesting there is limited downside to investing for a 2ºC scenario. Consistent with this the EAPF SAA and illustrative SAA without sustainability allocations show similar downside impacts, while allocations to fixed income provide a climate change risk hedge. Market repricing under the high carbon scenarios could damage sustainable investments in relative terms, though on balance, we think repricing is more likely to be supportive of sustainable investments (though not guaranteed).

FIGURE 3. ANNUALISED TOTAL PORTFOLIO RETURNS BY CLIMATE CHANGE SCENARIO



Asset Class Return Impacts

As a result of sustainability tilting in the EAPF portfolio, the "low carbon transition premium" creates strong opportunities within equities (private and listed) and infrastructure, over the next 10 years. The upside is strongest for sustainable infrastructure. EAPF is well positioned to capture the "low carbon transition premium" through its allocation to these opportunities.

Equities (private and listed), global property and infrastructure are also the asset classes that suffer the most from physical risks under the high carbon (3ºC and 4ºC) scenarios, with impacts coming through most strongly in the lead up to 2100. This suggests that these asset classes should be the focus for building portfolio resilience, regardless of the climate change scenario that unfolds.

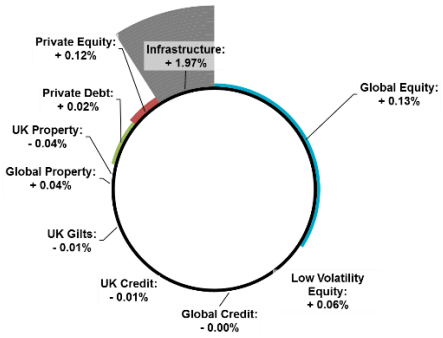
The benefits of sustainability tilting are lost under a 4ºC scenario. The asset class return impacts experience a similar downside for sustainable and illustrative 'unsustainable' asset classes under high carbon (3ºC and 4ºC) scenarios. This again emphasises that there is limited downside to investing for a 2ºC scenario.

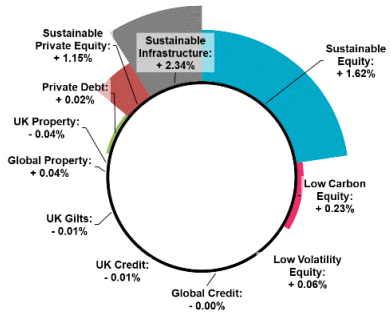
Fixed income allocations (c.40% of assets) show little responsiveness to climate change modelling, acting as a hedge against climate change risk across the scenarios and timeframes analysed, and creating resilience within the portfolio. This hedging is particularly striking within higher carbon (3ºC and 4ºC) scenarios. This indicates fixed income outcomes are being dominated by macroeconomic factors rather than climate change risks, although the latter remain relevant. For the higher emissions scenarios (3ºC and 4ºC) we expect the depressive macroeconomic effect of climate change to lead to interest-rate decreases and, therefore, price and return increases for fixed income assets.

ANNUALISED ASSET CLASS RETURNS BY CLIMATE CHANGE SCENARIO - 10 YEARS

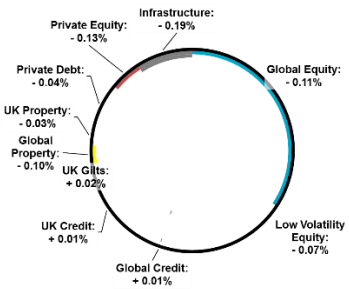
SAA with no sustainability **SAA**

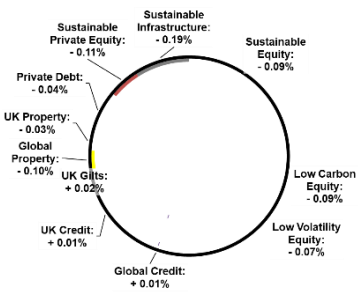
2ºC Scenario, 10 years





4ºC Scenario, 10 years

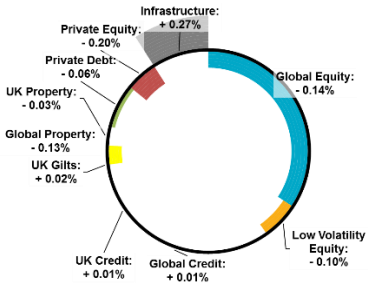




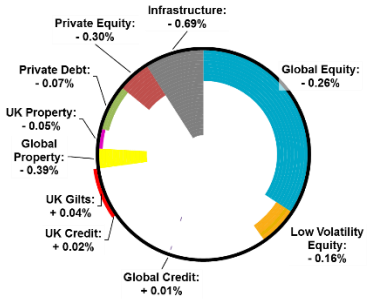
ANNUALISED ASSET CLASS RETURNS BY CLIMATE CHANGE SCENARIO - TO 2100

SAA with no sustainability

2ºC Scenario, 2100

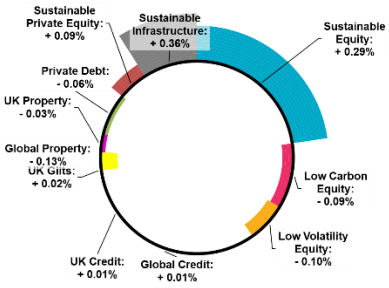


4ºC Scenario, 2100

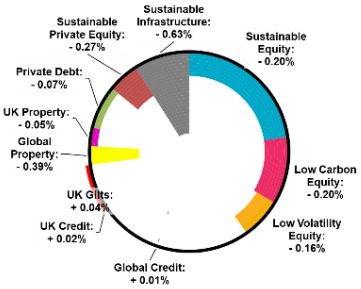


SAA

2ºC Scenario, 2100



4ºC Scenario, 2100



In the charts presented above, each circle represents the total asset allocation, with the sizes of each asset class section equivalent to the weighting in the portfolio. If the asset class section is within the circle, it represents a negative impact on return, however, when the asset class section is sitting outside the circle, it represents a positive impact on expected returns.

Further information on asset class sensitivity to the STIR risk factors can be found in the appendix.

Sector (Equities only) return impacts over next 10 years

Sector considerations are increasingly a strategic consideration. There are strong variations across sector performance revealing the likely "winners and losers", particularly for energy and utilities sectors under the low carbon transition.

Over the next 10 years, the public report findings show the most negative returns for coal, oil and gas, and electric utilities, for transition risks, under the assumption that such utilities continue to be dominated by fossil fuels (-5.9%, -3.3% and -3.7% p.a., respectively). Whilst, renewables experience extremely strong positive returns (+6.3% p.a.).

Overall the equity portfolio shows less exposure to transition risks over the next 10 years, relative to the benchmark MSCI ACWI. The portfolio is well positioned relative to the benchmark as it is underweight to energy (-5%) and only marginally overweight to utilities (+0.2%), the sectors which are expected to experience the strongest transition risks.

Physical risks are strongest in sectors reliant on raw materials, such as industrials, and scale up towards the end of the century. This should be a focus for building EAPF portfolio resilience. As compared with the MSCI ACWI index, the portfolio is +7% overweight to industrials, with physical risks strongest under a 4ºC scenario. We note that the full extent of physical risks will take longer than 10 years to come through.

Actions to manage exposure to climate change risks in industrials can include better understanding the nature of the companies held within this sector and engaging with investment managers and companies on improving resilience in the face of climate change, by, for example:

- Identifying companies which are promoting resilient industrial supply chains which consider climate change adaptation (e.g. sourcing paper goods from sustainably managed forests, or investing in transport infrastructure projects that consider adaptation in its environmental reporting, etc.)
- Increasing the level of energy derived from renewable sources, to safeguard against future fossil fuel regulations (see below box for more information).

Decarbonising the industrials sector

There is growing evidence on the uptake of renewables in energy-intensive industries, including research by the CDP (a not-for-profit charity that runs the global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts).

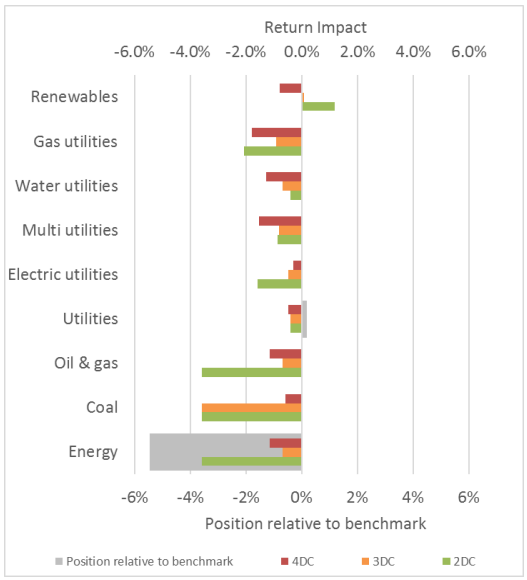
The mining sector leads the way with 12% of energy consumption from renewable sources (in absolute and relative terms in 2016), followed by cement with 3% and chemicals and steel with 1%, respectively. The oil and gas sector, meanwhile is lagging with no material uptake of renewable energy.

Opportunities for industries to decarbonise come with upfront investments costs. A recent report from McKinsey outlines that timely action could help to lower the costs of industrial decarbonisation, through technology maturation.

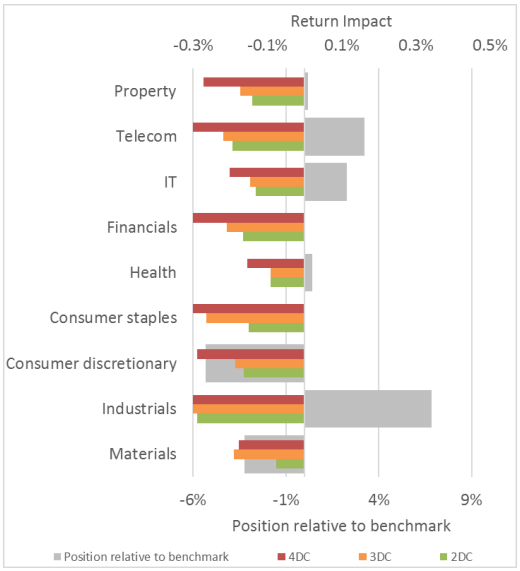
Collaborative investor efforts, such as The Transition Pathway Initiative (co-founded by EAPF) are already highlighting trends across industrials, with reports focused on cement and steel producers.

FIGURE 8. ANNUALISED SECTOR RETURN IMPACTS IN THE NEXT 10 YEARS AND RELATIVE SECTOR WEIGHTS (MSCI ACWI BENCHMARK)

ENERGY AND UTILITIES



SECTORS EX ENERGY/UTILITIES



Note: the left-hand chart shows only the EAPF position relative to the benchmark for the energy and utilities overarching sectors, not the sub-sectors. This is to avoid double-counting.

Overall, the sector findings support the EAPF's actions to date, to:

- Allocate to sustainable and environmentally themed equity managers who integrate ESG considerations within their investment process.
- Switch the benchmark for its index tracking equity, from market cap to a low carbon approach, further increasing the robustness of the equities portfolio.
- Undertake annual carbon and environmental footprinting analysis which enhances wider engagement with fossil fuel companies and other high carbon companies such as utilities.

EAPF should continue to focus on aligning its equities portfolio with mitigation and adaptation solutions, such as renewables and infrastructure investments that integrate climate change resiliency considerations. It should also seek to better understand the physical risks faced by companies within the portfolio, particularly for sectors, such as industrials, which are exposed to higher physical risks.

Further information on sector sensitivity to the STIR risk factors can be found in the appendix.

Stress testing

This section considers how longer-term investment return impacts could manifest as short-term market pricing events, as markets may rapidly respond to new climate change-related information (e.g. increased awareness of physical risks, increased likelihood of specific climate change scenarios becoming more apparent and climate change impact on GDP becoming better understood).[1] The return figures in this section are not annualised, but a single point in time impact over less than one year.

Stress testing can be a helpful way to envisage the extent of potential return impacts of more sudden events. The process of posing different scenario questions and applying different variables is a good way to improve strategic thinking on these issues.

Stress test #1 - increased probability of a 2ºC scenario and greater market awareness of that happening

This tests the market's reaction to the realisation of a faster-than-expected low carbon transition towards a 2ºC outcome, in line with the Paris Agreement. The aim of this stress test is to look at the impact of the low carbon transition on asset prices. This includes an acceleration in investment supporting the transition and a reduction in physical risks compared with the current "business as usual" climate change trajectory.

To do this we "shock" the model by moving:

- **From the base case:** Pathway of 3.3ºC, as per the Climate Action Tracker (by assigning 20% probability to the 2ºC scenario + 20% probability to the 3ºC scenario + 60% probability to the 4ºC scenario)[2]. This view also assumes that 20% of climate change information is priced-in by the markets.
- **To a future case:** Pathway of 2ºC (i.e. 100% probability of a 2ºC scenario). This view estimates 80% of climate change information is priced-in by the markets.

Consistent with the total portfolio results, discussed earlier, under the low carbon transition (or 2ºC scenario) stress test, the EAPF SAA results show significant upside exposure to climate change opportunities within existing sustainable allocations.

Overall, we find that sustainable allocations in real assets, listed and private equity allows EAPF to capitalise on opportunities through the low carbon transition premium.

The current SAA experiences a positive impact, at the total portfolio level (+6.7%) (the grey bar running throughout the chart below), with the strongest reactions from sustainable infrastructure, sustainable listed equities and sustainable private equity (up to +33%, 19% and 9%, respectively).

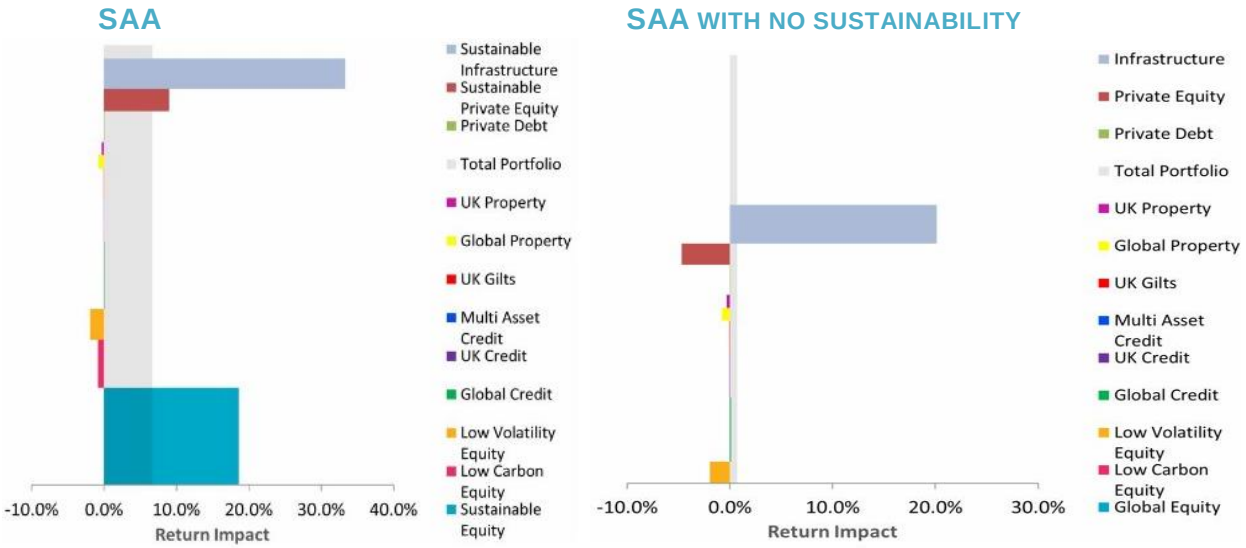
The illustrative SAA with no sustainability allocations experiences only a +0.7% total portfolio impact, largely driven by a positive outcome in infrastructure (+20%). This infrastructure upside is linked to the generally positive economic environment and the fact that infrastructure, even in its non-sustainable form, is already more sustainability aligned than the other asset classes. This test demonstrates the EAPF's potential performance

[1] Cognitive biases can lead to systematic failures in rational judgments; and, cognitive dissonance may impede the ability to manage weak signals (Mark Carney, Governor of Bank of England, speech "*A Transition in Thinking and Action*, 6 April 2018"). As such, modelling short-term shock events can help to engage with investors on decision-making in the face of climate shocks.

[2] The Climate Action Tracker currently estimates +3.3˚C warming by 2100 based on current policies. A sudden shift could result from what some observers call an "inevitable policy response" – a forceful and urgent closing of the policy gap required to reach the 2˚C scenario by 2100. Source: https://www.unpri.org/climate-change/the-inevitable-policy-response-to-climate-change/3578.article

advantage from its climate aligned investment strategy when assuming a 2ºC outcome (which still represents a doubling of emissions compared with today).

STRESS TEST #1, LOW CARBON TRANSITION: TOTAL PORTFOLIO AND ASSET CLASS IMPACT (POINT IN TIME IMPACT <1 YEAR)



Stress test #2 – moving to a slightly warmer 4ºC path with greater market awareness of physical risks emerging

The second part of the analysis addresses the physical risks question and stress tests a view where the market becomes more aware about higher physical damages while moving to a slightly higher carbon scenario.

To do this we "shock" the model by moving:

- **From the base case:** Pathway of 3.3ºC, as per the Climate Action Tracker (by assigning 20% probability on 2ºC scenarios + 20% probability on 3ºC scenario + 60% probability on 4ºC scenario). This view also assumes that 20% of climate change information is priced-in by the markets.
- **To a future case:** Pathway of 4ºC (i.e. 100% probability of a 4ºC scenario) with 80% of climate change information priced-in by the markets. We assume 17% loss in global GDP by 2100 under a 4ºC scenario.[3]

Under the physical risks stress test, the EAPF SAA shows resilience of returns, with limited downside as the allocation to fixed income remains largely unresponsive to climate change modelling shocks. Asset class returns suffer almost equally regardless of their sustainability alignment (as demonstrated by results for the illustrative portfolio with no sustainability allocations). Assuming even higher physical damages has little impact on total portfolio returns, demonstrating resiliency in returns[4].

The total impact on the SAA portfolio (grey bar running throughout) is -2.2% under this stress test. Equities and real assets show the strongest negative reactions. The SAA's sustainable infrastructure, sustainable private equities and listed equities experience a -

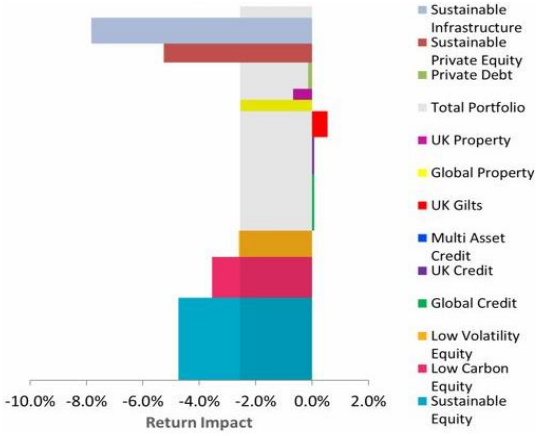
[3] Based on bottom-up inputs for three major 'perils' – coastal flooding, wildfire and agriculture
[4] We do not report further on this, given the similarity in returns across physical damage assumptions.

7.8%, -5.3% and a -4.7% drop in returns, respectively. Fixed income remains largely unresponsive to climate change modelling shocks.

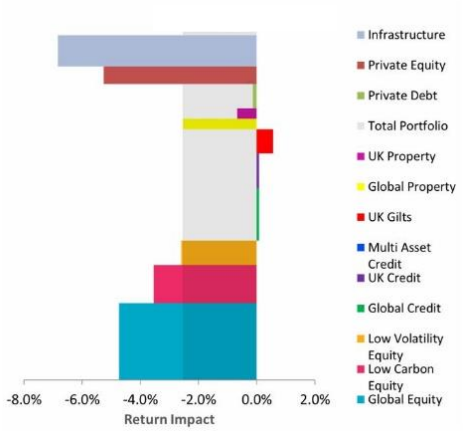
The total impact on the illustrative SAA with no sustainability is -2.6% under this stress test. Therefore, the SAA portfolio outperforms the SAA portfolio with no sustainability, although the difference is marginal at 0.4%. Equities and real assets show the strongest negative reactions. Infrastructure, private equity and listed equities experience a -6.8%, -5.3% and a -4.7% shock, respectively.

STRESS TEST #2, PHYSICAL RISKS: TOTAL PORTFOLIO AND ASSET CLASS IMPACT (POINT IN TIME IMPACT <1 YEAR)

SAA



SAA WITH NO SUSTAINABILITY



The following section provides recommendations for EAPF, in continuing to pursue its role as a “Climate Aware Future Maker”.

7

Recommendations

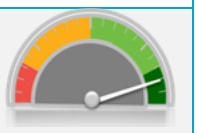
EAPF has sought to address climate change considerations by integrating them within exiting investment decision-making processes. This is consistent with Mercer's recommended approach to incorporating broader environmental, social, and governance (ESG) considerations into investment processes through an integrated model of Beliefs, Policies, Processes and Portfolio, as shown in the diagram below.

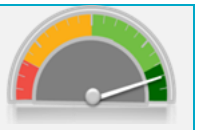
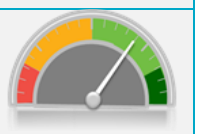
RESPONSIBLE INVESTMENT PATHWAY FRAMEWORK

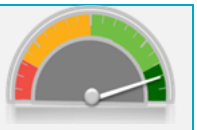
This report's suggested actions have been put forward to assist the EAPF in continuing its role as a "Climate Aware Future Maker".

The table below captures the EAPF's status for a set of suggested actions grouped by Beliefs, Policy, Processes and Portfolio. A dashboard indicator provides a visual summary, with all categories either in progress or best practice.

EAPF RECOMMENDATIONS IN FOUR-STEPS

Activity type		EAPF Position and Suggested Actions	EAPF Status
1.BELIEFS	**Investment Beliefs**	**EAPF has established and developed a set of investment beliefs that include its approach to managing climate change risks and opportunities.** EAPF believes that climate change represents a systemic risk, with financially material implications and that it should be considered in order to secure the long-term returns of the fund. **Suggested Actions:** The EAPF should continue to review and update its beliefs on a regular basis.	 **Best practice**

2. POLICIES	**Investment Policies**	**EAPF has a well-developed and publicly available stand-alone policy to address the impacts of climate change. EAPF reviewed its investment policy on managing climate change risks in October 2017.** Climate change considerations are included in other relevant policies such as the Investment Strategy Statement, Responsible Investment policy etc. **Suggested Actions:** The EAPF should continue to review and update its climate change policy on a regular basis, to ensure it remains up to date with the latest scientific thinking and policy direction. Beyond the mitigation targets already in place, EAPF could consider adaptation targets to improve resiliency. For example, the percentage of investments targeting adaptation opportunities.	 **Best practice (in mitigation)**
3. PROCESSES	**Portfolio Specific**	**There is a strong focus on integrating climate change considerations within current investment processes.** The management of climate change risks and opportunities is reported to members on an annual basis within the annual report and accounts for the Fund. Reporting is in line with TCFD recommendations across the four thematic pillars: • Governance – Policy to Address the Impacts of Climate Change • Strategy – using the Mercer Investing in a Time of Climate Change strategy modelling to inform decisions • Risk Management – collaborative engagement and involvement in the Transition Pathway Initiative ('TPI') • Metrics and Targets – carbon and environmental footprinting, fossil fuel reserve monitoring, private market monitoring The Fund has committed to annual reporting under the Principles for Responsible Investment (PRI). This includes an annual "Climate Transparency Report" that maps PRI disclosures against the recommendations of the TCFD. **Suggested Actions:** EAPF has made significant progress in reporting its climate change approach to members and other stakeholders, and we would encourage further action to continue to develop a systematic and integrated approach to reporting. This would help demonstrate the climate change 'impact' of the Fund, particularly for the sustainable portion of assets. Continue to develop climate change reporting with an increasing focus on adaptation and resiliency actions taken by the EAPF. Also increase the focus on member engagement and climate change education. Continue to engage with managers and companies for greater climate change related disclosure.	 **In Progress**

	Systemic (Market-Wide)	**EAPF is an active member of several collaborative industry initiatives to engage with companies, policymakers, access ongoing education and share best practices.** The EAPF co-founded the TPI. EAPF is also party to the following initiatives, amongst others: Carbon Tracker Initiative, CDP, Institutional Investor Group on Climate Change ('IIGCC'), Climate Action 100+. As a recognised leader, EAPF proactively supports other funds. **Suggested Actions:** EAPF should continue to monitor and engage with the evolving landscape of climate change industry initiatives, to ensure its continued role as a "Climate Aware Future Maker". EAPF should set clearer engagement goals (for example around AGM activity, number of collaborations) and report against these. EAPF should continue to develop its reporting on the positive impact of its sustainable investments. This can include the incorporation of adaptation targets, beyond the mitigation targets already in place. EAPF should look to improve investors understanding of climate change risks and opportunities. Undertaking a climate change resiliency project may be one way to achieve this. This could explore the proportion of real assets with insurance coverage or infrastructure projects that consider the long-term physical risks posed by climate change, as well as the proportion of equities (private or listed) invested in adaptation/resiliency solutions, for example.	 **Best practice (in mitigation)**

Portfolio recommendations

This report has analysed climate change risks at the investment strategy level, using the Mercer STIR factors. This provides an updated understanding for 2019, with Mercer having partnered with the EAPF on climate change risk analysis since 2010, with input into ongoing strategic investment reviews.

We would in particular recommend EAPF continues to explore the creation of sustainable allocations in the strategic allocation. This would include exploring the creation of a sustainable Multi-Asset Credit fund, by investigating best practice ESG integration and sustainable opportunities across relevant fixed income sleeves, in collaboration with Brunel Pension Partnership.

This below table provides further detail on portfolio recommendations.

Asset Class	Integration	Stewardship	Investment	Screening (including decarbonisation)
Equities and Fixed Income	- Managers continue to be assessed for their integration of climate change risks and opportunities into the investment process. The approach to manager monitoring by EAPF is rigorous, including quarterly monitoring reports and annual review meetings. - The level of ESG integration is monitored by EAPF through both its own assessment as well as the use of Mercer's ESG ratings. - Carbon and environmental footprinting, and fossil fuel reserve exposure are analysed and monitored annually. - Managers are proactively engaged to continually improve ESG integration, including climate change. **Suggested actions:** - Continue to encourage managers in ESG integration, drawing from evolving industry best practice.	- EAPF uses its annual carbon and environmental footprinting assessment to help identify companies for engagement activity by its investment managers, including targeting companies for lack of disclosure within company reporting in order to encourage greater disclosure of climate change related information (such as level of CO_2 emissions and water usage). - EAPF proactively encourages its investment managers to engage with underlying portfolio companies and monitors the effectiveness of engagement activity undertaken on its behalf. - In 2018, EAPF joined an engagement between Royal Dutch Shell and a leadership group of institutional investors on behalf of the global investor initiative Climate Action 100+. **Suggested actions:** - Continue to develop stewardship reporting for members.	EAPF has set itself the target to invest 17% of the Fund in low carbon, energy efficient and other climate change opportunities and 33% of the Fund in clean technology and other sustainable opportunities across all asset classes. EAPF has introduced the following sustainable investment positions: - An allocation to sustainable equities - Introduced a strategic allocation to sustainable real assets - Shifted its market-cap passive exposure to a low carbon approach - Introduced a private equity Target Opportunities Portfolio expected to benefit from opportunities related to a shift to a low carbon economy - Decarbonised the low volatility equity portfolio - Developed and introduced a sustainable value equity fund **Suggested actions:** - Continue to monitor and assess whether total Fund low carbon and sustainable allocation targets continue to be appropriate. - Explore the creation of a sustainable Multi-Asset Credit fund, by investigating best practice across relevant fixed income sleeves. - Incorporate impact reporting metrics to communicate to stakeholders.	- EAPF continues to monitor progress against the goal to "Decarbonise the equity portfolio, reducing our exposure to 'future emissions' by 95 per cent for coal and 90 per cent for oil and gas by 2020, compared to the exposure in our underlying benchmark as at 31 March 2015". - Carbon intensity and fossil fuel reserve analysis continues to highlight exposure to high (carbon) intensity companies and reserves. - EAPF has reduced its carbon footprint in equities since 2008 and in corporate bonds over time. **Suggested actions:** - Continue to engage managers and companies towards greater disclosure on carbon and environmental data.

Asset Class	Integration	Stewardship	Investment	Screening (including decarbonisation)
Real Assets	- EAPF encourages its underlying property funds to participate in the Global Real Estate Sustainability Benchmark (GRESB). In 2018, 11 of its investments received Green Star status. **Suggested actions:** - Continue to encourage managers in best practice ESG integration.	- EAPF encourages its real asset manager to proactively engage underlying portfolio managers and companies. **Suggested actions:** - Continue to engage with managers on resiliency of assets.	(Please see actions highlighted in Equites and Fixed Income.)	- EAPF monitors real asset manager carbon and environmental reporting where available. **Suggested actions:** - Continue to engage managers and companies for greater disclosure on carbon and environmental data.

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Lucy Tusa
Kate Brett
Hill Gaston
September 2019

Appendix:
Mercer's Climate Change Methodology Overview

The Mercer climate change scenario model isolates transition and physical risk factors and maps the relative impact of those risk factors under three climate change scenarios. The Mercer climate change scenario modelling estimates a 'climate change impact on return', which is in addition to the returns currently expected for asset classes and industry sectors in the future. An overview of the methodology is shown in the diagram below.

Further detail on the study is provided in the rest of this section.

Climate Change Scenarios

Three climate change scenarios have been developed in the study, each reflecting different climate change policy ambitions that result in varying CO_2 emissions pathways and levels of economic damages related to climate change. These have been developed using existing climate change models (Cambridge Econometric's E3ME model) and through an extensive literature review. The three scenarios used in the modelling are outlined below.

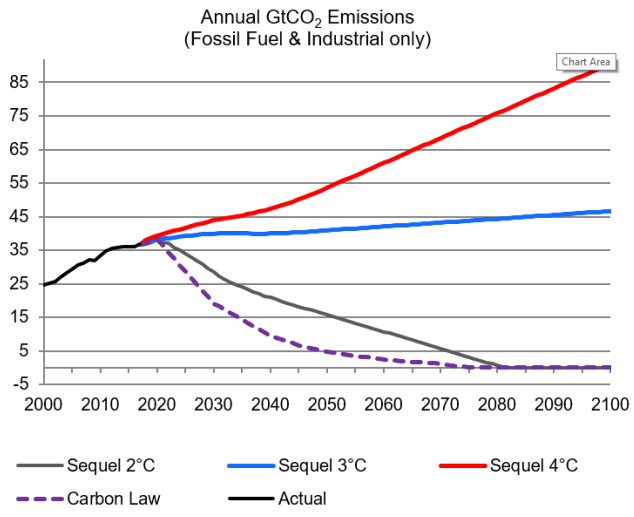
1. **2ºC scenario:** a low carbon economy transformation most closely aligned with both successful implementation of the Paris Agreement's ambitions and the greatest chance of lessening physical damages
2. **3ºC scenario:** some climate change action but a failure both to meet the Paris Agreement 2ºC objective and meaningfully alleviate anticipated physical damages
3. **4ºC scenario:** reflecting a fragmented policy pathway where current commitments are not implemented and there is a serious failure to alleviate anticipated physical damages

CLIMATE CHANGE SCENARIO TRANSITION MILESTONES AND PHYSICAL DAMAGE MILESTONES, TO 2050 AND 2100

	Transition	Physical Damages
Current	Fossil Fuels are 80% of the energy mix	Temperature is 1°C above preindustrial levels
	80% of emissions not covered by carbon pricing	Sea level rise of 22cm
	3.3 million electric vehicles on the road	Half the Great Barrier Reef has been bleached
2°C	Emissions peak in 2020 & fall to 'net zero' by 2080	1.7°C hotter by 2050 & 50% chance of 2°C by 2100
	Aggressive phase out of coal; Global oil demand down by 33% by 2050	Sea level rise of 50cm
	New vehicle sales are 50% electric & 25% LPG by 2050	Av. max daily temp is 2.6°C > & droughts 4mths longer
3°C	Emissions are flat to 2050	1.9°C hotter by 2050 and a 3.2°C by 2100
	Coal use maintained, but limited growth; Heavy reliance on gas as 'transition fuel'	Sea level rise of 58cm
	New vehicle sales are 37% electric and 35% LPG by 2050	Physical damages irreversible (e.g. sea ice) and 30% less water availability
4°C	Emissions increase by 49% by 2050	2°C hotter by 2050 and 3.9°C by 2100
	Fossil fuels are 84% of primary energy by 2050	Sea level rise of 70cm
	Power generation is 25% renewable by 2050	50% less water availability and strongest hurricanes increase by 80%

The figure below illustrates the emissions trajectory for the three Sequel scenarios.

EMISSIONS PATHWAYS FOR CLIMATE CHANGE SCENARIOS



Cumulative Carbon Emissions (2018 – 2100)

Scenario	$GtCO_2$
Sequel 2°C	1,100
Sequel 3°C	3,500
Sequel 4°C	5,100
Global Carbon Law	650

Emissions in the last decade: 350 $GtCO_2$

NOTE: the CO_2 emissions shown on the graph and above do not include land-use related emissions which are currently about 5 $GtCO_2$ annually, which must also reach net-zero or below, nor does it include the CO_2 equivalent of other GHGs. For context, the total GHG emissions in 2010 were 49 GtCO2eq.

Cambridge Econometrics did not model land use CO_2 emissions and other GHG emissions.

The longer policymakers, companies and investors delay, either:

a) the less likely we will stay below the 2ºC target; or

b) the more rapid the transition to a low carbon economy and, ultimately, a zero-carbon economy will need to be.

Sudden changes are more likely to be disruptive than an "orderly" transition. A delayed "catch up" to achieve the carbon budget (the amount of carbon that can be produced to stay within agreed warming limits) would also require the removal of carbon from the atmosphere, which would require significant areas of land and water to implement afforestation (new forests), reforestation (replacement forests), and carbon capture and storage, which requires technologies/processes that have not yet been fully commercialised.

The Sequel's 2ºC scenario represents a 50% chance of staying below 2ºC. Given the physical risks associated with warming above 2ºC, this is not the preferred target. To have a 66% chance of staying below 2ºC, emissions would have to decline more rapidly; for example, in a trajectory known as the global carbon law[5], which would see emissions peaking in 2020 and halving every decade thereafter. The "carbon law" concept is based on Moore's Law in the computer industry, applied to cities, nations and industrial sectors that would ensure the greatest efforts to reduce emissions happen sooner, not later, and reduces the risk of exceeding the remaining global carbon budget to stay well below 2ºC.

Risk Factors

In order to consider the impact on investment returns and volatility under the different climate change scenarios, Mercer identified four climate change risk factors that can be used to translate each of the climate change scenarios (based on the outputs of the climate change modelling and literature review) into the language of investments.

The climate change risk factors identified in the 2015 Report were deemed the climate-change-specific factors most relevant for investors. This approach was reinforced by the 2017 Task Force on Climate-Related Financial Disclosures (TCFD) recommendations that emphasised the differential nature of transition and physical risks.

The "STIR" risk factors for the Sequel are founded in the 2015 "TRIP" factors, with an evolved approach to the transition.

STIR Risk Factors

Transition factors – near-term

1. Spending: rate of investment spending to catalyse the transition to a low carbon economy
2. Transition: development of technology and low carbon solutions and climate change focused policy targets, legislation and regulations aiming to reduce the risk of further human-induced climate change

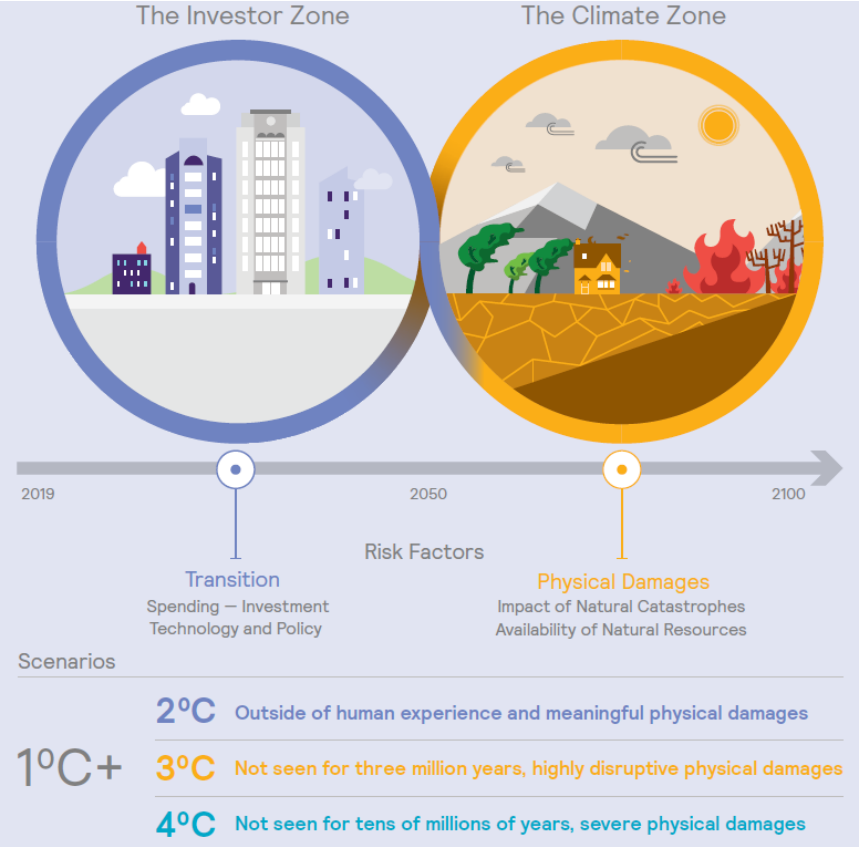
Physical risk factors – long-term

3. Impact of natural catastrophes: physical damages due to acute weather incidence/severity; for example, extreme or catastrophic events
4. Resource availability: long-term weather pattern changes — for example, in temperature or precipitation — impacting the availability of natural resources like water

[5] Rockström J, Gaffney O, Rogelj J et. al. "A Roadmap for Rapid Decarbonization," *Science*, Volume 355, Issue 6331 (2017), available at https://www.stockholmresilience.org/research/research-news/2017-03-23-curbing-emissions-with-a-new-carbon-law.html.

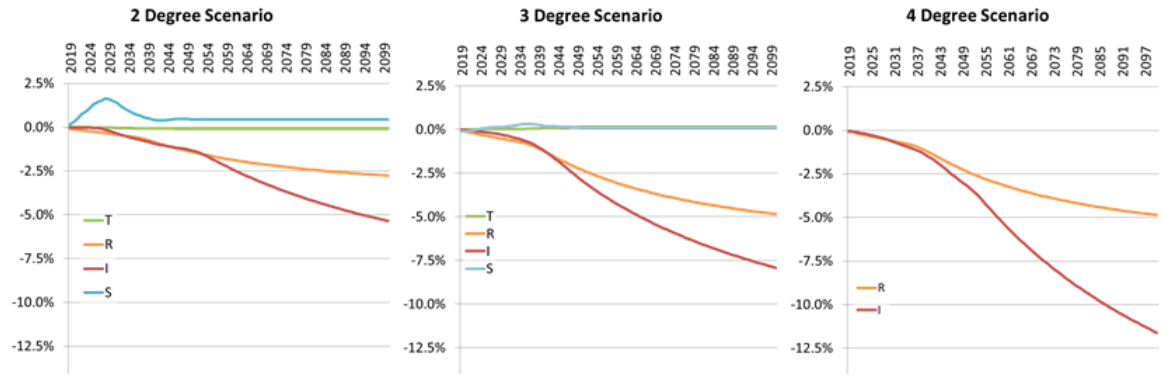
In the 2019 model, we have included a Spending factor to track investments in the low carbon resilient transition, not previously included within the 2015 model. The Transition factor has also been introduced in the 2019 model, incorporating policy and technology risks into a single factor, which were treated separately in the 2015 model. The Transition factor was split into T2 and T3 factors, to represent the fundamentally different pathways that would be required to achieve a 2ºC and a 3ºC scenario, respectively. This is an important distinction because sectors, in particular energy and utility sectors, will respond differently to these different pathways (e.g. in the extent to which coal is replaced and/or the role of gas as a transition fuel).

CLIMATE CHANGE RISK FACTORS OVER TIME



The relative overall cumulative impact on global GDP for each scenario for each risk factor is shown below, with S = spending, T= transition (2ºC and 3ºC versions — T2 and T3), I = impact of natural catastrophes and R= resource availability.

FIGURE 23. RISK FACTOR PATHWAYS — CUMULATIVE GDP IMPACTS BY SCENARIO



Calculating the Climate Change Impact on Return

The next stage is to consider how sensitive different investments are to the climate change risk factors. By combining the development of the STIR factors over time with the sensitivity of different investments to the STIR factors we are able to look at the potential impact of climate change on the Fund's investments. The following two modeling approaches are used to calculate climate change impact on return:

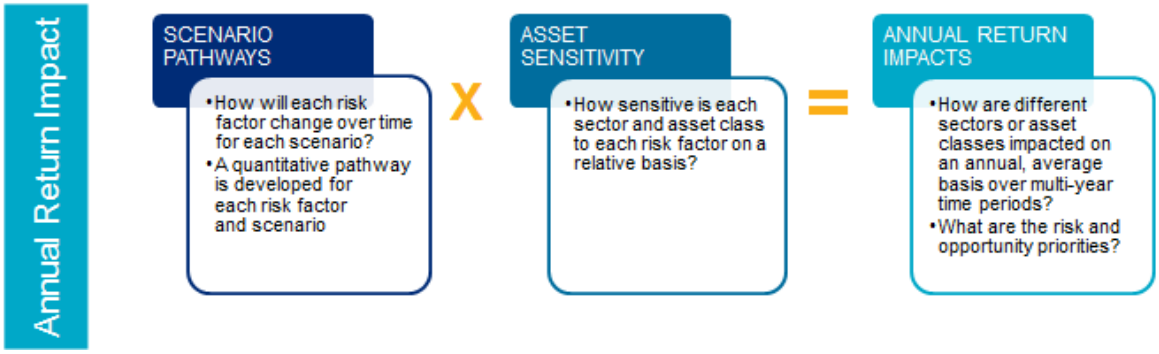
Modeling Approach 1: Annualised Return Impact Analysis (consistent with 2015)

Portfolio results are generated by calculating the average, annual climate change impact on return for different asset classes and industry sectors across the three scenarios, over different time periods (over 10 years, to 2050 and to 2100).

This return impact analysis is generated at three different levels:

1. At the total portfolio level to better understand the impacts of climate change in aggregate for the portfolio as a whole.
2. At the asset class level to better understand how different asset classes might react more or less favourably to climate change risks and opportunities.
3. At the sector level to better understand the portfolio's equity sector exposures (as compared with a benchmark) and how climate change risks and opportunities can impact on sector-specific returns.

ANNUAL RETURN IMPACT ANALYSIS INPUTS AND OUTPUTS



Modeling Approach 2: Stress-Testing Analysis

Climate change science, and in particular the modelling of physical risks, has repeatedly shown a propensity to severely underestimate climate change impacts. Stress testing is therefore important in testing portfolio resilience in light of sudden climate change-related shocks.

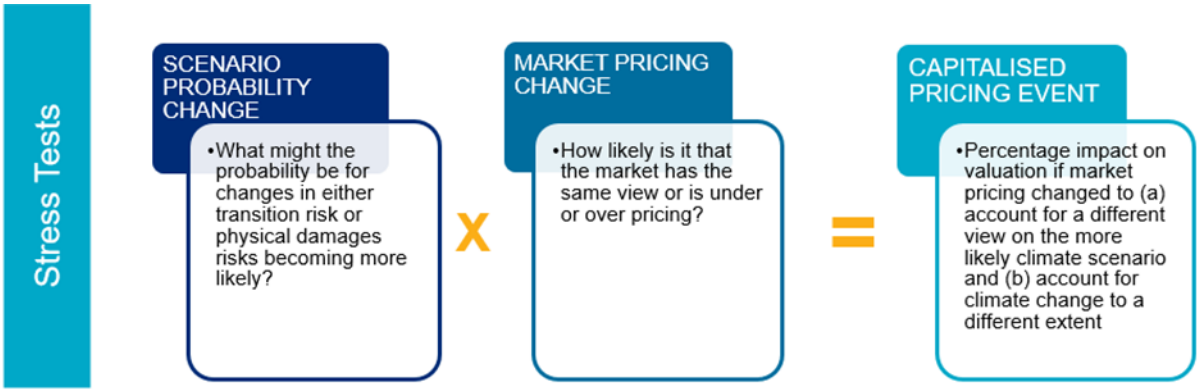
Stress testing is a new addition to the Mercer model for 2019 to consider how longer-term return impacts could manifest as shorter-term climate change-related market repricing events. These tests translate multiple annualised return impacts into a single short-term event (over a period of less than one year). Sudden onset events are a more likely eventuality from the climate change perspective, as compared with neat annual averages traditionally modelled – such as, following sudden policy shifts regulating against the use of fossil fuels, or natural disasters.

Climate change stress tests are driven by a change in view on:

- scenario probabilities (i.e. what if the probability of a 2ºC scenario increased);
- market pricing (i.e. changing how much climate change information is priced in by the market); and/or
- physical damages

We note that in reality, global market awareness of climate change is unlikely to be uniform. For example, investors in real assets may be more aware of physical risks, whilst investors in high carbon assets may be more aware of transition risks. In particular, investors in coal and renewables, for example, are likely to have a much stronger sensitivity to the low carbon transition than the market as a whole, as first order beneficiaries and losers.

STRESS TEST INPUTS AND OUTPUTS



Asset Class Sensitivities

Asset class returns can vary significantly by scenario. Variations in results between asset classes, and sustainable allocations, pose portfolio construction considerations for investors. These responses can be summarised by the climate change risks and opportunities presented in the below table.

	Opportunities	Risks
Equities	- The government stimulus to achieve a 2ºC scenario creates an opportunistic investment environment in the near-term - Emerging market equities expected to benefit from climate finance support	- Expected to be less negatively impacted by transition risks than anticipated in 2015, with better capturing of the opportunities - The government will need to service stimulative debt, in the long-term
Real assets	- Positive exposure to renewable assets in infrastructure allocations - Low carbon adaptive solutions will benefit strongly from stringent climate	- Greatest negative sensitivity to the impact of physical damages and resource availability - More-stringent climate change policy (and investment in technology) is likely to

	change policy (and investment in technology). - In infrastructure, the transition would drive an extended period of economic transformation and investment	reduce the value of some assets that are less-advanced or unable to adapt
Bonds	- Climate risk hedging: we do not expect developed market sovereign bonds to be sensitive to the climate change risk factors at an aggregate level	- Emerging market debt and high yield debt are most sensitive to climate change risk factors - We now expect the depressive macroeconomic effect of climate change to lead to interest-rate decreases and price and return increases in most debt asset classes irrespective of scenario.

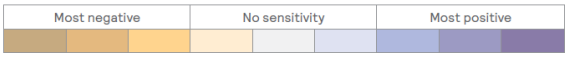
The below figures show the relative reactions of traditional and sustainable asset classes to the STIR climate change risk factors using a heatmap framework.

RELATIVE SENSITIVITIES OF DIFFERENT ASSET CLASSES – TRADITIONAL ASSETS AND SUSTAINABLE ASSETS

Sector Sensitivities – equities only

Physical risk sensitivity is most negative for utilities and energy, but some sensitivity is relatively widespread across sectors, including industrials, telecoms, financials, and consumer staples and consumer discretionary. Water utilities also experience a strong negative outcome to resource availability, as a result of declining water reliability in the face of climate change. We expect physical risks to scale up towards the end of the century, though efforts to build portfolio resilience and safeguard future assets should begin now.

Equity industry/subsector	S	T2	T3	I	R
Energy					
Oil and gas					
Coal					
Utilities					
Renewables utilities					
Electric utilities					
Gas utilities					
Multi-utilities					
Water utilities*					
Materials					
Forestry and logging					
Industrials					
Consumer discretionary					
Consumer staples					
Crops and animals					
Health					
Financials					
IT					
Telecoms					
Real estate					



Study highlights: combining the scenarios and risk sensitivity

1. The results emphasize the physical damages risks and why a below 2ºC scenario is most beneficial, and the 4ºC and 3ºC scenarios are to be avoided, from a long-term investor perspective.

2. Transition opportunities emerge from a 2ºC scenario, with transition now expected to be a benefit from a macroeconomic perspective, including the potential to capture a "low-carbon transition (LCT) premium." Although a 2ºC scenario definitely still presents transition risk (especially for portfolios aligned to a 3ºC or 4ºC+ world), opportunistic investors can target investment in the many mitigation and adaptation solutions required for a transformative transition.

3. Expected annual return impacts remain most visible at an industry-sector level, with significant variations by scenario, particularly for energy, utilities, consumer staples and telecoms. Asset class returns can also vary significantly by scenario, with infrastructure, property and equities being the most notable. Variations in results between asset classes and across regions, cumulative impacts, and the emphasis on sustainable opportunities provide multiple portfolio construction possibilities for investors.

4. In reality, sudden changes in return impacts are more likely than neat, annual averages, so stress testing is an important tool in preparing for this eventuality. Stress testing portfolios for changes in view on scenario probability, market awareness and physical damage impacts can help investors to consider how longer-term return impacts that may appear small on an annual basis could emerge as more-meaningful shorter-term market repricing events.